DOCUMENT NUMBER AND REVISION

FS-8810H02552 REV. A

(VTNL2WNMC-ALL-ST-NSC)

DOCUMENT TITLE:

SPECIFICATION

OF

LCD MODULE TYPE

CUSTOMER	
MODEL NUMBER	**8810H02552**
CUSTOMER APPROVAL	
DATE	

DEPARTMENT	NAME	SIGNATURE	DATE
PREPARED BY	LIANG YUN	梁云	2013.08.05
CHECKED BY	CHEN BIAO WEI	陈标为	13.8.5
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A	2013.08.05	First Release.	LIANG YUN	CHEN BIAO WEI

CONTENTS

Specification of LCD Module Type
Item No.: 8810H02552

1. General Description

- 16 Characters x 2 lines VBN negative Transmissive character LCD Module.
- Viewing Angle: all viewing angle.
- Driving duty: 1/16 Duty, 1/5 bias.
- 'SITRONIX' ST7066U LCD Controller & Driver or equivalent.
- 'SITRONIX' ST7065C LCD Controller & Driver or equivalent.
- Power Supply: +5.0V.
- White LED 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	80.0(L) x 36.0(W) x 12.8(H)	mm
Viewing area	61.0(L) x 15.8(W)	mm
Display format	16 characters x 2 lines	
Character size	2.95(L) x 5.55(W) (5 x 8 dots)	mm
Character spacing	0.60(L) x 0.40(W)	mm
Character pitch	3.55(L) x 5.95(W)	mm
Dot size	0.55(L) x 0.65(W)	mm
Dot spacing	0.05 (L) x 0.05(W)	mm
Dot pitch	0.60(L) x 0.70(W)	mm
Weight:	TBD	grams

ISSUE	MODIFY DESCRIPTION	DATE
B	Modify Backlight and PCB	13.06.2
		5

PCB ASSIGNMENT:

PIN	SYMBOL	PIN	SYMBOL
1	GND	9	DB2
2	VDD	10	DB3
3	V0	11	DB4
4	RS	12	DB5
5	R/W	13	DB6
6	E	14	DB7
7	DB0	15	K(LED-)
8	DB1	16	A(LED+)

Display Type	VBN/TRANSMISSIVE/NEGATIVE
Display Resolution	16*02 CHARACTER TYPE
Viewing Angle	ALL VIEWING ANGLE
Max.Ratio and Bias Level	1/16 DUTY,1/5 BIAS
LCD Controller/Driver	ST7066U+ST7065C(COB)
Logic Voltage	5.0V
LCD Driving Voltage	9.3V
Operation Temperature	0° C TO 50° C
Storage Temperature	-10° C TO 60° C
Backlight Speciality	LED SIDE(WHITE), 3 PCS LED dies V(BL-LED)=4.0± 0.3V , IF=120mA V(AKF=5.0± 0.3V LED TYPE:NS2W150T-E
Remark	

TITLE:	Module Speciality		
ITEM NO:			
PROJECT NO:	8810H02552		
DESCRIPTION:	VTNL2WNMC-		
◇: Special characters	+: Vertical dimension		
+: Safety characteristic	(...): Reference dimension		
Tolerance unless:x.x± 0.3	Otherwise specified:x.xx± 0.2		
THIRD ANGLE PROJECTION			
	NAME	SIGN	DATE
DRAWN	Lan li juan		13.06.25
CHECKED	Lan li juan		
CHECKED	Chen biao wei		
APPROVED	Wang zhao cai		
REV: B	UNIT: mm	SCALE:1/1	SHEET: 1 OF 1

JHD CO. LTD

Figure 1: Module Specification

3. Interface signals

<div align="center">Table 2</div>

Pin No.	Symbol	Description
1	GND	Ground (0V).
2	VDD	Power supply for logic.
3	V0	Power supply for LCD
4	RS	Select registers. 0: Instruction register (for write) Busy flag: address counter (for read) 1: Data register (for write and read)
5	R/W	Select read or write. 0: Write 1: Read
6	E	Enable. Start signal for data read /write.
7	DB0	Data bus. The data input/output pin.
8	DB1	
9	DB2	
10	DB3	
11	DB4	
12	DB5	
13	DB6	
14	DB7	
15	K (LED-)	Cathode of LED backlight.
16	A (LED+)	Anode of LED backlight.

