DMA270UHNENT0-2A
PRODUCT SPECIFICATION

Version 0.1
Sep 20, 2024

Customer's Approval	
Signature	*Date*

Prepare*d by Yvette Hsieh*
Approved by *Eric Wan*

Revision History

VERSION	DATE	DESCRIPTION	AUTHOR
0.1	Sep 20, 2024	Preliminary	Yvette Hsieh

Legal Notice

Table Of Contents

1. General Description

1.1 Introduction

This is a 27" size colour AMOLED display module. The display is 1.07B colour, has a resolution of 3840 x 2160 and supports EDP 1.4b interface.

1.2 Main Features

Item	Contents
Display Type	AMOLED
Screen Size	27" Diagonal
Display Format	3840 x RGB x 2160 Dots
No. of Colour	1.07B
Mode	AMOLED
Overall Dimensions	607.66 (W) x 348.18 (H) x 1.24 (D) mm
Active Area	597.6576 (W) x 336.1824 (H) mm
Surface Treatment	Anti-Glare (3H)
Viewing Direction	All round
Interface	EDP 1.4b
Operating Temperature	-20°C ~ +70°C
Storage Temperature	-40°C ~ +85°C
ROHS	RoHS Compliance

2. Mechanical Specification

2.1 Mechanical Characteristics

Item	Characteristic	Unit
Display Format	3840 x RGB x 2160	Dots
Overall Dimensions	607.66 (W) x 348.18 (H) x 1.24 (D)	mm
Active Area	597.6576 (W) x 336.1824 (H)	mm
Dot Pitch	0.15564(W) x 0.15564(H)	mm
Weight	TBD	g

2.2 Mechanical Drawing

NOTES:
1. DISPLAY TYPE: 27.0"OLED, TFT COG,RGB(8/10Bit) COLORS
2. DISPLAY MODE: NORMALLY BLACK,IPS
3. VIEWING DIRECTION: ALL
4. LCM DRIVER IC: ***(COG)
5. TFT INTERFACE: EDP
6. VBAT INPUT: 21-30V
7. OPERATING TEMP: 20°C TO 70°C
   STORAGE TEMP: -40°C TO 85°C
8. Connector:IPEX I-PEX 20455-050E-0, .:FH41-60S-0.5SH,FH41-50S-0.5SH
9. RoHS AND REACH COMPLIANT.

Front View

Side View

Bottom View

27"OLED
3840*RGB*2160

DETAIL-A
SCALE:20:1

DMA270UHNENT0-2A

DRAWING NAME

PARTS NO. 5750270001

Drawn

Checked

Approve

Unit mm

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TOLERANCE(公差)

TOLERANCE UNLESS: X.X±0.3

OTHERWISE SPECIFIED: X.XX±0.2

Scale 1:1

3. Electrical Specification OLED

3.1 Absolute Maximum Ratings

(Ta=25ºC, VSS=0V)

Item	Symbol	Min	Max	Unit
Supply Voltage	VBAT	-0.3	30	V
Operating Temperature	T_{OP}	-20	+70	ºC
Storage Temperature	T_{ST}	-40	+85	ºC

Note 1: When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur. Also, for normal operations, it is desirable to use this module under the conditions according to Section 3.2 "DC Electrical Characteristics OLED" and Section 4 "Optical Characteristics OLED." If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.

3.2 DC Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Input Voltage	VBAT	-	21.6	24.0	26.4	V
Normal Mode Current Consumption	VBAT	Full white, VBAT = 24V	-	1458	1604	V
Power Consumption	VBAT		-	35	38.8	W
Frame Frequency	Fps	-	-	60	Hz	mA

Note: Full white pattern, temperature = 22 $\pm$ 3ºC, room temperature.

