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SPECIFICATION
FOR
LCM MODULE

MODULE NO.: AMG12832AR-B-Y6WFDY
DOC.REVISION：00

Customer Approval:

	SIGNATURE	DATE
PREPARED BY (RD ENGINEER)		
PREPARED BY (QA ENGINEER)		
CHECKED BY		
APPROVED BY		

DOCUMENT REVISION HISTORY

Version	DATE	DESCRIPTION	CHANGED BY
00	Jan-14-2010	First issue	

CONTENTS

1. FUNCTIONS & FEATURES

1.1. Format	: 128x32 Dots
1.2. LCD mode	: STN /Positive Transflective Mode /Y-G
1.3. Viewing direction	: 6 o'clock
1.4. Driving scheme	: 1/32 Duty cycle, 1/5 Bias
1.5. Power supply voltage (V_{DD})	: 5.0V
1.6. LCD driving voltage (VLCD)	: 4.8V (reference voltage)
1.7. Operation temp	: -20~70℃
1.8. Storage temp	: -30~80℃
1.9. Backlight color	: SIDE,Y-G
1.10.ROHS standard	

2. MECHANICAL SPECIFICATIONS

2.1. Module size	: 66.0mm(L)*26.0mm(W)*9.0mm(H)
2.2. Viewing area	: 51.0mm(L)*14.8mm(W)
2.3. Dot pitch	: 0.37mm(L)*0.33mm(W)
2.4. Dot size	: 0.38mm(L)*0.34mm(W)
2.5. Weight	: Approx.