4. Absolute Maximum Ratings

4.1 Electrical Maximum Ratings (Ta = 25 ºC)

<div align="center">Table 3</div>

Parameter	Symbol	Min.	Max.	Unit
Power Supply voltage (Logic)	VDD	-0.3	+7.0	V
Power supply voltage (VLCD)	VLCD	VDD-15.0	VDD+0.3	V
Input voltage range	VIN	-0.3	VDD+0.3	V

Note:

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

All voltage values are referenced to GND= 0V.

4.2 Environmental Condition

Table 4

Item	Operating Temperature (Topr)		Storage Temperature (Tstg)		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	0°C	+50°C	-10°C	+60°C	Dry

5. Electrical Specifications

5.1 Typical Electrical Characteristics

At Ta = 25 °C, VDD = 5.0V±0.2, GND=0V.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	VDD-GND		4.8	5.0	5.2	V
Supply voltage (LCD)	VLCD	VDD =+5.0V, Note 1	4.8	5.0	5.2	V
Input signal voltage	V_{IH}	"H" level	2.2	-	VDD	V
	V_{IL}	"L" level	-0.3	-	0.6	V
Supply Current (Logic)	IDD	Note 1	-	2.0	3.0	mA
Supply voltage for Backlight	VLED	Forward current =120 mA Lv≥2500cd/m^2	3.7	4.0	4.3	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 Ta = 0°C To +50°C, VDD = +5.0V±0.2, GND = 0V.

Refer to Fig. 2& Fig. 3, the bus-timing diagram for AC Interface.