3.3 Interface Pin Assignment

CNT: I-PEX 20455-050E-0 (50pins, 0.5pitch) or compatible

| No.	Symbol	I/O	Function
1	NC	I	No connection
2	H_GND	P	High speed ground
3	LANE3N	I	Complement signal link lane 3
4	LANE3P	I	True signal link lane 3
5	GND	P	High speed ground
6	LANE2N	I	Complement signal link lane 2
7	LANE2P	I	True signal link lane 2
8	GND	P	High speed ground
9	LANE1N	I	Complement signal link lane 1
10	LANE1P	I	True signal link lane 1
11	GND	P	High speed ground
12	LANE0N	I	Complement signal link lane 0
13	LANE0P	I	True signal link lane 0
14	GND	P	High speed ground
15	AUXP	I	Ture signal auxiliary channel
16	AUXN	I	Complement signal auxiliary channel
17	H_GND	P	High speed ground
18-20	GND	P	Ground
21	BIST	P	BIST enable signal
22	GND	P	Ground
23	HPD	P	HPD signal
24-27	GND	P	Ground
28-37	VBAT	P	Power supply
38	NC	-	No connection
39-42	GND	P	Ground
43-50	NC	-	No connection

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3.4 Block Diagram

TBD

3.5 Timing Characteristics

3.5.1 Recommend Operating Sequence
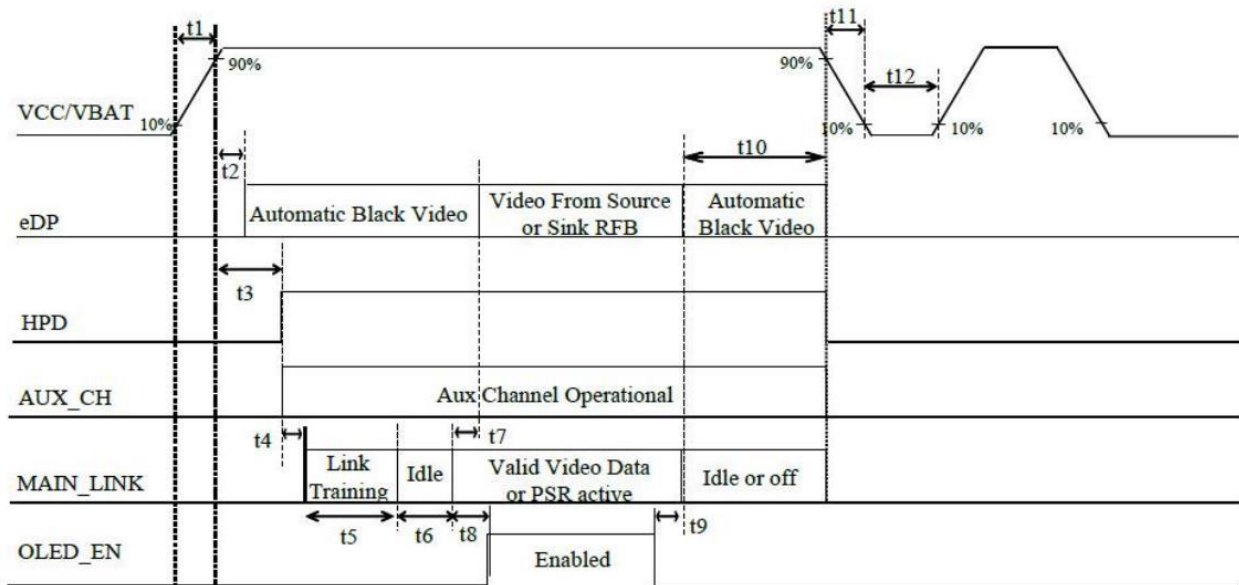
Note 1: It needs minumum 1200ms HPD~Valid Video Data (T4-T6). During the period display back data and valid video data before 1200ms can be lost.

Note 2: Do not keep the interface signal high-impendace or unusual signal when power is on.

