



DOCUMENT NUMBER AND REVISION

(FFPL2WHNG-06-UL-NSC)

DOCUMENT TITLE:
**SPECIFICATION
OF
LCD MODULE TYPE**

CUSTOMER	
MODEL NUMBER	JM24064A6WLW
CUSTOMER APPROVAL	
DATE	

DEPARTMENT	NAME	SIGNATURE	DATE
PREPARED BY	LIANG YUN		
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A	2008.03.19	First Release.	LIANG YUN	JIANG WEN RONG



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Specification of LCD Module Type Item No.: JM24064A6WLW

1. General Description

- 240 x 64 Dots FSTN Positive Transflective Graphic LCD Module.
- Viewing Angle: 6:00 O'clock direction.
- Driving duty: 1/96 Duty, 1/(10.7) bias.
- 'ULTRACHIP' UC1608 or equivalent LCD controller. (COG)
- Power Supply: +3.0V.
- FPC.
- White Backlight (side LED).

2. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

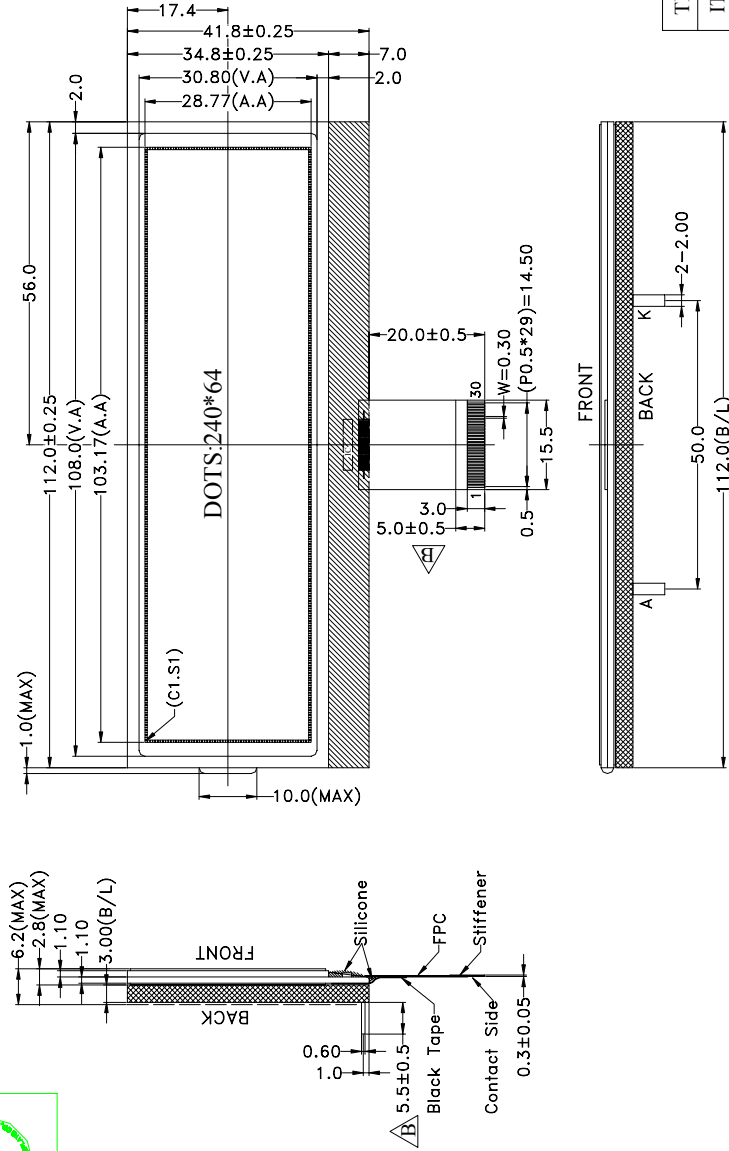
Table 1

Parameter	Specifications	Unit
Outline dimensions	113.0 (L) x 41.8(W) x 6.2MAX. (H)(Exclude FPC)	mm
	113.0 (L) x 41.8(W) x 6.2MAX. (H)(Include FPC)	
Viewing area	108.0(L) x 30.80(W)	mm
Display format	240 x 64	dots
Dot size	0.40(L) x 0.42(W)	mm
Dot spacing	0.03(L) x 0.03(W)	mm
Dot pitch	0.43(L) x 0.45(W)	mm
Weight:	TBD	grams



ISSUE	MODIFY DESCRIPTION	DATE
A	首次版本	05.08.20
B	修改FPC补强板及背光A、K脚长度	05.11.01

禁止晶华环境管理物质



FPC ASSIGNMENT:

1	NC	16	D5
2	NC	17	D4
3	NC	18	D3
4	NC	19	D2
5	VBI-	20	D1
6	VBI+	21	D0
7	VBI0-	22	WR1
8	VBI0+	23	WR0
9	VLCD	24	CD
10	VBIAS	25	RST
11	VSS	26	NC
12	VDD2,3	27	CS
13	VDD	28	BM0
14	D7	29	BMI
15	D6	30	NC

TITLE	Module Speciality		
ITEM NO:	JM24064A6WLW		
PROJECT NO:			
DESCRIPTION:	JM24064A6WLW		
TOLERANCE UNLESS:	X.X ± 0.3		
OTHERWISE SPECIFIED:	X.XX ± 0.2		
THIRD ANGLE PROJECTION			
NAME	SIGN	DATE	
DRAWN	Lan li juan	05.11.01	
CHECKED	Jiang wen rong		
APPROVED	Wang zhao cai		
REV: B	UNIT: mm	SCALE: 1/1	SHEET: 1 OF 1

Display Type	FSTN/TRANSFLECTIVE/POSITIVE
Display Resolution	DOTS:240*64
Viewing Angle	6:00
Max Ratio and Bias Level	1/96 DUTY, 1/(10.7) BIAS
LCD Controller/Driver	UC1608(COG)
Logic Voltage	3.0V
LCD Driving Voltage	11.3V
Operation Temperature	-20° C TO 70° C
Storage Temperature	-20° C TO 70° C
Backlight Speciality	LED SIDE(White)
Remark	

JHD CO LTD

Figure 1: Module Specification



3. Interface signals

Table 2

Pin No.	Symbol	Description
1	NC	No connection.
2	NC	No connection.
3	NC	No connection.
4	NC	No connection.
5	VB1-	LCD Bias Voltages. These are the voltage source to provide SEG driving currents. These voltages are generated internally. Connect capacitors of CBX value between VBX+ and VBX-.
6	VB1+	
7	VB0-	The resistance of these four traces directly affects the SEG driving strength of the resulting LCD module. Minimize the trace resistance is critical in achieving high quality image.
8	VB0+	
9	VLCD	Power supply for driver LCD.
10	VBIAS	Power supply.
11	VSS	Ground (0V).
12	VDD _{2,3}	VDD _{2,3} is the analog VDD and it should be connected to the same power source. VDD
13	VDD	Power supply for logic.
14	D7	Bi-directional bus for both serial and parallel host interfaces. In 4-bit bus mode, connect unused pins to VDD or VSS.
15	D6	
16	D5	
17	D4	
18	D3	
19	D2	
20	D1	
21	D0	
22	WR1	WR [1:0] controls the read/write operation of the host interface.
23	WR0	In parallel mode, WR [1:0] meaning depends on whether the interface is in the 6800 modes or the 8080 modes.
24	CD	Select Command or Display Data for read/write operation. "L": Command "H": Display data
25	RST	When RST="L", all control registers are re-initialized by their default states. Since UC1608 has built-in Power-ON-Reset and Software Reset command, RST pin is not required for proper chip operation. When RST pin is used, insert a 5~10K Ohm resistor to improve noise filtering. When RST is not used, connect the pin to VDD.
26	NC	No connection.
27	CS	Chip Select. The chip is selected when CS="H". When the chip is not selected, D [7:0] will be high impedance.
28	BM0	Parallel/Serial.
29	BM1	4-bit bus modes: "LL": 8080 "LH": 6800 8-bit bus modes: "HL": 8080 "HH": 6800
30	NC	No connection.



4. Absolute Maximum Ratings

4.1 Electrical Maximum Ratings (Ta = 25 °C)

Table 3

Parameter	Symbol	Min.	Max.	Unit
Supply voltage (Logic)	VDD, VDD2, 3	-0.3	+4.0	V
Supply voltage (LCD drive)	VLCD	-0.3	+17.0	V
Input voltage	Vin	-0.4	VDD+0.5	V

Note:

The modules may be destroyed if they are used beyond the absolute maximum ratings.

All voltage values are referenced to VSS = 0V.

4.2 Environmental Condition

Table 4

Item	Operating Temperature (Topr)		Storage Temperature (Tstg)		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	-20°C	+70°C	-20°C	+70°C	Dry



5. Electrical Specifications

5.1 Typical Electrical Characteristics

At $T_a = 25\text{ }^\circ\text{C}$, $V_{DD} = 3.0\text{V} \pm 0.1\text{V}$, $V_{SS} = 0\text{V}$.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	VDD-VSS		2.9	3.0	3.1	V
Supply voltage (LCD)	VLCD	VDD = +3.0V, Note 1	10.9	11.3	11.7	V
Input signal voltage	V _{IH}	“H” level	0.8VDD	-	-	V
	V _{IL}	“L” level	-	-	0.2VDD	V
Supply Current (Logic & LCD)	IDD	Note 1	-	0.7	1.0	mA
Supply voltage for backlight	VLED	Forward current =90mA; $L_v \geq 120\text{cd/m}^2$	3.8	4.0	4.2	V

Note 1: There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.