3. BLOCK DIAGRAM

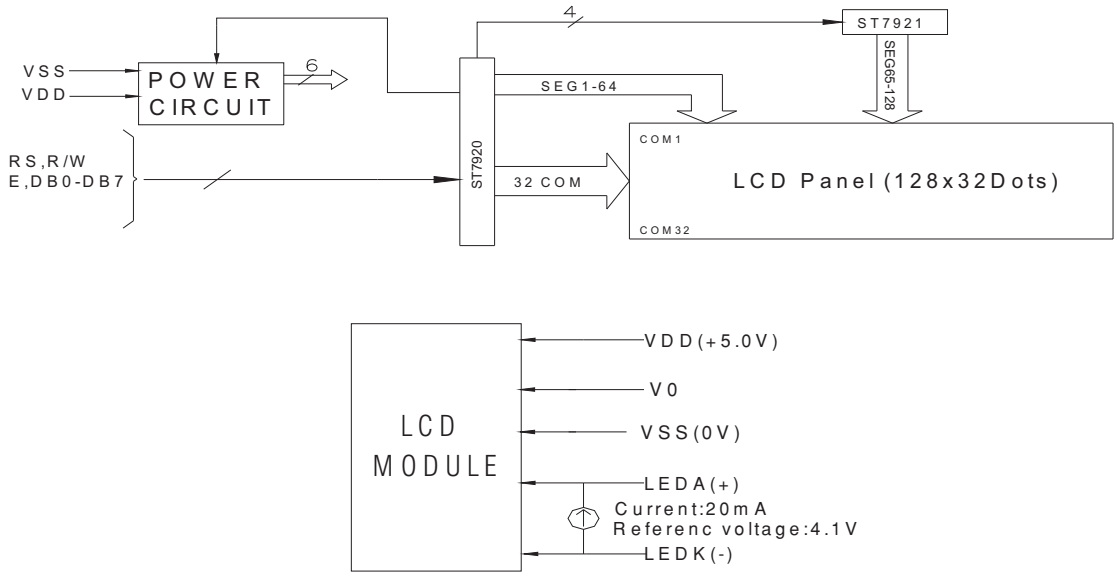


Figure 1. Block diagram

4. DIMENSIONAL OUTLINE

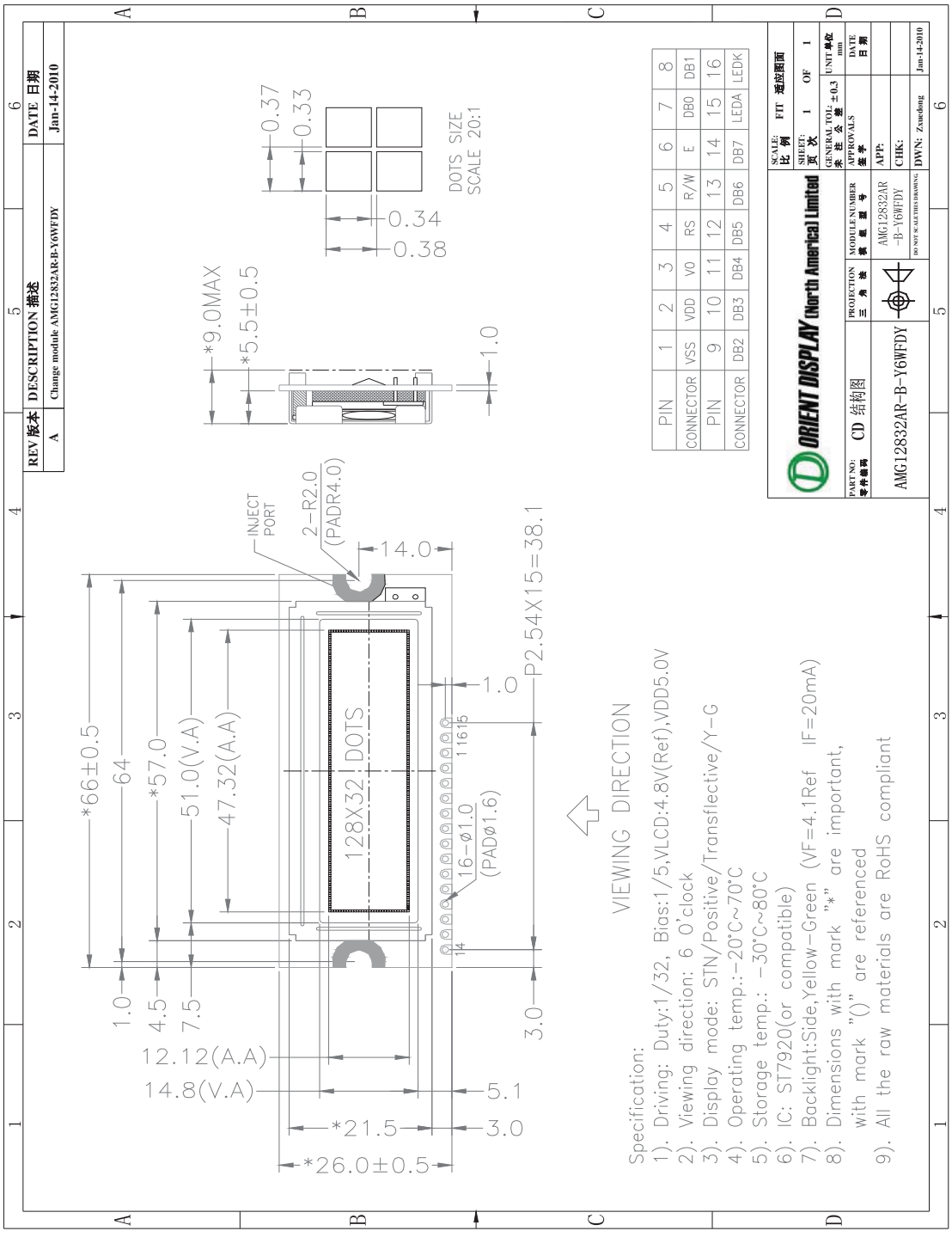


Figure 2. Dimensional outline

5. PIN DESCRIPTION

No.	Symbol	Function
1	VSS	GND(0V)
2	VDD	Logic supply voltage (+5.0V)
3	V0	Power supply for LCD
4	RS	H: Data L: Instruction
5	R/W	H: Read L: Write
6	E	Chip enable
7-14	DB0-DB7	Data bus lines
15	LEDA	Power supply for LED backlight(Current:20mA,Referenc voltage:4.1V)
16	LEDK	Power supply for LED backlight（0V）

6. MAXIMUM ABSOUTE LIMIT

Item	Symbol	MIN	MAX	Unit
Supply Voltage for Logic	V_{DD}	-0.3	7.0	V
Supply Voltage for LCD	V0	V_{DD}-10	0	V
Input Voltage	Vin	-0.3	V_{DD}+0.3	V
Supply Current for Backlight	I_F(Ta = 25°C)	---	30	mA
Reverse Voltage for Backlight	V_R(Ta =25°C)	---	5	V
Operating Temperature	Top	-20	70	℃
Storage Temperature	Tst	-30	80	℃

7. ELECTRICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage for Logic	V_{DD}-V_{SS}	Ta = 25°C	4.75	5.0	5.25	V
Input High Voltage	V_{IH}	Ta = 25°C	0.7V_{DD}	---	V_{DD}	V
Input Low Voltage	V_{IL}	Ta = 25°C	0	---	0.3V_{DD}	V
Output High Voltage	V_{OH}	Ta = 25°C	2.4	---	---	V
Output Low Voltage	V_{OL}	Ta = 25°C	---	---	0.4	V
Supply Current	I_{DD}	Ta = 25°C	---	15	20	mA

8. BACKLIGHT CHARACTERISTICS

LCD Module with side YG LED Backlight

ELECTRICAL RATINGS

Ta = 25°C

Item	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	VF	IF=20mA	3.9	4.1	4.3	mA
Reverse Current	IR	V_R=5.0V	---	40	---	uA
Luminous Intensity (Without LCD)	Lv	IF=20mA		TBD	---	Cd/m^2
Wave length (Without LCD)	X	IF=20mA	569	572	575	nm
Color	YG					

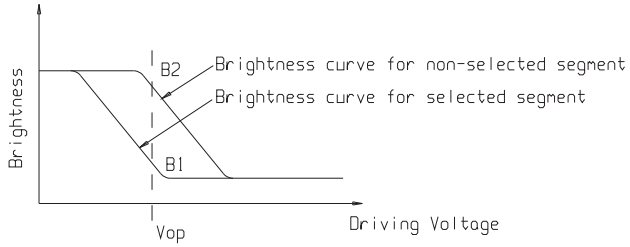
Note:when the temperature exceed 25℃, the approved current decrease rate for Backlight change as the temperature increase is: -0.36x4mA/℃(below 25℃, the current refer to constant, which would not change with temperature).