Symbol	Min	Max	Unit	Description
t1	0.5	10	ms	Power rail rise time, 10 to 90%
t2	0	200	ms	Delay from VCC/VBAT to automatic Black Video
t3	0	200	ms	Delay from VCC/VBAT to HPD high
t4	-	-	ms	Allows for the Source device to read Link capability
t5	-	-	ms	Link Training duration
t6	-	-	ms	Link idle
t7	0	50	ms	Delay from valid video data from Source to video on display
t8	20	-	ms	Delay from valid video data from Source device to OLED_EN
t9	0	-	ms	Delay from OLED disable to end of valid video data
t10	0	500	ms	Delay from end of valid video data from the Source to power-off
t11	--	10	ms	Power rail fall time, 90 to 10%
t12	500	-	ms	Note

Note: As for the power off-on sequence for VCC (t12), be sure to keep above mentioned timing. If the VCC power off-on

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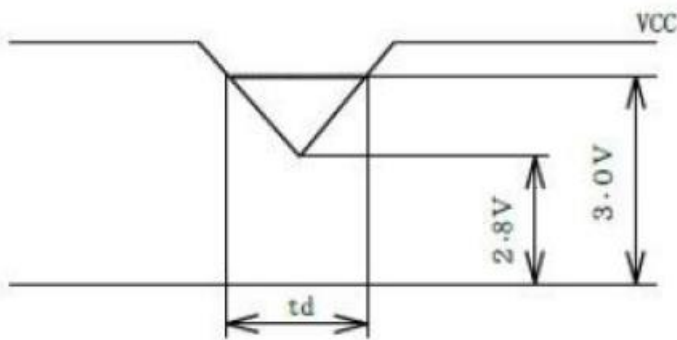sequence timing is other than shown above, panel may cause permanent damage.
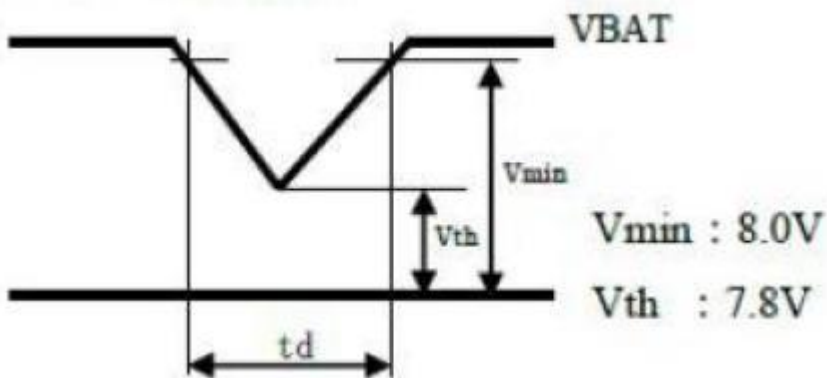
VCC-dip condition

1. 2.8V ≤ VCC < 3.0V, td ≤ 10ms

Under above condition, the display image should return to an appropriate figure after VCC voltage recovers.

2. VCC < 2.8V

VCC-dip conditions should also follow the ON-OFF conditions for supply voltage.

VBAt-dip condition

Vmin : 8.0V

Vth : 7.8V

1. Vth ≤V_{BAT} ≤ Vmin: td ≤ 20ms

2. V_{BAT} < Bth: The condition of instataneous voltag dop is apply to display exception.

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3.5.2 EDP Interface Timing Characterisitcs

Item	Value	
eDP Speed	Typ 5.4Gps	
Frame Freq.	Typ 60Hz	
Porch	HFP + HBP (with HS)	160
	VFP + VBP (with VS)	48