| Symbol	Characteristics	Test Condition	Min.	Typ.	Max.	Unit
		Internal Clock Operation				
f_{OSC}	OSC Frequency	R = 91KΩ	190	270	350	KHz
		External Clock Operation				
f_{EX}	External Frequency	-	125	270	410	KHz
	Duty Cycle	-	45	50	55	%
T_R, T_F	Rise/Fall Time	-	-	-	0.2	µs
		Write Mode (Writing data from MPU to ST7066U)				
T_C	Enable Cycle Time	Pin E	1200	-	-	ns
T_{PW}	Enable Pulse Width	Pin E	140	-	-	ns
T_R, T_F	Enable Rise/Fall Time	Pin E	-	-	25	ns
T_{AS}	Address Setup Time	Pins: RS,RW,E	0	-	-	ns
T_{AH}	Address Hold Time	Pins: RS,RW,E	10	-	-	ns
T_{DSW}	Data Setup Time	Pins: DB0 - DB7	40	-	-	ns
T_H	Data Hold Time	Pins: DB0 - DB7	10	-	-	ns
		Read Mode (Reading Data from ST7066U to MPU)				
T_C	Enable Cycle Time	Pin E	1200	-	-	ns
T_{PW}	Enable Pulse Width	Pin E	140	-	-	ns
T_R, T_F	Enable Rise/Fall Time	Pin E	-	-	25	ns
T_{AS}	Address Setup Time	Pins: RS,RW,E	0	-	-	ns
T_{AH}	Address Hold Time	Pins: RS,RW,E	10	-	-	ns
T_{DDR}	Data Setup Time	Pins: DB0 - DB7	-	-	100	ns
T_H	Data Hold Time	Pins: DB0 - DB7	10	-	-	ns
		Interface Mode with LCD Driver(ST7065)				
T_{CWH}	Clock Pulse with High	Pins: CL1, CL2	800	-	-	ns
T_{CWL}	Clock Pulse with Low	Pins: CL1, CL2	800	-	-	ns
T_{CST}	Clock Setup Time	Pins: CL1, CL2	500	-	-	ns
T_{SU}	Data Setup Time	Pin: D	300	-	-	ns
T_{DH}	Data Hold Time	Pin: D	300	-	-	ns
T_{DM}	M Delay Time	Pin: M	0	-	2000	ns
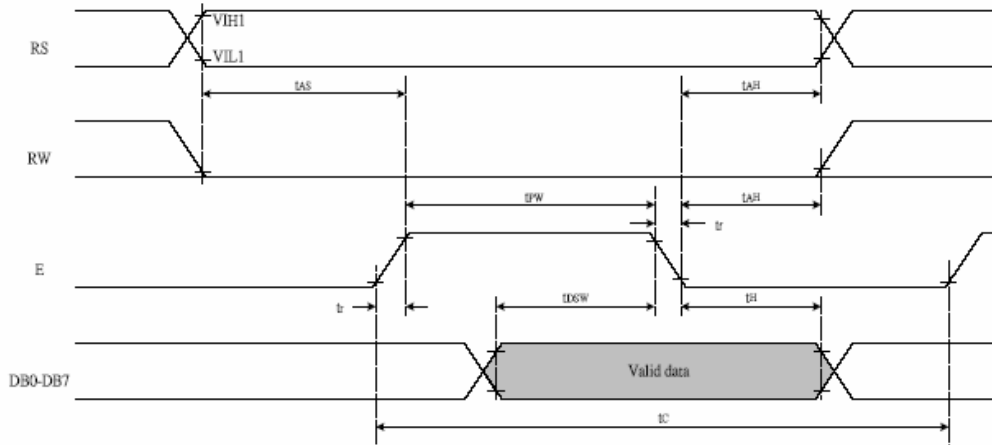
Figure 2: Writing data from MPU.
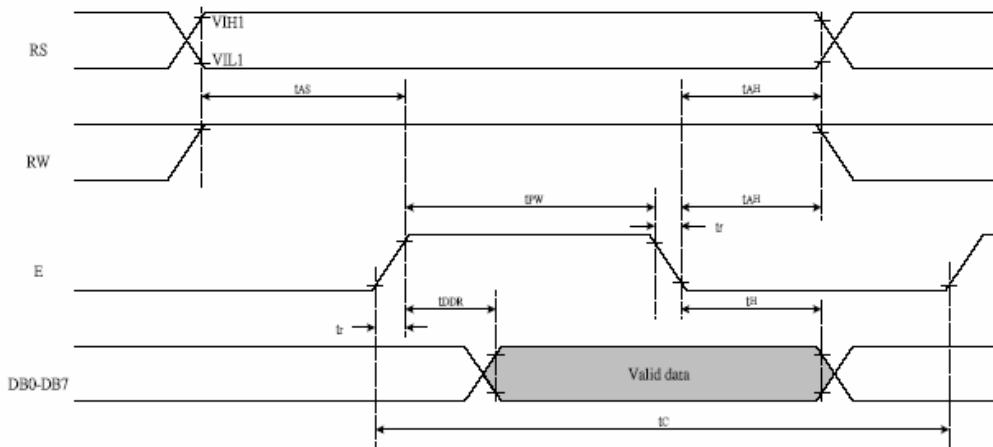
Figure 3: MPU Read timing.
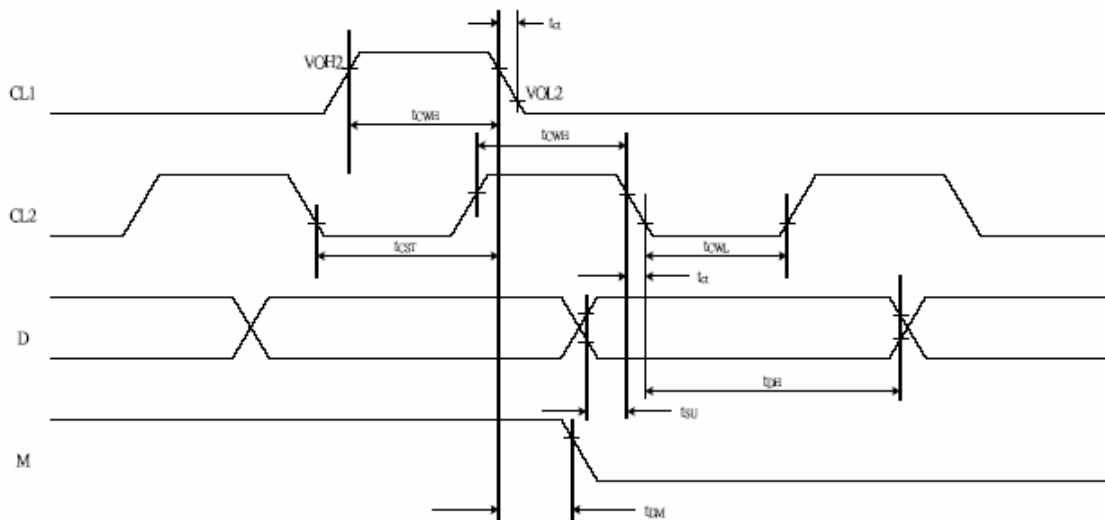
Figure 4: Interface Timing with External Driver.