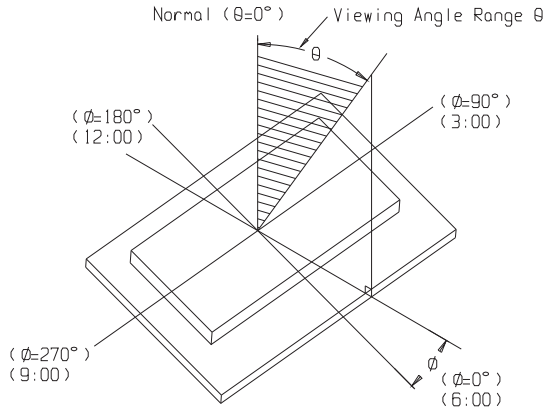
9. ELECTRO-OPTICAL CHARACTERISTICS

(VDD=5.0V, Ta = 25°C)

Item	Symbol	Condition	Min	Typ	Max	Unit
Operating Voltage for LCD	Vop	Ta =-20°C	4.9	5.2	5.5	V
		Ta = 25°C	4.5	4.8	5.1	
		Ta = 70°C	4.1	4.4	4.7	
Response time	Tr	Ta = 25°C	---	185	---	ms
	Tf		---	200	---	ms
Contrast	Cr	Ta = 25°C	---	5.0	---	---
Viewing angle range	θ	Cr≥2	-40	---	+40	deg
	Φ		-40	---	+40	deg

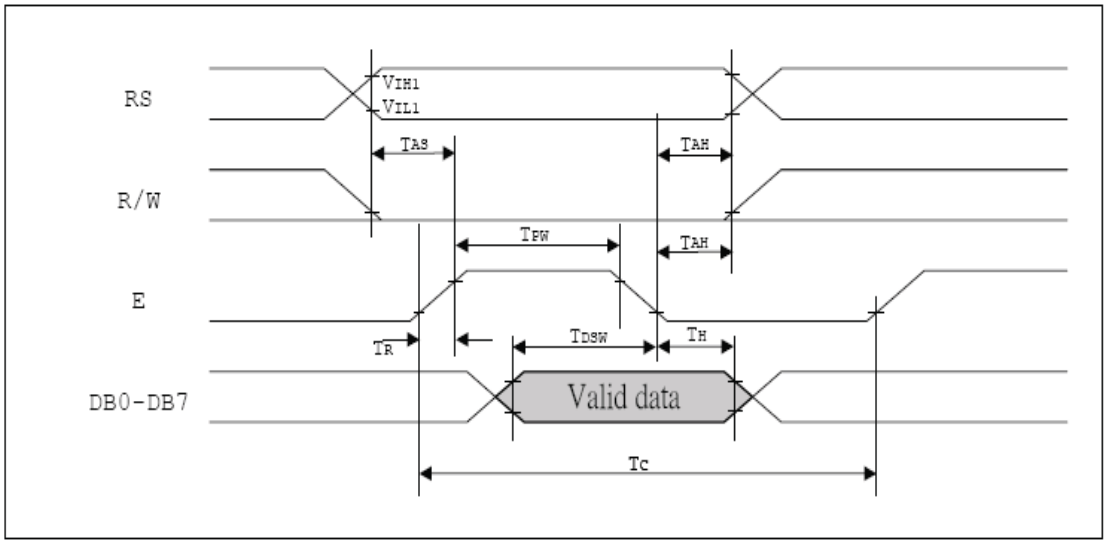
$$Cr=\frac{\text{Brightness of non-selected segment(B2)}}{\text{Brightness of selected segment(B1)}}$$