4. Optical Specification OLED
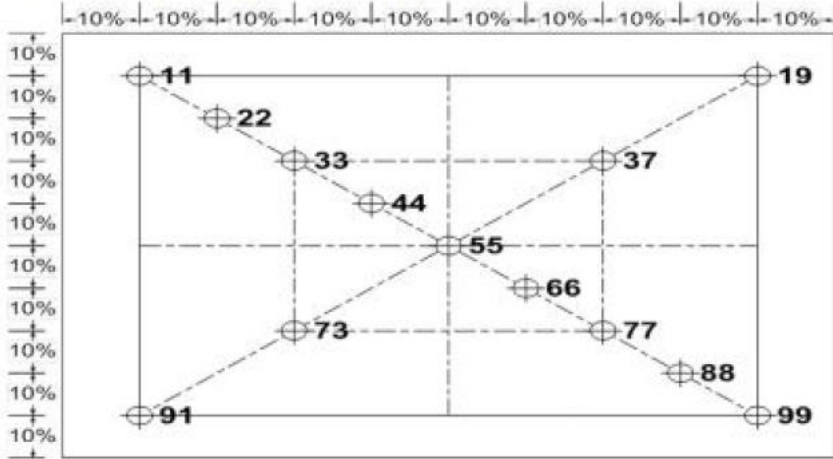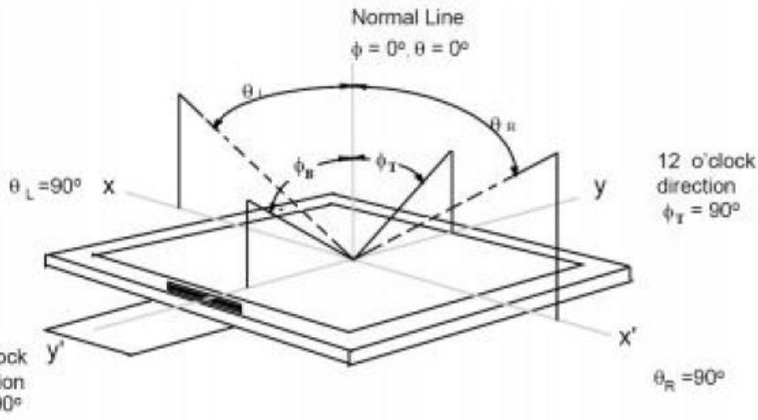
4.1 Optical Characteristics
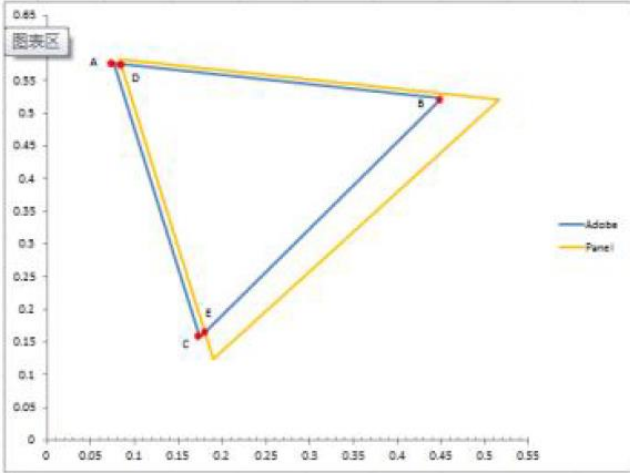
Characteristics		Symbol	Conditions	Min	Typ.	Max	Unit	Note
Brightness		Lv	Normal (White mode)	352	400	448	cd/m^2	1
Peak Luminance (10% Box)		-	VESA HDR	600	-	-	cd/m^2	VESA HDR 600TB
Uniformity		-	White mode	75	85	-	%	2
Contrast Ratio		CR	by CA310	-	100000	-	-	3
			by CS2000A	-	1000000	-	-	
Response Time		Tr + Tf		-	1	2	ms	6
Viewing Angle	Left	ΘL	CR > 10	85	-	-	Deg	7
	Right	ΘR						
	Top	ΘU						
	Bottom	ΘD						
Color Chromaticity	Red	Rx	Normal viewing angle- Θ=Φ=0°	-0.02	0.683	+0.02	-	-
		Ry			0.315			
	Green	Gx			TBD			
		Gy			TBD			
	Blue	Bx			0.137			
		By			0.043			
	White	Wx			0.313			
		Wy			0.329			
Color Gamut		S (%)	Adobe RGB	TBD	-	-	%	4
			DCI-P3	98	100	-	%	
			sRGB	100	-	-	%	
White Temperature °K		-	Normal viewing angle- Θ=Φ=0°	6000	6500	7000	K	-
Gamma		-		2.0	2.2	2.4	-	5
Color Shift		Δuv	Θ=Φ=45°	-	-	0.020	-	8