5.3 Instruction Table

Table 7

Instruction Table:

Instruction	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Description	Description Time (270KHz)
											Instruction Code	
Clear Display	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM. and set DDRAM address to "00H" from AC	1.52 ms
Return Home	0	0	0	0	0	0	0	0	1	x	Set DDRAM address to "00H" from AC and return cursor to its original position if shifted. The contents of DDRAM are not changed.	1.52 ms
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	S	Sets cursor move direction and specifies display shift. These operations are performed during data write and read.	37 us
Display ON/OFF	0	0	0	0	0	0	1	D	C	B	D=1:entire display on C=1:cursor on B=1:cursor position on	37 us
Cursor or Display Shift	0	0	0	0	0	1	S/C	R/L	x	x	Set cursor moving and display shift control bit, and the direction, without changing DDRAM data.	37 us
Function Set	0	0	0	0	1	DL	N	F	x	x	DL:interface data is 8/4 bits N:number of line is 2/1 F:font size is 5x11/5x8	37 us
Set CGRAM address	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address counter	37 us
Set DDRAM address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter	37 us
Read Busy flag and address	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Whether during internal operation or not can be known by reading BF. The contents of address counter can also be read.	0 us
Write data to RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM/CGRAM)	37 us
Read data from RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM (DDRAM/CGRAM)	37 us

Note:
Be sure the ST7066U is not in the busy state (BF = 0) before sending an instruction from the MPU to the ST7066U. If an instruction is sent without checking the busy flag, the time between the first instruction and next instruction will take much longer than the instruction time itself. Refer to Instruction Table for the list of each instruction execution time.

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 of those with special requirements from customer.
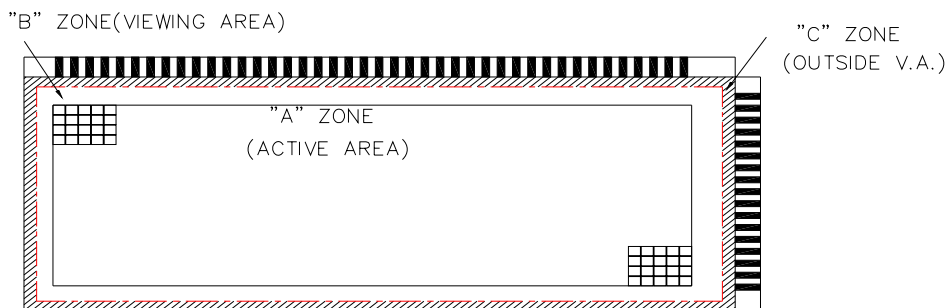
6.3.0 Definition

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):1～6 pcs LCD screens are cut out of from each 14"×16" motherglass.

Middle size(M):7～99 pcs LCD screens are cut out of from each 14"×16" unit motherglass.

Small size(S):> 99 pcs LCD screens are cut out of from each 14"×16" unit motherglass.

6.4.0 Quality Specification

6.4.1 Conditions of Inspection

6.4.1.1 Tests should be conducted under the following conditions:

Ambient temperature: 22±5℃.

Ambient humidity: 65±20%RH.

6.4.1.2 Function test:

With fluorescent lamps, the light should be 200Lux or upwards of 200 Lux, the product should be inspected

with 30cm to LCD surface;

6.4.1.3 Cosmetic Inspection:

With fluorescent lamps, the light should be 600~800Lux, the product should be inspected with 30cm to

LCD surface;