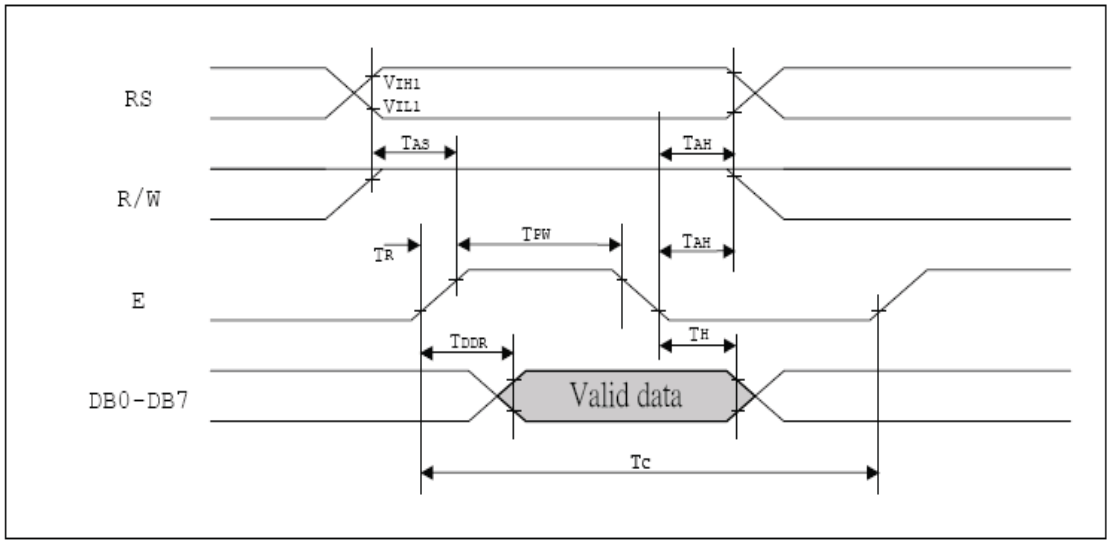


10. TIMING CHARACTERISTICS

- **MPU write data to ST7920**

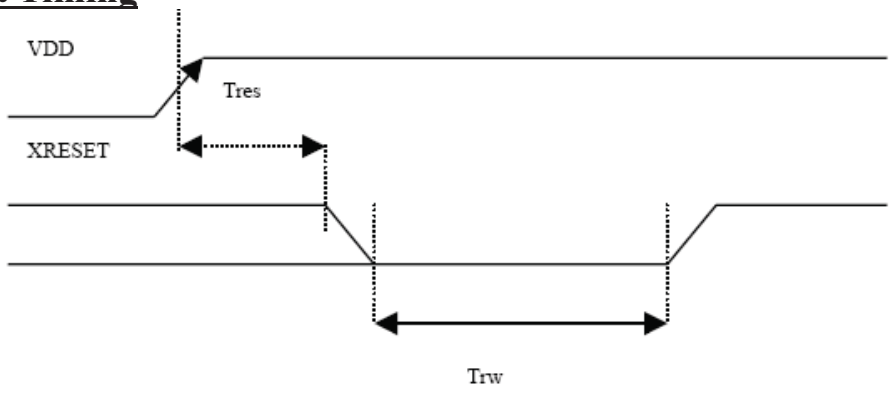


- **MPU read data from ST7920**



Symbol	Characteristics	Test Condition	Min.	Typ.	Max.	Unit
Internal Clock Operation						
f_{OSC}	OSC Frequency	R = 33KΩ	480	540	600	KHz
External Clock Operation						
f_{EX}	External Frequency	-	480	540	600	KHz
	Duty Cycle	-	45	50	55	%
T_R,T_F	Rise/Fall Time	-	-	-	0.2	μs
Write Mode (Writing data from MPU to ST7920)						
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	10	-	-	ns
T_{AH}	Address Hold Time	Pins: RS,RW,E	20	-	-	ns
T_{DSW}	Data Setup Time	Pins: DB0 - DB7	40	-	-	ns
T_H	Data Hold Time	Pins: DB0 - DB7	20	-	-	ns
Read Mode (Reading Data from ST7920 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	10	-	-	ns
T_{AH}	Address Hold Time	Pins: RS,RW,E	20	-	-	ns
T_{DDR}	Data Delay Time	Pins: DB0 - DB7	-	-	100	ns
T_H	Data Hold Time	Pins: DB0 - DB7	20	-	-	ns
Interface Mode with LCD Driver(ST7921)						
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	-1000	-	1000	ns

11. Reset Timing



XRESET pulse width	Trw	10us
RESET start time	Tres	50ns

12. CONTROL AND DISPLAY COMMAND

Instruction set 1: (RE=0: basic instruction)

Ins	code										Description	Exec time (540KHZ)
	RS	RW	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
CLEAR	0	0	0	0	0	0	0	0	0	1	Fill DDRAM with "20H", and set DDRAM address counter (AC) to "00H"	1.6 ms
HOME	0	0	0	0	0	0	0	0	1	X	Set DDRAM address counter (AC) to "00H", and put cursor to origin ; the content of DDRAM are not changed	72us
ENTRY MODE	0	0	0	0	0	0	0	1	I/D	S	Set cursor position and display shift when doing write or read operation	72us
DISPLAY ON/OFF	0	0	0	0	0	0	1	D	C	B	D=1: display ON C=1: cursor ON B=1: blink ON	72 us
CURSOR DISPLAY CONTROL	0	0	0	0	0	1	S/C	R/L	X	X	Cursor position and display shift control ; the content of DDRAM are not changed	72 us
FUNCTION SET	0	0	0	0	1	DL	X	0 RE	X	X	DL=1 8-BIT interface DL=0 4-BIT interface **RE=1: extended instruction** **RE=0: basic instruction**	72 us
SET CGRAM ADDR.	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address to address counter (AC) **Make sure that in extended instruction SR=0 (scroll or RAM address select)**	72 us
SET DDRAM ADDR.	0	0	1	0 AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address to address counter (AC) AC6 is fixed to 0	72 us
READ BUSY FLAG (BF) & ADDR.	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Read busy flag (BF) for completion of internal operation, also Read out the value of address counter (AC)	0 us
WRITE RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data to internal RAM (DDRAM/CGRAM/GDRAM)	72 us
READ RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM (DDRAM/CGRAM/GDRAM)	72 us

Instruction set 2: (RE=1: extended instruction)