5.2 Timing Specifications

At $T_a = -20^{\circ}\text{C}$ To $+70^{\circ}\text{C}$, $V_{DD} = +3.0\text{V} \pm 0.1\text{V}$, $V_{SS} = 0\text{V}$.

Refer to Fig. 2, the bus-timing diagram for 8080 MCU.

Table 6

Symbol	Signal	Description	Condition	Min.	Max.	Units
t_{AS80} t_{AH80}	CD	Address setup time Address hold time		0 10	–	ns
t_{CY80}		System cycle time 8 bits bus (read) (write) 4 bits bus (read) (write)		140 140 80 80	–	ns
t_{PWR80}	WR1	Pulse width 8 bits (read) 4 bits		65 35	–	ns
t_{PWW80}	WR0	Pulse width 8 bits (write) 4 bits		65 35	–	ns
t_{HPW80}	WR0, WR1	High pulse width 8 bits bus (read) (write) 4 bits bus (read) (write)		65 65 35 35	–	ns
t_{DS80} t_{DH80}	D0~D7	Data setup time Data hold time		30 10	–	ns
t_{ACC80} t_{OD80}		Read access time Output disable time	$C_L = 100\text{pF}$	– 10	50 50	ns
t_{CSSA80} t_{CSSD80} t_{CSH80}	CS	Chip select setup time		10 10 20		ns

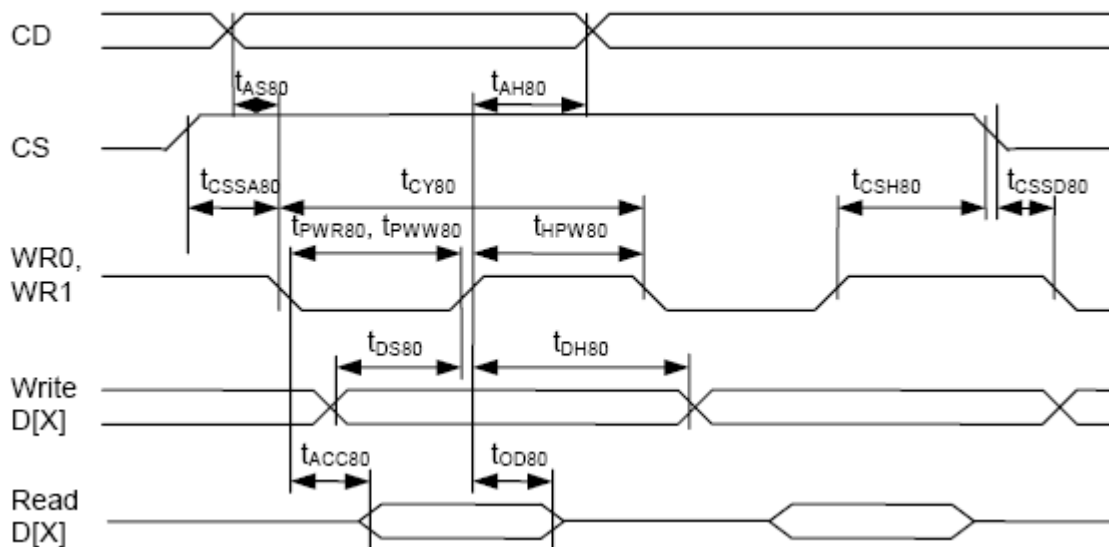


Figure 2: Parallel Bus Timing Characteristics (for 8080 MCU)



At $T_a = -20^{\circ}\text{C}$ To $+70^{\circ}\text{C}$, $V_{DD} = +3.0\text{V} \pm 0.1\text{V}$, $V_{SS} = 0\text{V}$.

Refer to Fig. 3, the bus-timing diagram for 6800 MCU.

Table 7

Symbol	Signal	Description	Condition	Min.	Max.	Units
t_{AS68} t_{AH68}	CD	Address setup time Address hold time		0 10	–	ns
t_{CY68}		System cycle time 8 bits bus (read) (write) 4 bits bus (read) (write)		140 140 80 80	–	ns
t_{PWR68}	WR1	Pulse width 8 bits (read) 4 bits		65 35	–	ns
t_{PWW68}		Pulse width 8 bits (write) 4 bits		65 35	–	ns
t_{LPW68}		Low pulse width 8 bits bus (read) (write) 4 bits bus (read) (write)		65 65 35 35	–	ns
t_{DS68} t_{DH68}	D0~D7	Data setup time Data hold time		30 10	–	ns
t_{ACC68} t_{OD68}		Read access time Output disable time	$C_L = 100\text{pF}$	– 10	50 50	ns
TCSSA68 TCSSD68 TCSH68	CS	Chip select setup time		10 10 20		ns