DENSITRON

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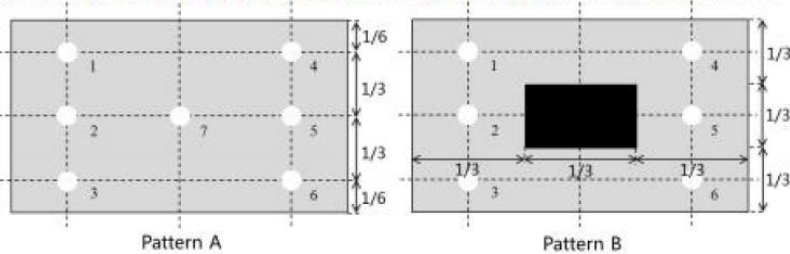
Characteristics	Symbol	Conditions	Min	Typ.	Max	Unit	Note
Image Sticking	ΔL	Macbeth pattern, max lum 3000h, ambient: ~25°C, Panel: ~45°C	-	-	3.5	%	-
Flicker	-	Θ=Φ=0°	-	-	-35	dB	Pattern: W255/W128/W32
Crosstalk	-		-	-	1.5	%	9
TUV Blue Ray Certification	-	145-455nm/400-500nm	-	-	50	%	10
OLED Lifetime	-	T50@25°C	15000	-	-	Hrs	11

Note: Measuring Condition = in dark room, at ambient temperature 25±2°C, 65±20% RH, for 15 min warm-up time

Note	Item	Test method
1		Brightness follows Microsoft brghtness3 (Based on OPR 50%) The Brightness of full white pattern (OPR 100%) is the same as that of OPR 50%. OPR 50%
2	Definition of Brightness Uniformity	For brightness uniformity measure, EDO's request as below: 1. The test condition is at 25°C and measured on the surface of display panel module. 2. Measurement equipment: CA310 or similar equipment. 3. The brightness uniformity is calculated by using follows formula: Brightness Uniformity = BP (Min)/ VBp (Max) Bp (Max) = Maximum brightness in 13 measured spots. Bp (Min) = Minimum brightness in 13 measured spots.

Note	Item	Test method
3	Definition of Contrast Ratio	Dark Room C.R = LW/LB LW: Full white brightenss of display center P0. LB: Full black brighrness of display cneter P0.
4	Definition of Color Gamut	For brightness uniformity measure, EDO's request below: 1. Measurment equipment: CS2000A or similar equipment. 2. DCI-P3 & Adobe color data:

CIE1976	R	G	B
DCI-P3	(0.496, 0.526)	(0.099, 0.578)	(0.175, 0.158)
Adobe	(0.451, 0.523)	(0.076, 0.576)	(0.175, 0.158)
sRGB	(0.451, 0.523)	(0.125, 0.563)	(0.175, 0.158)

3. The color gamut is calculated by using following fomula:

Color gamut % = $S_{covergage}$/$S_{original\ color\ gamut}$

$S_{covergage}$: The area covered by panel color gamut

$S_{original\ color\ gamut}$: The triangle area of Adobe of DCI-P3 color gamut

For example: Color Gamut % = S_{EDB}/S_{ABC}%

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Note	Item	Test method
5	Definition of Gamma	For gamma curve control, EDO's requestis as below: 1. Callibration the test instrument. Set the screen size parameters, and measure the center point. 2. EDO will test the gray scale below, if possible also can use the patterns of gray 0 to 255 to test for example: 0, 8, 16, 25, 33, 41, 58, 66, 74, 82, 90, 99, 107, 115, 123, 132, 140, 148, 156, 165, 173, 181, 189, 197, 206, 214, 222, 230, 239, 247, 255 or 0, 1, 2, 3, , 252, 253, 254, 255. Total 256 pcs patterns. 3. Output the measure data. Data number normalization and draw the chart. 4. The whole screen should be complied with the gamma curve of gamma 2.0 or 2.4, it measns +/- 0.2 error is allowed. But if there are special requirements for the special project, its required specification can be used as standard value, please refer the project spec.
6	Definition of Response Time	Responsed time = Pixel turn on and turn off time (White<->Black) It is measuring transition on time from 10% to 90% of liminance.
7	Definition of Viewing Angle	