Inst.	code										description	Exec. time (540KHZ)
	RS	RW	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
STAND BY	0	0	0	0	0	0	0	0	0	1	Enter stand by mode, any other instruction can terminate (Com1..32 halted)	72 us
SCROLL or RAM ADDR. SELECT	0	0	0	0	0	0	0	0	1	SR	SR=1: enable vertical scroll position SR=0: enable CGRAM address**(basic instruction)**	72 us
REVERSE	0	0	0	0	0	0	0	1	R1	R0	Select 1 out of 4 line (in DDRAM) and decide whether to reverse the display by toggling this instruction **R1,R0 initial value is 00**	72 us
EXTENDED FUNCTION SET	0	0	0	0	1	DL	X	1 RE	G	0	DL=1 8-BIT interface DL=0 4-BIT interface **RE=1: extended instruction set** **RE=0: basic instruction set** G=1 :graphic display ON G=0 :graphic display OFF	72 us
SET IRAM or SCROLL ADDR	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	SR=1: AC5~AC0 the address of vertical scroll	72 us
SET GRAPHIC RAM ADDR.	0	0	1	0 0	0 AC5	0 AC4	AC3 AC3	AC2 AC2	AC1 AC1	AC0 AC0	Set GDRAM address to address counter（AC） First set vertical address and the horizontal address by consecutive writing Vertical address range AC5...AC0 Horizontal address range AC3…AC0	72 us

Note：

1. Make sure that ST7920 is not in busy state by reading the busy flag before sending instruction or data. If use delay loop instead please make sure the delay time is enough. Please refer to the instruction execution time.
2. "RE" is the selection bit of basic and extended instruction set. Each time when altering the value of RE it will remain. There is no need to set RE every time when using the same group of instruction set.

13. PRECAUTION FOR USING LCD/LCM

After reliability test, recovery time should be 24 hours minimum. Moreover, functions, performance and appearance shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (20±8°C), normal humidity (below 65% RH), and in the area not exposed to direct sun light. Using LCM beyond these conditions will shorten the life time.

Precaution for using LCD/LCM

LCD/LCM is assembled and adjusted with a high degree of precision. Do not attempt to make any alteration or modification. The followings should be noted.

General Precautions:

1. LCD panel is made of glass. Avoid excessive mechanical shock or applying strong pressure onto the surface of display area.
2. The polarizer used on the display surface is easily scratched and damaged. Extreme care should be taken when handling. To clean dust or dirt off the display surface, wipe gently with cotton, or other soft material soaked with isoproply alcohol, ethyl alcohol or trichlorotriflorothane, do not use water, ketone or aromatics and never scrub hard.
3. Do not tamper in any way with the tabs on the metal frame.
4. Do not made any modification on the PCB without consulting Orient Display.
5. When mounting a LCM, make sure that the PCB is not under any stress such as bending or twisting. Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.
6. Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels and also cause rainbow on the display.
7. Be careful not to touch or swallow liquid crystal that might leak from a damaged cell. Any liquid crystal adheres to skin or clothes, wash it off immediately with soap and water.

Static Electricity Precautions:

1. CMOS-LSI is used for the module circuit; therefore operators should be grounded whenever he/she comes into contact with the module.
2. Do not 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.
3. Do not touch the connection terminals of the display with bare hand; it will cause disconnection or defective insulation of terminals.
4. The modules should be kept in anti-static bags or other containers resistant to static for storage.

5. Only properly grounded soldering irons should be used.
6. If an electric screwdriver is used, it should be grounded and shielded to prevent sparks.
7. The normal static prevention measures should be observed for work clothes and working benches.
8. Since dry air is inductive to static, a relative humidity of 50-60% is recommended.

Soldering Precautions:

1. Soldering should be performed only on the I/O terminals.
2. Use soldering irons with proper grounding and no leakage.
3. Soldering temperature: 280°C±10°C
4. Soldering time: 3 to 4 second.
5. Use eutectic solder with resin flux filling.
6. If flux is used, the LCD surface should be protected to avoid spattering flux.
7. Flux residue should be removed.

Operation Precautions:

1. The viewing angle can be adjusted by varying the LCD driving voltage Vo.
2. Since applied DC voltage causes electro-chemical reactions, which deteriorate the display, the applied pulse waveform should be a symmetric waveform such that no DC component remains. Be sure to use the specified operating voltage.
3. Driving voltage should be kept within specified range; excess voltage will shorten display life.
4. Response time increases with decrease in temperature.
5. Display color may be affected at temperatures above its operational range.
6. Keep the temperature within the specified range usage and storage. Excessive temperature and humidity could cause polarization degradation, polarizer peel-off or generate bubbles.
7. For long-term storage over 40°C is required, the relative humidity should be kept below 60%, and avoid direct sunlight.

Limited Warranty

Orient Display LCDs and modules are not consumer products, but may be incorporated by Orient Display's customers into consumer products or components thereof, Orient Display does not warrant that its LCDs and components are fit for any such particular purpose.

1. The liability of Orient Display is limited to repair or replacement on the terms set forth below. Orient Display will not be responsible for any subsequent or consequential events or injury or damage to any personnel or user including third party personnel and/or user. Unless otherwise agreed in writing between Orient Display and the customer, Orient Display will only replace or repair any of its LCD which is found defective electrically or visually when inspected in accordance with Orient Display general LCD inspection standard . (Copies available on request)
2. No warranty can be granted if any of the precautions state in handling liquid crystal display above has been disregarded. Broken glass, scratches on polarizer mechanical damages as well as defects that are caused accelerated environment tests are excluded from warranty.
3. In returning the LCD/LCM, they must be properly packaged; there should be detailed description of the failures or defect.