6.4.1.4 Diagram of inspection as following:
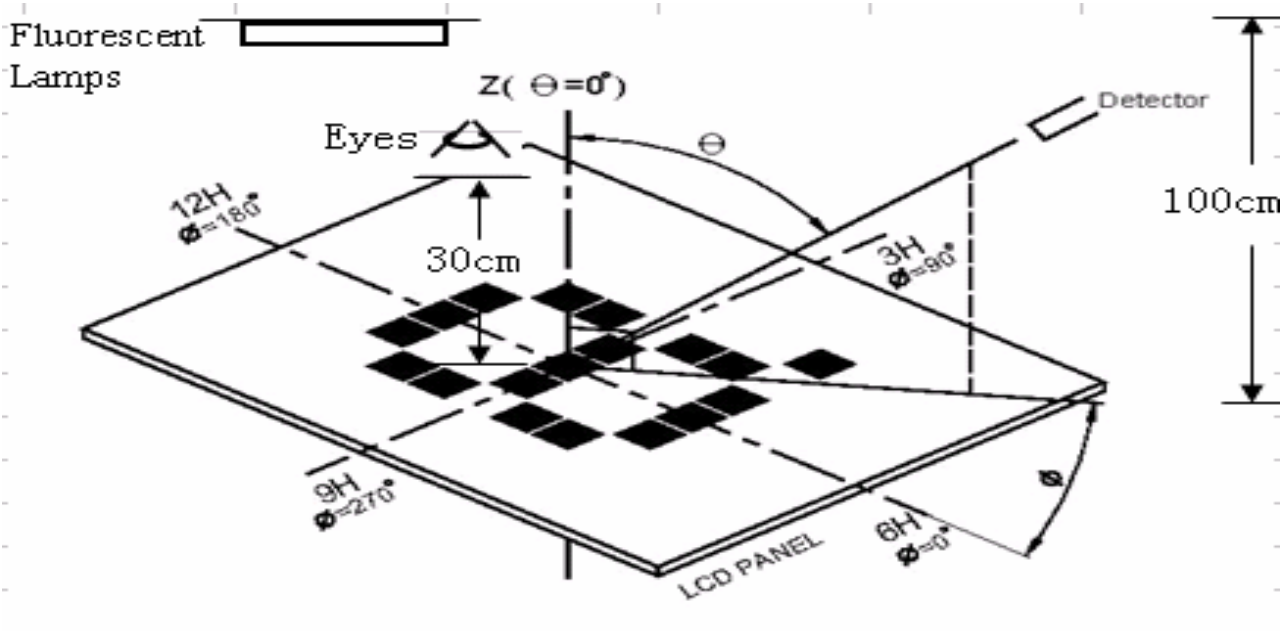
6.4.2 Sampling plan

Unless otherwise agreed in written, 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 and classified as either a major or minor defect defined as belows:

📖 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 following:

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
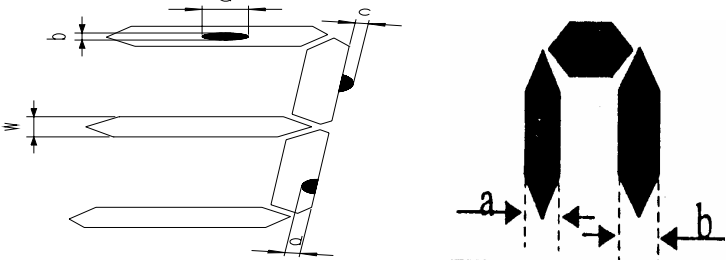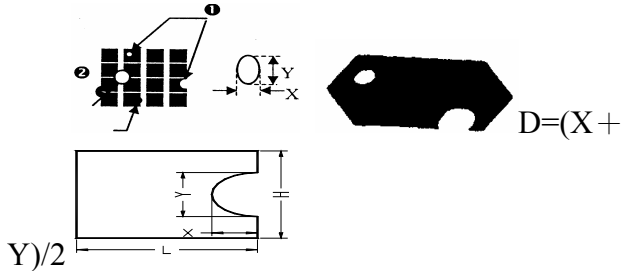
📖 LCD module tester.

📖 Multi-meter.

📖 Caliper.

📖 Defect size filming standard.

6.4.5 Inspection quality criterion

6.4.5.1 Function Inspection：

Content	Item	Inspection list and Standard	Defect
Display	1	LCD cross short;	Maj.
	2	Segment missing, line missing, short, much dot;	Maj.
	3	Display uniformity not good;	Maj.

	4	No display or display error;			Maj.
	5	Pattern deformation: segment fatter or smaller.; Accept if c or d≤1/4—1/5W; or refer to the defect specimen. W= Segment width Accept if │a-b│≤1／4a; or refer to the defect specimen. a = Segment width			Min.
	6	Pinholes: black spot (negative)/ white spot (positive) at activated state.			Min.

Product Type	Defect Size		Accept Qt'y
Large Size	Within 1m inspection, the defect is unobvious and not get bigger when display;		
Middle Size	D≤0.15		Ignorance
	0.15＜D≤0.25		3
	0.25＜D≤0.35		1
	0.35＜D		0
Small Size	D≤0.15		Ignorance
	0.15＜D≤0.25		2
	0.25＜D≤0.3		1
	0.3＜D		0

1. For the dot pattern: accept if the area of defect is less than or equal to half of one lattice's.

2. Only allow one defect in one segment.

3.The nearest distance allowed between two pinholes is above 20mm.

$D=(X+Y)/2$

	7	When character displays, the background is deeper or lighter than simple.			Min.
	8	The color of character is lighter than sample;			Min.
Back-light	9	The backlight is not light;			Maj.
	10	When working, the light is flashing;			Maj.
	11	The backlight does not work or the color is wrong;			Maj.