Note	Item	Test method
8	Definition of Color Shift	For color shift measure: Fix on white patternm. On the condition θ = 0, F = 0°, we can get the color coordinate (u_1', v_1') and on θ = 45°, F = 45° we can get another color coordinate (u_2', v_2') Delta = Square Root ((u_2' − u_1')^2 + (v_2' − v_1')^2) JNCD stands for "Just Noticealbe Color Differenece) For the (u', v') color space 1 JNCD = 0.0040 5 JNCD means Delte $u'v'$ < 0.020
9	Definition of CrossTalk	For crosstalk measure, EDO's request as belowL 1. Pattern A and B are of 127 gray, the only difference is the black patch in the middle of paaten B. 2. Calibrate the test insturment. 3. Point 7 in pattern A is used as brightness calibration for each panel. Then measure the brightness of points 1 to 6 on pattern A and B. 4. Calculate the value of crosstalk according to the formula: Crosstalk = max {[(B2-A2)-[B1-A1]+(B3-A3)]/2} / A2{[(B5-A5)-[B4-A4]+(B6-A6)]/2}A5}
10	Definition of TUV Blue Ray Certification	Under full white mode, test the spectra of center point, and them calculate the intensity in the range 415nm-455nm and 400nm-500nm. The ratio of intensity from 415nm-455nm compared to 400nm-500nn should be less than 50%.
11	Definition of OLED Lifetime	The test procedure os as follows: At room temperature (25°C), light the module twith typical value brightness (full white). After that, record the brighrness of center every 24 hours. Then test 600 hours or more to collect the raw data. Finally, used the raw data and the speicfic formulas to calculate and estimate the T50.

5. Functional Specification OLED

TBD

6. Packaging

TBD

7. Quality Assurance Specification

7.1 Conformity

The performance, function and reliability of the shipped products conform to the Product Specification.

7.2 Environment Required

Customer's test & measurement are required to be conducted under the following conditions:

Temperature:	25 ± 5℃
Humidity:	65% ± 10% RH
Viewing Angle:	Normal Viewing Angle
Illumination:	300 – 700LUX
Viewing distance:	30-50cm