14. LCM TEST CRITERIA

1. Objective

The criteria is made for customer and company to check on delivery LCM end product, guarantee the production quality to meet with customer's demand.

2. Range

2.1 Suit for our company's LCD end production.

3. Testing equipment

Function tester、sliding calipers、microscope、visual magnifying glass、ESD arm protector、finger cover、label、 high-low temperature experiment case、refrigerator、fixed-voltage power supply（DC），table lamp and so on.

4. Sampling plan and quote superscript

4.1.1 According to GB/T 2828.1---2003/ISO2859-1:1999，normal check of one sampling plan, general level of inspection II.

Testing item	Sample quantity	AQL judgment
cosmetic	II one time sample	MA=0.4 MI=1.5
scale	N=3	C=0
function	II one time sample	MA=0.4 MI=1.5

4.1.2 GB/T 2828.1---2003/ISO2859-1:1999 check and count the sampling procedure and table one by one.

4.1.3 GB/T 1619.96 Test method of twisting out LCD device.

4.1.4 GB/T 12848.91 General standard of super-out LCD device.

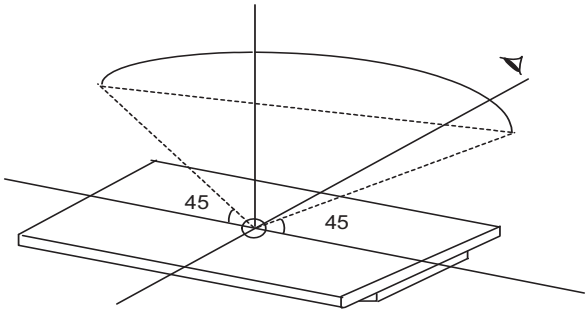
4.1.5 GB2421-89 Basic experience environment of electrical and electronic products

4.1.6 IPC-A-610C Check condition of electrical assemblies.

5. Test condition and basis

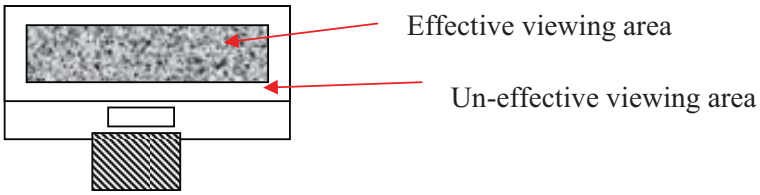
5.1 visual：General under the condition of 25±5℃，45±20%RH，with enough light（>300cd/cm2），the distance between operator and LCD is 30cm， use the method of reflective to test is normal，the backlight products, must test under the condition of luminance smaller than 100cd/cm2，and lit up the backlight.

5. 2 The test left and right direction is 45°,up and down view angle is 0-45°



（STN depends on -20-55°）to have a test， as follows：

5. 3 Viewing area definition



5. 4 Naked eye examination（except with assistant of magnifying glass to do defect test）.

5. 5 Electricity property

Testing use self-made/professional LCM test installation: contrast with the products file and designed drawing, ask for the display content and parameters accord with the document, and the result in line with the pattern

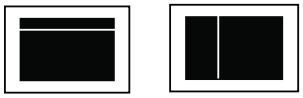
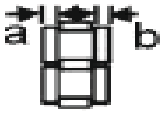
5. 5. 1 Testing voltage（V）： Refer to the requirement of test device， customer have no special statement, think the external circuit adjustable, effect controlled in agreed voltage fluctuation（without special agreement， accord to LCD driving voltage at 9V or bellowed control in±0.3V, above 9V, at least is LCD driving voltage ±3%），to the products with special voltage demand, assurance display effect through circuit adjust， when necessary made the maximum and minimum receivable samples.

5. 5. 2 Power consumption of electric current（I）： refer to product document or designed blueprint identify.

6. Defective item and testing criteria

6. 1 Scale： To the whole cosmetic scale and which could influence the assemble position , should accord to the drawing, main defect.

6. 2 capacity test:

order	item	description	MAJ	MIN	Accept standard
6. 2. 1	Segment missing	SEG/COM showed line or spot missing caused by line break/bad connection，i8nner short 	√		reject
6. 2. 3	No display/no action	Normal connection, no display	√		reject
6. 2. 4	mistake/abnormal	Accord to common scanner procedure, picture and order inconsistent with requirement	√		reject
6. 2. 5	Viewing angle mistake	The clearest direction inconsistent with requirement	√		reject
6. 2. 6	Display dark/light	Normal display the whole ratio too light or dark	√		Over voltage standard,reject
6. 2. 7	Slow reflect	Reflection of lit or off on part dose not uniform with others.	√		reject
6. 2. 8	Show more symbol, more lines and rows	due to lack of matching unrightenousness or etched caused alignment or logo when lit display of symbols, row or line.		√	refer to spot/line standard
6. 2. 9	light/dim segment	On the condition of normal voltage, the display contrast is not uniformed		√	Reject or refer to samples
6. 2. 10	PI black/white spot	Poor connect in LCD lead to black/white spot in word change procedure		√	Suspended screen , refer to spot/line，others OK
6. 2. 11	pinhole/white spot	ITO missing lead to picture incomplete when lit up  d = (X+Y)/2		√	refer to spot/line standard
6. 2. 12	word deformed	Mistaken match caused the display width dose not conform to standard, then lead to convex or air leakage: |Ia-Ib|≤1/4W(W is the normal width) 		√	accept |Ia-Ib|>1/4W, reject
6.2.13	High current	LCM current exceed requirement		√	reject