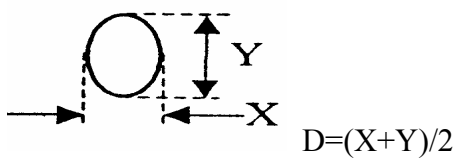|	12	When working, the obvious gridding is visual;	Min

	13	The uniformity inspection:
		    As following picture, we use the 5-points test method to confirm the uniformity, the standard is: Min/Max≥70%;
		    Average both length and width to 6 parts, and test points as following(green points):
		
		l=1/6L l=1/3L
		w=1/6W
		W
		w=1/3W
		L	

Others	14	The product model does not match the specification;	Maj.
	15	LCD view angle does not match the specification;	Maj.
	16	The color is obviously different(pls reference for sample);	Min

4.5.2 Final Assembly cosmetic inspection

Content	Item	Inspection list and Standard	Defect
Final Assembly cosmetic inspection	1	The product structure should match the specification. It can not be titled or loosed;	Maj.
	2	The silica gel of LCD can not be over the upper polarizer;	Maj.
	3	When heating, the touch area of PAD/ ITO between two parts should be≧1/2w (eg: FFC to PCB; FFC to FFC)	Maj.
	4	The product holder is tilted(can not be assembled) or cracked;	Maj.
	5	Polarizer scalded: the protect film can not be torn off or can be seen in view area;	Maj.
	6	The size of LCM does not match the drawing;	Maj.
	7	The height of silica gel can not be over the upper polarizer;	Min
	8	The tape should not be missing;	Min
	9	The label should follow the specification, and should be sticked in right position and can not be missing;	Min
	10	The label can be scanned, and the ink can not be off easily;	Min

4.5.3 LCD cosmetic inspection:

Content	Item	Inspection list and Standard	Defect
LCD	1	Crack on LCD: not accept;	Maj.
	2	LCD rainbow;(compare with the sample)	Min
	3	The spot in LCD:	Min
		①Zone A:	
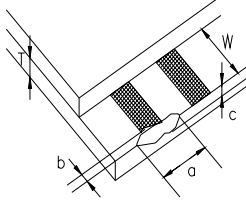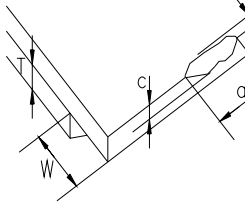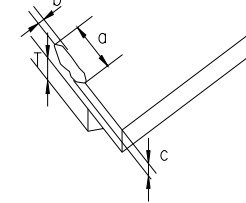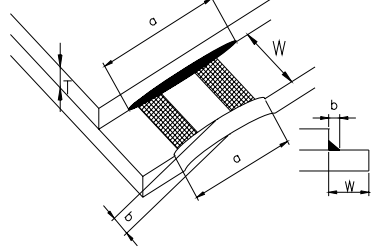
Product Type	Defect Size	Accept Qt'y
Positive Large Size	Within 1m inspection, the defect is unobvious and not get bigger when display;	
Positive Middle Size	D≤0.15	Ignorance
	$0.15 < D ≤ 0.25$	3
	$0.25 < D ≤ 0.35$	1
Positive Small Size	D≤0.15	Ignorance
	$0.15 < D ≤ 0.25$	2
	$0.25 < D ≤ 0.3$	1
	$D > 0.3$	0
Negative Large Size	D≤0.15	Ignorance
	$0.15 < D ≤ 0.3$	4
	$0.3 < D ≤ 0.5$	1
	$D > 0.5$	0
Negative Middle Size	D≤0.15	Ignorance
	$0.15 < D ≤ 0.3$	3
	$D > 0.3$	0
Negative Small Size	D≤0.15	Ignorance
	$0.15 < D ≤ 0.25$	3
	$D > 0.25$	0

②Zone B: the defect size is 1.5 times than Zone A;
③Zone C: Ignore the spot defect;
The distance between two defect should longer than 20mm;

$D=(X+Y)/2$

4 | The scratch / line defect on LCD or polarizer | Min

①Zone A:

Product Type	Defect Width	Defect Length	Accept Qt'y
Positive Large Size	Within 1m inspection, the defect is unobvious and not get bigger when display;		
Positive Middle Size	W≤0.02	/	Ignorance
	$0.02 < W ≤ 0.03$	L≤4	2
	$0.02 < W ≤ 0.03$	L>4	0
	$0.03 < W ≤ 0.05$	L≤3	2
	$0.03 < W ≤ 0.05$	L>3	0
	$W > 0.05$	/	Same as the spot
Positive Small Size	W≤0.02	/	Ignorance
	$0.02 < W ≤ 0.03$	L≤4	2
	$0.02 < W ≤ 0.03$	L>4	0
	$0.03 < W ≤ 0.05$	L≤2	2