Finger glove (or finger cover) must be worn by the inspector.
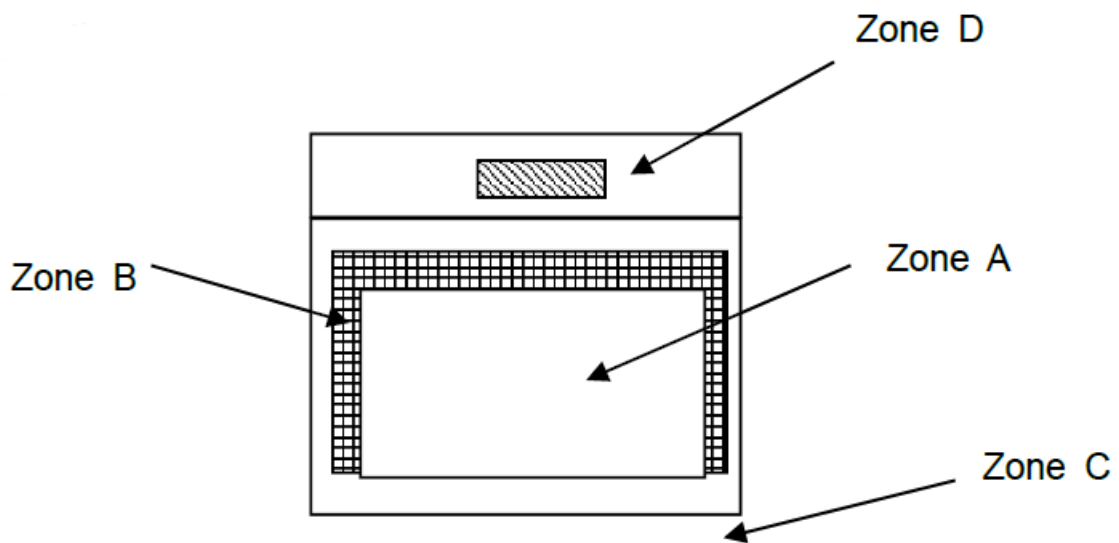
Inspection table or jig must be anti-electrostatic.
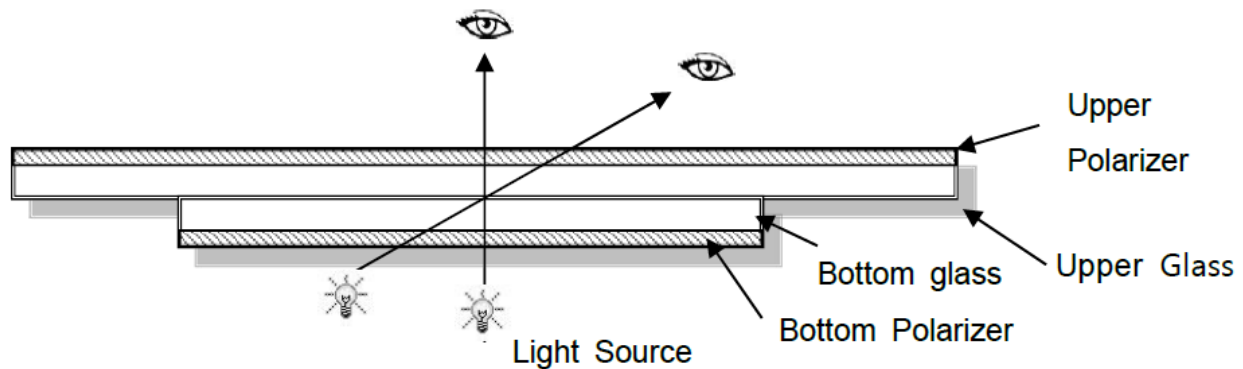
7.3   Delivery Assurance

7.3.1   Delivery Inspection Standards

Class II, Normal Inspection, MIL-STD-105E

7.3.2   Zone Definition

Zone A: Effective Viewing Area (Character or Digit can be seen)

Zone B: Viewing Area except Zone A

Zone C Cover (Zone A + Zone B) which can not be seen after assembly by customer.)

Zone D: IC Bonding Area

Note: As a general rule, visual defects in Zone C can be ignored when it doesn't affect product function or appearance after assembly by customer.

7.3.3 Criteria & Acceptable Quality Level

Partition	AQL
Major	0.65
Minor	1.5

LCD: Liquid Crystal Display, LCM: Liquid Crystal Module, CTP: Capacitive Touch Panel
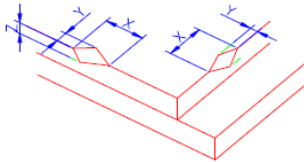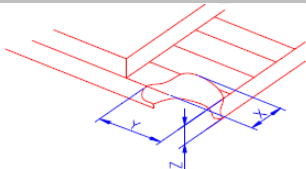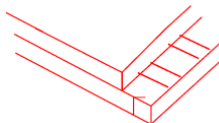
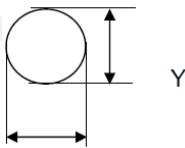| No.	Items	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting etc.	Major
2	Missing	Missing components etc.	
3	Outline Dimension	Overall outline dimension beyond the drawing or deformation is not allowed.	
4	Color Tone	Color unevenness, refer to limited sample	Minor
5	Spot/Line Defect	Light dot,Dim spot, Polarizer Air Bubble, Polarizer accidented spot and etc.	
6	Soldering Appearance	Good soldering, peeling noff is not allowed etc.	
7	LCD/Polarizer	Black/White spot/line, scratch, crack etc.	

Note:

a) Light dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

b) Dim dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.