6.3 LCD visual defect

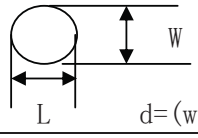
6. 3. 1 spot defect(controlled in viewing area, in un-viewing area, OK)

Defective item	average diameter（d）	Accept number	MAJ	MIN
Spot defect （black spot, impurity, pinhole,, contain LC defect）	d≤0.2	3		√
	0.2<d≤0.25	2		
	0.25<d≤0.30	1		

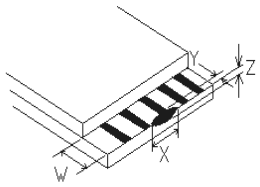
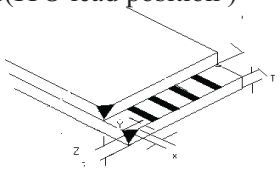
6. 3. 2 Line defect(controlled in viewing area, in un-viewing area, OK)

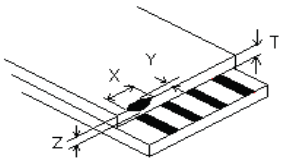
Defective item	length(L)	width(W)	Accept number	MAJ	MIN
line defect (segment, impurity) 	≤5.0	≤0.02	3		√
	≤3.0	≤0.03	3		
	≤3.0	≤0.05	1		
note： 1.when width is bigger than 0.1, it needs to handle as line defect。					

6. 3. 3 polarizer air bubble (controlled in viewing area, in un-viewing area, OK)

Defective item	average diameter（d）	Accept number	MAJ	MIN
polarizer air bubble、convex point 	d≤0.3	3		√
	0.3<d≤0.5	2		
	0.5<d≤0.8	1		

6. 3. 4 Damaged(LCD edge reveal without mental frame, contain COG,H/S, deduct BL directly)

order	item	Permit standard		MAJ	MIN
6. 3. 4. 1	Conductor chips 		（mm）		√
		X	≤1/8L		
		Y	≤1/3W		
		Z	≤1/2t		
		Accept number	2		
		When Y≤0.2mm, neglect the length of X, un-conductor chips，depend on X≤1/10L， Y≤1/2W。			
6. 3. 4. 2	chips(ITO lead position) 		（mm）	MAJ	MIN
		X	Not enter into frit or do not attach the conductor		√
		Y			
		Z	≤t		

		Accept number	2		
		Seal position refer to 6.3.4.3， do not enter into frame black edge. Chips damage the conducing， refer to 6.3.4.1			
6.3.4.3	interface seal rubber crack (outer crack)  		（mm）	MAJ	MIN
		X	≤1/8 L		√
		Y	≤1/2H		
		z	≤ 1/2t		
		Accept number	2		
		Seal edge rubber inner crack conform to the standard of outer. when the back of stage cracked refer to 6.3.4.1.			
note: t---glass thickness, L---length, H---distance. W—glass stage width					

6.3.5 others

order	item	description	MAJ	MIN	Accept standard
6.3.5.1	coloration/background	One product, different color		√	Reject or refer to limited sample
6.3.5.2	Leak ink(LC)	/	√		reject
6.3.5.3	Without protect film	/		√	reject

6.4 backlight components

order	item	description	MAJ	MIN	Accept standard
6.4.1	Backlight unlit, wrong color	/	√		reject
6.4.2	Color deviation	Lit up, color differ from the sample, or do not match the drawing after testing		√	Refer to sample and drawing
6.4.3	Brightness deviation	Lit up, lightness differ from the sample, or do not match the drawing after testing, or over the sample range of±30%.		√	Refer to sample and drawing
6.4.4	LED uneven	Lit up, brightness uneven, exceed the drawing specification.		√	Refer to sample and drawing
6.4.5	Spot/line segment	There are tainted, segment when lit up.		√	Refer to 6.3.1/6.3.2

6.5 Mental frame

order	item	description	MAJ	MIN	Accept standard
6.5.1	material/surface	Mental frame/surface approach inconsistent with specification.	√		reject
6.5.2	Twist un-quality/without twisting	Twist method/direction default,	√		reject
6.5.3	oxidation, paint stripping, discoloration, dent ,segment	The surface of the mental frame dose not appear oxidation, front surface paint stripping and segment to bottom≤0.8mm, exceed 3 point, length≤5.0mm, width≤0.05mm line defect exceed 2 point, positive dent, bubble and side surface have paint stripping and segment to bottom≤1.0mm exceed 3 point, width≤0.05mm line defect exceed 3 point.		√	reject
6.5.4	prick	Prick is too long, enter into viewing area		√	reject