		$0.03 < W \leq 0.05$	$L>2$	0	
		$W > 0.05$	/	Same as the spot	
	Negative Large Size	$W \leq 0.02$	/	Ignorance	
		$0.02 < W \leq 0.03$	$L \leq 5$	3	
		$0.02 < W \leq 0.03$	$L>5$	0	
		$0.03 < W \leq 0.05$	$L \leq 4$	2	
		$0.03 < W \leq 0.05$	$L>4$	0	
		$W > 0.05$	/	Same as the spot	
	Negative Middle Size	$W \leq 0.02$	/	Ignorance	
		$0.02 < W \leq 0.03$	$L \leq 4$	2	
		$0.02 < W \leq 0.03$	$L>4$	0	
		$0.03 < W \leq 0.05$	$L \leq 2$	2	
		$0.03 < W \leq 0.05$	$L>2$	0	
		$W > 0.05$	/	Same as the spot	
	Negative Small Size	$W \leq 0.02$	/	Ignorance	
		$0.02 < W \leq 0.03$	$L \leq 3$	2	
		$0.02 < W \leq 0.03$	$L>3$	0	
		$0.03 < W \leq 0.05$	$L \leq 2$	1	
		$0.03 < W \leq 0.05$	$L>2$	0	
		$W > 0.05$	/	Same as the spot	

②Zone B: the defect size is 1.5 times than Zone A;
③Zone C: Ignore the spot defect;
The distance between two defect should longer than 20mm;

Chipped glass on corner:

ITO side   Others

Zone	a	b	c	Acc Qt'y	
ITO side	$a \leq 5mm(L \geq 5mm)$	$b \leq W$	$c \leq T$	3	Min
	$a < L(L < 5mm)$	$b \leq W$	$c \leq T$	3	
Others	not exceed 1/2 width of seal		$c \leq T$	3	

| 5 | | | | | Min |

| 6 | Glass chip on edge | | | | Min |

	ITO touch side		ITO back side		Others	
Zone	a		b	c	Acc Qt'y	
ITO touch side(COG and TAB)	a≤3mm(and not exceed 4 ITO terminal		b≤W/5	c≤1/2T(T＞0.7mm) c≤T(T≤0.7mm)	3	
ITO touch side(except COG and TAB)	a≤4mm(and not exceed 4 ITO terminal		b≤W/4	c≤T	3	
ITO back side(COG and TAB)	a≤3mm		b≤1/4W	c≤3/4T(T＞0.7mm) c≤T(T≤0.7mm)	3	Min
ITO back side(except COG and TAB)	a≤5mm		b≤1/3W	C≤T	3	
Others	a≤5mm		Not exceed 1/2 width of seal	c≤T	3	

	7	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≤1/4W, accept Qt'y: 2 ;
COG	8	The silica gel is missing;
	9	The FPC is open, short;
	10	The protection for COG ITO: ITO should be fully cover with silica gel and the height of silica should not over the LCD upper side, and the width should not overrun the side of LCD;(If there is special command, follow it) No dust or foreign in this zone;

8	Maj.
9	Maj.
10	Min.

	11	The gobo tape should totally cover IC; The bubble under tape should less than 0.5mm;	Min.
	12	Missing the gobo tape/ silica gel/ protect tape etc.	Min.
Polarizer	13	Bubble under polarizer: Zone A: it is visual at 30cm inspection; Zone B: ignorance;	Min.
	14	The size or position of polarizer can not match the drawing; It should cover the view zone and can not exceed the edge of LCD or cover the ITO;	Min.
Silk	15	The silk is discontinuous;	Min.
	16	Burr: Reject if the thick or thin is more than 1/4W	Min.
	17	Spot/ pinhole: same as the spec of LCD pinhole;	Min.
	18	Reject if the thick or thin is more than 1/2W. (W: normal width)	Min.
	19	The width of silk is not uniformity: Reject when Wmax—Wmin>1/3W.	Min.
Others	20	Wrong assembly direction of LCD;	Maj.
	21	LC leakage;	Maj.
	22	Finger prints/ dirty on LCD surface;	Min.

6.4.5.4 PCBA Cosmetic Inspection

Content	Item	Inspection list and Standard	Defect
PCBA	1	The connecting finger of COB can not be leaked outside;	Maj
	2	The pinholes is deep to IC: not accept;	Maj.
	3	The surface of COB can not be scratched;	Min.
	4	The diameter of pinholes on Cob surface should be under 0.2mm; And there is no foreign;	Min.
	5	The height of COB should match the specification;	Min.
	6	The glue should be inside of PCB silk-circle;	Min.
	7	If there is some tin remained at the screw hole, it should be removed to make the hole surface smooth;	Min.
	8	The solder standard: IPC-610D;	/

6.4.5.5 Bezel Inspection

Content	Item	Inspection list and Standard	Defect
Bezel	1	The material, surface processing, color should match the specification;	Maj.
	2	The holder of bezel is cracked;	Maj.
	3	Wrong twist direction;	Maj.
	4	The bezel should not be oxydic, bended, deformed, finger prints, oil, dirty etc…	Maj.
	5	The bezel can not be scratched to the inner material;	Min.
	6	The burr can not exceed into view area;	Min.
	7	The angle of holder should be 30°~70°;If the copper is shaved, it should be cleaned;	Min.