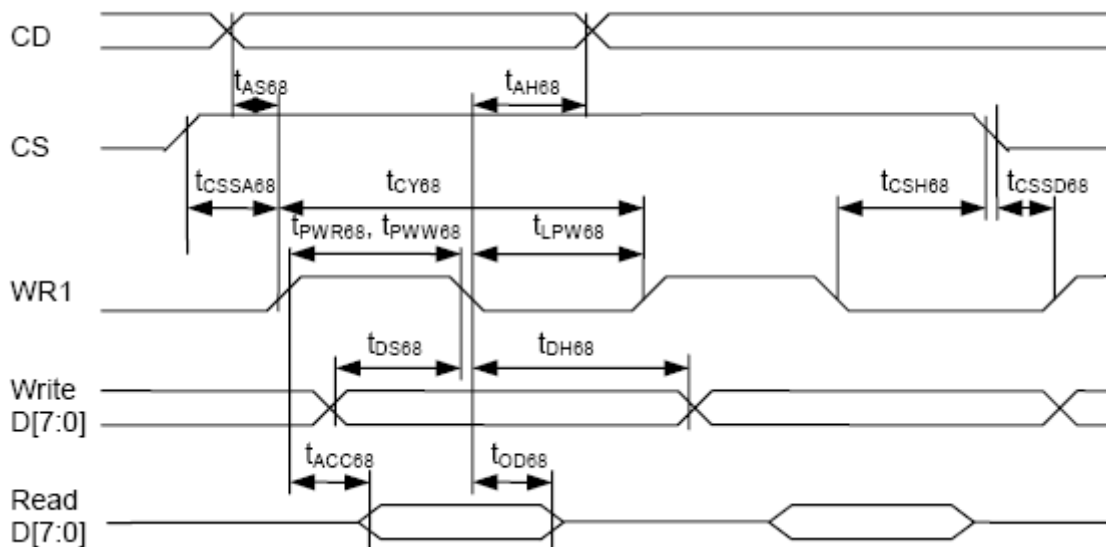


Figure 3: Parallel Bus Timing Characteristics (for 6800 MCU)



At $T_a = -20^{\circ}\text{C}$ To $+70^{\circ}\text{C}$, $V_{DD} = +3.0\text{V} \pm 0.1\text{V}$, $V_{SS} = 0\text{V}$.

Refer to [Fig.4](#), the bus-timing diagram for Reset timing.

Table 8

Symbol	Signal	Description	Condition	Min.	Max.	Units
t_{RW}	RST	Reset low pulse width		1000	–	ns

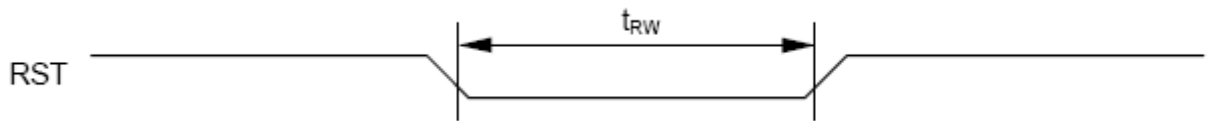


Figure 4: Reset timing



5.3 Instruction Table

Table 9

C/D: 0: Control, 1: Data
W/R: 0: Write Cycle, 1: Read Cycle
Useful Data bits
- Don't Care

	Command	C/D	W/R	D7	D6	D5	D4	D3	D2	D1	D0	Action	Default value
1	Write Data Byte	1	0	#	#	#	#	#	#	#	#	Write 1 byte	N/A
2	Read Data Byte	1	1	#	#	#	#	#	#	#	#	Read 1 byte	N/A
3	Get Status	0	1	BZ	MX	DE	RS	WA	GN 1	GN 0	1	Get Status	N/A
4	Set Column Address LSB	0	0	0	0	0	0	#	#	#	#	Set CA[3:0]	0
	Set Column Address MSB	0	0	0	0	0	1	#	#	#	#	Set CA[7:4]	0
5	Set Mux Rate and temperature compensation.	0	0	0	0	1	0	0	#	#	#	Set {MR, TC[1:0]}	MR: 1 TC: 0
6	Set Power Control	0	0	0	0	1	0	1	#	#	#	Set PC[2:0]	111b
7	Set Adv. Product Config. (double byte command)	0	0	0	0	1	1	0	0	0	R	For UltraChip only. Do not use.	N/A
		0	0	#	#	#	#	#	#	#	#		
8	Set Start Line	0	0	0	1	#	#	#	#	#	#	Set SL[5:0]	0
9	Set Gain and Potentiometer (double-byte command)	0	0	1	0	0	0	0	0	0	1	Set {GN[1:0], PM[5:0]}	GN=3 PM=0
		0	0	#	#	#	#	#	#	#	#		
10	Set RAM Address Control	0	0	1	0	0	0	1	#	#	#	Set AC[2:0]	000b
11	Set All-Pixel-ON	0	0	1	0	1	0	0	1	0	#	Set DC[1]	0=disable
12	Set Inverse Display	0	0	1	0	1	0	0	1	1	#	Set DC[0]	0=disable
13	Set Display Enable	0	0	1	0	1	0	1	1	1	#	Set DC[2]	0=disable
14	Set Page Address	0	0	1	0	1	1	#	#	#	#	Set PA[3:0]	0
15	Set LCD Mapping Control	0	0	1	1	0	0	#	#	#	#	Set LC[3:0]	0
16	System Reset	0	0	1	1	1	0	0	0	1	0	System Reset	N/A
17	NOP	0	0	1	1	1	0	0	0	1	1	No operation	N/A
18	Set LCD Bias Ratio	0	0	1	1	1	0	1	0	#	#	Set BR[1:0]	10b=12
19	Reset Cursor Mode	0	0	1	1	1	0	1	1	1	0	AC[3]=0, CA=CR	N/A
20	Set Cursor Mode	0	0	1	1	1	0	1	1	1	1	AC[3]=1, CR=CA	N/A
21	Set Test Control (double byte command)	0	0	1	1	1	0	0	1	TT		For UltraChip only. Do not use.	N/A
		0	0	#	#	#	#	#	#	#	#		