6.6 PCB/COB part

order	item	description	MAJ	MIN	Accept standard
6.6.1	Seal rubber defect	1. COB inner round white remark line have PAD out reveal.. 2. height exceed the document/drawing specification. 3. COB seal rubber should in white remark, the largest out scale can not exceed remark radius 2MM 4. COB surface has clear lien assemble mark, some even through the pinhole. 5. COB surface pinhole diameter over 0.25mm or have tainted..		√	reject
6.6.2	PCB cosmetic defect	1. PCB golden figure surface can not have oxidation, dirt. 2. PCB can not appear bubble caused by reflow. 3. PCB green oil drop /segment lead to leak copper. Use mending, circuit diameterψ can not over 1.3mm, other diameterψ can not over 2.6mm, total less than 10 point. otherwise reject.		√	reject

6.6.3	Components mistake	1. PCB components inconsistent with drawing. Find wrong pitch, more or less pitch, polar reverse（LCD voltage side circuit/BL current limit resistance modify, only if customer have special require, otherwise do not control） 2. The JUMP of PCB shot need refer to the structure picture, appear more or less soldering. 3. customer have special require on the component, mode specification and supplier should conform to technique demand. Otherwise reject.	√	√	reject

6.7 SMT part (vague parts refer to IPC-A-610C)

Order	Item	Description	MAJ	MIN	Accept standard
6.7.1	Soldering defect	Cold solder, fake solder, missing solder，crack，tin un-dissolved		√	reject
6.7.2	Solder ball/bridge	Solder ball/bridge drop lead to spot short.		√	reject
6.7.3	DIP parts	DIP parts，keypad，connection appear flowing and tilted.		√	reject
6.7.4	Spot shape	Inner dent，can not form to cover solder or less solder, otherwise reject		√	reject
6.7.5	Component out reveal	After cutting, just left 0.5mm~2mm,can not damage solder surface and covered the component foot. Otherwise reject.		√	reject
6.7.6	Cosmetic defect	Solder residues appear tawny or coke black. PCB solder spot remained white mist residues after clean.		√	reject

6.8 Thermal press part（contain H/S，FPC）

Order	item	description	MAJ	MIN	Accept standard
6.8.1	Model specifications do not match		√		reject
6.8.2	Scale/position	Material scale must in the drawing specification range，the contact area of dielectric material and the body（ITO，PDA） should be above 1/2， and the dislocation must control in specification		√	Accept

6.8.3	Thermal press dirt	Thermal area tainted can not lead to short, OK，in through position， dirt area is smaller than 50%，OK。		√	accept
6.8.4	creases			√	Refer to limited sample

6.9 connection and other parts

order	item	description	MAJ	MIN	Accept standard
6.9.1	Specification un-matched	Connection and other components do not conform to drawing requirement	√		reject
6.9.2	Position and order	Solder position should consistent with the drawing .		√	reject
6.9.3	cosmetic	1. the body of our connect component and the PIN foot have solder-helping. 2. PIN connection PIN deformation bigger than PIN width 1/2.		√	reject

6.10 General visual

order	item	description	MAJ	MIN	Accept standard
6.10.1	Connect material	FPC golden figure or H/S,FFC out part of PIN leak copper or material, have damaged. FPC,FFC,COF,H/S connected material curved（except for original ）. FPC、PCB golden figure bigger than 1PIN width. FPC/FFC material segment, crease exceed the specification.		√	reject
6.10.2	Protect defect	Protect film do not cover circuit totally（如H/S，FFC，FPC） or not contact with interface, or add on PIN outer part.		√	reject
6.10.3	Visual dirty	The surface of end products have dirt, rubber，PCB/COB un-welding area has solder ball. The defective remark or label do not clean.		√	reject
6.10.4	Assembly black spot	Add backlight，taint and black spot		√	Refer to 6.3.1
6.10.5	Product remark	Model defer from approved remark and technique requirement、 position, vague and leak.		√	reject
6.10.6	Inner product packing	Packing inconsistent with requirement，segment short，wrong amount. And inconsistent with shipment remark/ order demand.		√	reject

7．Reality test

Note：If customer have requirement, please put forward on the item development.（high/low temperature storage and experiment, the temperature refer to specific requirement），±5℃ deviation could be accept.

8．Packing

8.1 Product design must meet the requirement of packing design and check on delivery. Besides the product name, specification, model, quantity and date on the label, the quality chapter is necessary after checked by QA. Incomplete or mistake, is not qualified.

8.2 When the safety of the packing (earthquake, moisture-proof, anti-static, anti-squeezed) exist problem, not qualified.

8.3 When customer's special requirement is confirmed and accepted by interior, carry it out and check on delivery.

8.4 Environment protected and unprotected products must have obvious distinguished remark. The present remark adopts "RoHS". If customer have special requirement, use the appointed remark or label.

Test item	Condition	Time(hrs)	Accept standard
high temp storage	70°C	120	Before and after test, function and cosmetic is qualified.
high temperature operating	80°C	120	
low temperature storage	-30°C	120	
low temperature operating	-20°C	120	
temperature& humility test	40°C/ 90%RH	120	
temperature shock	-20°C ← 25°C →+70°C (30 min ← 5 min → 30min)	10 cycles	

9．Others

9.1 No-provision or compromised item, depend on two side agreement and limited prototype.