6.4.5.6 Connector Inspection

Content	Item	Inspection list and Standard	Defect
TCP/FPC	1	The pin should not be oxydic, dirty, bended, cracked;	Maj.
	2	TCP IC broken or torn off from LCD;	Maj.
	3	FPC/TCP broken (The circuit is broken)	Maj.
	4	The holder board should be sticked closely and the size should match the specification;	Min.
	5	FPC/TCP broken (The circuit is OK)	Min.
Heat Seal Connector	6	Heat Seal Connector broken (The circuit is broken);	Maj.
	7	Silica gel is missing; (If there is no special request from customer, the connecting area should be project by silica gel)	Maj.
	8	Heat Seal: foreign or bubble: the connecting area should be under $\leqq 1/2$ ITO (But if it make the surface not smooth, it is not accept) Heat position not perfect matched: $f \leq 1/3W, h \leq 1/4H$: accept Not horizontal: ｜h2-h1｜ $\leq 1/8H$: accept; 	Maj.
	9	Pull test and remain inspection: 1.Test the force of pulling the heat seal connector instantly; It should be > 500g.f/cm ×L (L: the length of connecting, CM); 2.After tearing, 70% of heal seal connector remains on every ITO of LCD;	Maj.
	10	Heat Seal Connector broken (The circuit is OK);	Min.
	11	Heat Seal Connector is dirty;	Min.
Connector (Pin)	12	Connector is loose;	Maj.
	13	The pin is tilted, and can not be assembled;	Maj.
	14	Connector is broken, and can not be assembled;	Maj.

6.4.5.7 Others

Content	Item	Inspection list and Standard	Defect
Back-light	1	The size should match the specification;	Maj.
	2	Back-light is broken or cracked, bended;	Maj.
	3	The standard of spots/ scratches is the same as LCD;	Min.
Glue	5	According the drawing and sample, check all the glue is OK or not;	Maj.
	6	The quantity of glue is not enough;	Min.
	7	The color of glue does not match the BOM or sample;	Maj.

6.4.5.8 Special Commands from Customer

If there is some standard need to be discussed or some special command, it should be confirmed by both customer and JHD.

6.5.0 Reliability

The LCD module should not fail the following reliability test.

ITEM	Condition		Criterion
High temperature operation	Temp: +50℃; 48H		1.Total current consumption should be below double of initial value. 2.Cosmetic defects should not be happened. 3. Products to be displayed normal after starting up again, cannot occur without display, the black screen, segment, display confusion.
Low temperature operation	Temp: 0℃; 48H		
Humidity	Storage	40℃;93%RH; 24H	
	Operation	40℃;93%RH; 24H	
High temperature storage	Temp: +60℃ 24H		
Low temperature storage	Temp: -10℃ /24H		
Thermal shock storage	Temp:0℃→+50℃ 30min→30min 10cycle		
Vibration (Package state)	10~500Hz;5g; 30min in each direction (X, Y, Z).		
Falling test (Packaged state)	Weight≥15kg; Falling height: 80cm. Weight＜15kg; Falling height: 100cm.		
ESD test	1.Test frequence:5points/panel,5times/point (LCD around and middle a total of 5 points). 2.Test apparatus parameter: C=150pF,R=330Ω 3.Environment:15℃~35℃,30%~60%RH. 86Kpa~106Kpa. 4.Test item: A. Contact: ±2KV，±4KV，±6KV B. Air: ±2KV，±4KV，±8KV Arcing distance≤1cm 5.Test method: According to the above voltage level at each test point in order to test 5 times discharge under each voltage level .		

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 handing 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

6.7.1 Handling of LCM

6.7.1.1 Don't give external shock.

6.7.1.2 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.

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

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

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

6.7.2. Storage

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

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

6.7.2.3 Storage in anti-static electricity container.

6.7.3. Soldering

6.7.3.1 The soldering temperature is 260+5℃(with Pb)/ 330+5℃(No Pb) and soldering Time should be less than 3 sec,and soldering iron power should be less than 30w.

6.7.3.2 Re-soldering: no more than 3 times.

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

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

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