* Other than commands listed above, all other bit patterns may result in undefined behavior.



6. Quality Units

6.1.0 Purpose

This standard for quality assurance should define the quality of LCD module products to customer by JINGHUA DISPLAYS LTD.

6.2.0 Scope

This document defines general provisions as well as inspection standards for LCD module supplied by JINGHUA DISPLAYS LTD, except for those with special requirements from customer.

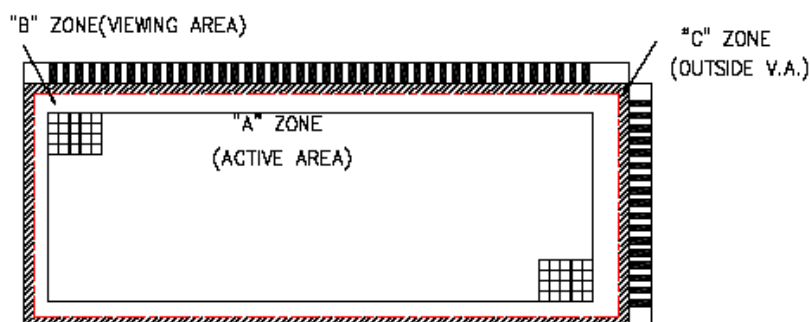
6.3.0 Definition

6.3.1 Definition of area

A Zone: Active area.

B Zone: Viewing area.

C Zone: Outside Viewing area.



6.3.2 Definition of size

Large size(L): Less than or equal to 1 Pcs / 7 " ×14 " unit glass.

Middle size(M): 2~6 Pcs / 7 " ×14 " unit glass.

Small size(S): more than 6 Pcs/7 " ×14 " unit glass.



6.4.0 Quality Specification

6.4.1 Conditions of Cosmetic Inspection

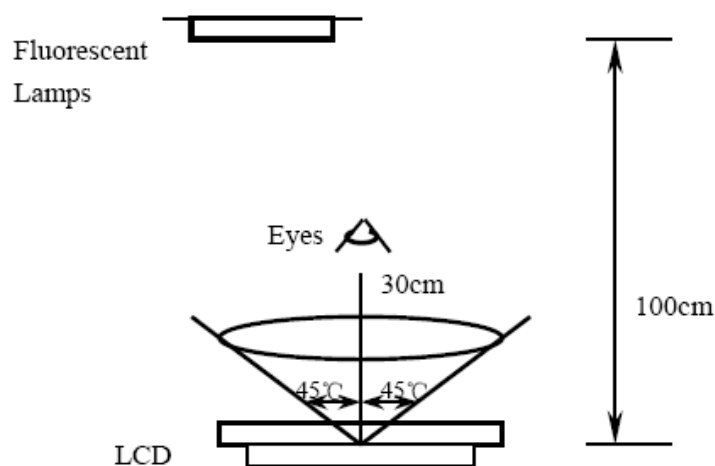
6.4.1.1 Tests should be conducted under the following conditions:

Ambient temperature: $22 \pm 5^{\circ}\text{C}$.

Ambient humidity: $65 \pm 20\%RH$.

Ambient Luminance: 40 watt fluorescent lamp.

An appearance test should be conducted by human sight at approximately 30 cm distance from the LCD module under fluorescent light. Distance between LCD and fluorescent lamps should be 100 cm or more. Viewing direction for inspection is 45° from vertical against LCD.



6.4.1.2 when test the model of transmissive product must add the reflective plate.

6.4.2 Sampling plan

Unless otherwise agreed in writing, the sampling inspection shall be applied to the incoming inspection of customer.

- 📖 Lot size: Quantity of shipment lot per model.
- 📖 Sampling type: Normal inspection, single sampling.
- 📖 Sampling Level: Level II.
- 📖 Sampling table: GB/T2828.1. (GB-national standard of China.)



6.4.3 Classification of defects and Acceptable quality level

Defects are classified as either a major or minor defect defined as follows:

- 📖 Major defect: It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
- 📖 Minor defect: It is a defect that will not result in functioning problem with deviation classified.

The AQL for major and minor defects is defined as follows:

Partition	Definition	AQL
Major defect	Functional defective as product.	0.4
Minor defect	Satisfy all functions as product but not satisfy cosmetic standard.	1.0

6.4.4 Applicable instrument

- 📖 LCD module tester.
- 📖 Multimeter.
- 📖 Caliper.
- 📖 Defect size filming standard.



6.4.5 Inspection quality criterion

6.4.5.1 LCD panel part.


The inspection specification as following list:

Classify	Item	Description of defects	Inspection criterion	Drawing specification	
Major defect	1. Non-display.	Product no function.	Not accept.		
	2. LCD with wrong view direction.	Difference in Spec.	Not accept.		
	3. Segment missing.	Part or all patten do not light up.	Not accept.		
	4. Occur high current.	Current exceed designed value.	Not accept.		
	5. LC leakage.	LC does not fulfill the glass cell.	Not accept.		
	6. Deviation from drawing.	LCM Dimension difference from drawing and over tolerance	According to dimensions noted in the specification.		
	7. Wrong type applied.	Wrong polarizer attachment.		Not accept.	
		Pin attached wrong type applied.		Not accept.	
8. Incorrect pins quantity	Pin attached wrong quantity applied.		Not accept.		



<p>Minor defect</p>	<p>9. Pattern deformation</p>	<p>Segment fatter or smaller.</p>	<p>Accept if c or $d \leq 1/4 - 1/5W$, or refer to the defect specimen. W = Segment width</p> <p>Accept if $a-b \leq 1/4a$, or refer to the defect specimen. a = Segment width</p>																					
<p>Minor defect</p>	<p>10. Pinholes</p>	<p>black spot/ white spot at activated state.</p>	<p>1. Large size LCD Accept if can't be found at 1m distance and will not enlarge under electronic test.</p> <p>2. Middle size LCD</p> <table border="1" data-bbox="627 1003 986 1193"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.10$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 < \varnothing \leq 0.30$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.30$</td> <td>0</td> </tr> </tbody> </table> <p>3. Small size LCD</p> <table border="1" data-bbox="627 1238 986 1429"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.15$</td> <td>2</td> </tr> <tr> <td>$0.15 < \varnothing \leq 0.20$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.20$</td> <td>0</td> </tr> </tbody> </table> <p>4. For the dot pattern: Accept $X, Y \leq 2/3L, H$ ($X, Y = (\text{Max } X, Y)$)</p> <p>5. Only allow one defect in one segment.</p> <p>6. The nearest distance allowed between two pinholes is 20mm.</p>	Diameter (mm)	Accept QTY	$\varnothing \leq 0.10$	Not count	$0.10 < \varnothing \leq 0.20$	2	$0.20 < \varnothing \leq 0.30$	1	$\varnothing > 0.30$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.15$	2	$0.15 < \varnothing \leq 0.20$	1	$\varnothing > 0.20$	0	
Diameter (mm)	Accept QTY																							
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<p>Minor defect</p>	<p>11. Blemishes and foreign matters.</p>	<p>Black spot/ dust on LCD. (non-display)</p>	<p>Positive panel:</p> <p>1. A zone.</p> <p>(1) Large size LCD Accept if can't be found at 1m distance and will not enlarge under electronic test.</p> <p>(2) Middle size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 < \varnothing \leq 0.30$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.30$</td> <td>0</td> </tr> </tbody> </table> <p>(3) Small size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.15$</td> <td>2</td> </tr> <tr> <td>$0.15 < \varnothing \leq 0.20$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.20$</td> <td>0</td> </tr> </tbody> </table> <p>2. B zone. 1.5 times of acceptable largest diameter size of Zone A.</p> <p>3. C area Not count.</p> <p>Negative panel:</p> <p>1. A zone.</p> <p>(1) Large size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.15$</td> <td>Not count</td> </tr> <tr> <td>$0.15 < \varnothing \leq 0.30$</td> <td>3</td> </tr> <tr> <td>$0.30 < \varnothing \leq 0.50$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.50$</td> <td>0</td> </tr> </tbody> </table> <p>(2) Middle size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$\varnothing > 0.20$</td> <td>0</td> </tr> </tbody> </table> <p>(3) Small size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.15$</td> <td>2</td> </tr> <tr> <td>$\varnothing > 0.15$</td> <td>0</td> </tr> </tbody> </table>	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.20$	2	$0.20 < \varnothing \leq 0.30$	1	$\varnothing > 0.30$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.15$	2	$0.15 < \varnothing \leq 0.20$	1	$\varnothing > 0.20$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.15$	Not count	$0.15 < \varnothing \leq 0.30$	3	$0.30 < \varnothing \leq 0.50$	1	$\varnothing > 0.50$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.20$	2	$\varnothing > 0.20$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.15$	2	$\varnothing > 0.15$	0	 <p style="text-align: center;">$\varnothing = (X + Y) / 2$</p>
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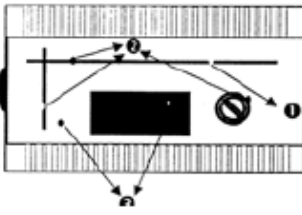
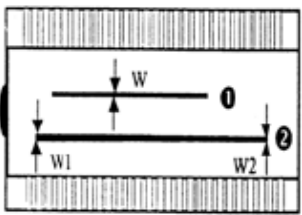
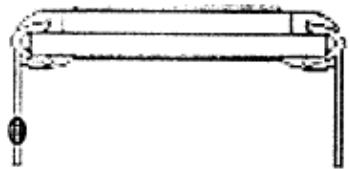


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Minor defect	13.Scratch on PI coating.	PI coating scratched.	The visible scratch of A zone can not accepted at 30cm view distance.																																							
Minor defect	14.Rainbow	Arches, circular or parallel colorful spread.	According to the limit specimen.																																							
Minor defect	15.Bubbles or wrinkles in polarizer	Bubbles or wrinkles between polarizer and glass.	According to black spot/ foreign material specification.																																							



Minor defect	16. Position of polarizer attachment	16.1 Wrong polarizer attachment in position or dimension.	Polarizer protruding from edge of glass and exceeding/ within the maximum external dimension of LCD.	
Minor defect	17. Ink printing defect	17.1 Ink line/ pattern broken	Not accept.	
		17.2 Ink pattern/ line jagged.	Accept if the thick or thin part is less than or equal to 25% segment width or according to the limit specimen.	
		17.3 Light leakage	When activated with current white light appears in the position of pinhole or scratch due to ink printing misalignment. According to the pinhole specification.	
Minor defect		17.4 Ink printing pattern/ line uneven	Reject if the thick or thin is more than 1/2W. Reject when $W1 - W2 \leq 1/3W$.	
Minor defect	18. Pin defect.	18.1 Corrosion or foreign material on terminal legs.	Pin incoming defect: oxidized, damage (including pins plating damaged), excess epoxy on bottom glass or terminal legs, which are not acceptable.	
Minor defect		18.2 Pin deviation over tolerance	According to the specification.	



Minor defect	19. Chipped glass on corner		19.1 Chip in lead contact area.	a	b	c	Accept QTY	
				$a \leq 3\text{mm}$ ($L \geq 5\text{mm}$)	$b \leq 1/2W$	$c \leq T$	2	
			$a < 1/2L$ ($L < 5\text{mm}$)	$b \leq 1/2W$	$c \leq T$	2		
			19.2 Others	a	b	c	Accept QTY	
not exceed 1/2 width of seal		$c \leq T$	2					
Minor defect	20. Glass chip on edge		a	b	c	Accept QTY		
			$a \leq 3\text{mm}$	not exceed 1/2 width of seal	$c \leq 3/4T$	2		
Minor defect	21. Chipped electrode pad	21.1 Glass chip on ITO edge	COG and TAB product.	a	b	c	Accept QTY	
			$a \leq 2\text{mm}$ (and not exceed 3 ITO terminal)	$b \leq W/5$	$T > 0.7\text{mm}$ $c \leq 1/2T$ $T \leq 0.7\text{mm}$ $c \leq T$	2		
Minor defect	Others	a	b	c	Accept QTY			
		$a \leq 3\text{mm}$ (and not exceed 4 ITO terminal)	$b \leq W/4$	$c \leq T$	2			



Minor defect	21.2 Glass chip on ITO back	COG and TAB product.	a	b	c	Accept QTY	
			$a \leq 3\text{mm}$	$b \leq W/4$	$T > 0.7\text{mm}$ $c \leq 1/2T$ $T \leq 0.7\text{mm}$ $c \leq T$	2	
		Others	a	b	c	Accept QTY	
			$a \leq 5\text{mm}$	$b \leq W/4$	$c \leq T$	2	
Minor defect	22.Mechanical damage.	Extended crack inspector shall attempt to remove the chip with tweezers, re-evaluate if the remaining defect is still a crack or a chip.	B		Accept QTY		
			$b \leq 1/5W$		2		
Minor defect	23.Glass cracks		Not accept				

Remark:

The minimum space between any 2 defects (spot, dirt) should more than 20mm, and Max. allowed defect QTY in total:

Large size LCD : Zone A: $\leq 5/\text{unit}$, Zone B $\leq 5/\text{unit}$;

Middle size LCD : Zone A: $\leq 3/\text{unit}$, Zone B $\leq 3/\text{unit}$;

Small size LCD: Zone A: $\leq 2/\text{unit}$, Zone B $\leq 2/\text{unit}$.



6.4.5.2 Other part

The inspection specification as following list:

NO	Items	Criterion of defects	AQL
1	Backlight	1.Lumination source flickers. 2.Using spot, lines and contamination standard of LCD to judge the spots or scratches defect on backlight. 3.Not allow unlighted on backlight. 4.Colour and luminance of backlight should correspond its specification.	Major Minor Major Major
2	PCB, COB	1.COB seal may not have pinholes larger than 0.2mm or contamination. 2.COB seal surface may not have pinholes through to the IC. 3.The height of the COB should not exceed the height indicated in the assembly diagram. 4.Beyond 2mm of the seal area, there may not have sealant on the PCB. 5.No oxidation or contamination on PCB connector. 6.Parts on PCB should correspond the characteristic, and not allow wrong parts, missing parts or additional parts. 7.The jumper on the PCB should correspond to the characteristic. 8.The solder which gets on bezel, LED pad, zebra pad or screw hole pad should be smoothed down.	Minor Minor Major Minor Minor Major Minor Major
3	Soldering	1.No unmelted solder pastes on the PCB. 2.No cold solder joints, solder connection missing, oxidation of solder. 3.No short circuits in components on PCB.	Minor Minor Minor
4	General Appearance	1.No oxidation, contamination, curves ,cracks or bends on interface Pin of TCP. 2.No solder residue or solder balls on product. 3.The IC on the TCP may not be damaged. 4.The residual rosin or tin oil of soldering (component or chip component) is not turned into brown or black color. 5.Packing method correspond the specification. 6.Dimension and structure correspond the specification sheet. 7.No dirt and break on the heat seal.	Minor Minor Major Minor Major Major Major



6.5.0 Reliability

The LCD module shall not fail the following reliability test.

ITEM	Condition		Criterion
High temperature operation	+70 8h		1.Total current consumption should be below double of initial value. 2.Cosmetic defects should not be happened.
Low temperature operation	-20 8h		
Humidity	Storage	40 93%RH 24h	
	Operation	40 93%RH 8h	
High temperature storage	+70 10h		
Low temperature storage	-20 10h		
Thermal shock storage	-20 +70 60min 60min 5 cycle		
Vibration (Package state)	50Hz 0.7mm 30min in each direction (X, Y, Z).		
Falling test (Packaged state)	Weight 15kg; Falling height: 80cm. Weight < 15kg; Falling height: 100cm.		



6.6. Quality Assurance

6.6.1 JINGHUA DISPLAYS will only replace or repair any of its LCD which is found defective electrically or visually when inspected in accordance with the LCM specification, for a period of one year from the date of shipment. Confirmation of such date shall be based on freight documents.

No warranty can be granted if any of the precautions stated in handling LCD and LCD Modules above have been disregarded.

6.6.2 In returning the LCD and LCD Modules, they must be properly packaged and there should be detailed description of the failures or defects. Broken glass, scratches on polarizers, mechanical damages as well as defects that are caused by accelerated environmental tests are excluded from warranty.

6.7. Precautions in Use of LCM

1. Handling of LCM

1.1 Don't give external shock.

1.2 Liquid crystal is chemical hazardous substance. Once the liquid crystal inside it leaks out, be sure not to get any in your mouth. If the liquid is adhered your skin or clothes etc, wash it off using soap and water thoroughly and immediately.

1.3 Don't apply excessive force on the display surface.

1.4 Don't scratch and dirty polarizer of covering the display surface of the LCD module.

1.5 In order to prevent static electricity from destructing, be sure to wear gauntlet that is tested up to grade.

2. Storage

2.1 Store in dark places and do not expose to sunlight or fluorescent light. Keep the temperature between 0°C and 40°C and the humidity lower than 60%RH. Please consult JINGHUA DISPLAYS LTD. for other storage requirements.

2.2 Storage in a clean environment, free-dust and well ventilated.

2.3 Storage in anti-static electricity container.

3. Soldering

3.1 The soldering temperature is 260±5°C and soldering Time should be less than 3 sec, and soldering iron power should be less than 30w.

3.2 Re-soldering: no more than 3 times.

3.3 The soldering point should be further than 1.6 mm from body.

“Shenzhen Jinghua Displays CO., LTD. reserves the right to change this specification.”

- END -