7.3.4 Criteria & Classification

Units: mm

No	Item	Criteria
1.0	The edge of LCD broken	 	X	Y	Z	 	≤ 3	< Inner border line of the seal	≤ T	
	LCD corner broken	 	X	Y	Z	 	≤ 3	< L	≤ T	
	LCD crack	 Crack Not allowed
2.0	Spot defect Φ=(X+Y)/2	1. light dot (LCD/TP/Polarizer black/white spot, light dot, pinhole, dent, stain) See table below 2. Dim spot （LCD/TP/Polarizer dim dot, light leakage、dark spot）

1. light dot (LCD/TP/Polarizer black/white spot, light dot, pinhole, dent, stain)

Size	Acceptable Qty		
	A	B	C
Φ ≤ 0.15	Ignore		Ignore
0.15 < Φ ≤ 0.25	3 (distance ≥ 10mm)		
0.25 < Φ ≤ 0.4	2 (distance ≥ 10mm)		
Φ > 0.4	0		

2. Dim spot （LCD/TP/Polarizer dim dot, light leakage、dark spot）

Size	Acceptable Qty		
	A	B	C
Φ ≤ 0.15	Ignore		Ignore
0.15 < Φ ≤ 0.25	3 (distance ≥ 10mm)		
0.25 < Φ ≤ 0.4	2 (distance ≥ 10mm)		
Φ > 0.4	0		

No	Item	Criteria
		3. Polarizer accidented spot
		<table><tr><td rowspan="2">Size</td><td colspan="3">Acceptable Qty</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>Φ ≤ 0.2</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>0.2 < Φ ≤ 0.5</td><td colspan="2">2 (distance ≥ 10mm)</td></tr><tr><td>Φ > 0.5</td><td colspan="2">0</td></tr></table>
		4. Polarizer Bubble
		<table><tr><td rowspan="2">Size</td><td colspan="3">Acceptable Qty</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>Φ ≤ 0.2</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>0.2 < Φ ≤ 0.4</td><td colspan="2">2 (distance ≥ 10mm)</td></tr><tr><td>Φ > 0.4</td><td colspan="2">0</td></tr></table>
3.0	LCD Pixel defect	Pixel bad points

Pixel bad points:

Item	Zone A	Acceptable Qt
Bright dot	Random	$N \le 2$
	2 dots adjacent	$N \le 0$
	3 dots adjacent	$N \le 0$
Dark dot	Random	$N \le 3$
	2 dots adjacent	$N \le 0$
	3 dots adjacent	$N \le 0$
Distance	1. Minimum Distance Between bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot	5mm
Total bright and dark dot		$N \le 4$

No	Item	Width (mm)	Length (mm)	Acceptable Qty A	B	C
4.0	Line defect (LCD /Polarizer backlight black/white line, scratch, stain)	W ≤ 0.05	Ignore	Ignore		Ignore
		0.05 < W ≤ 0.06	L ≤ 5	$N \le 3$		
		0.06 < W ≤ 0.08	L ≤ 4	$N \le 2$		

No	Item	Criteria	
	W: width, L：length N：Count	0.08 < W	defined as spot defect
5.0	Electronic Components SMT	Not allow missing parts, solderless connection, cold solder joint, mismatch. The positive and negative polarity opposite	
6.0	Display color& Brightness	1. Color: Measuring the color coordinates, The measurement standard according to the datasheet or samples. 2. Brightness: Measuring the brightness of White screen, The measurement standard according to the datasheet or Samples	
7.0	LCD Mura/Waving/Hot spot	Not visible through 5% ND filter in 50% gray or judge by limit sample if necessary.	

Criteria

Item	Criteria
No Display	Not allowed
Missing Segment	
Short	
Backlight No Lighting	
CTP No Function	

7.4   Dealing with Customer Complaints

7.4.1   Non-conforming Analysis

Purchaser should supply Densitron with detailed data of non-conforming sample.

After accepting it, Densitron should complete the analysis in reasonable time and update the status to the purchaser.

7.4.2   Handling of Non-conforming Displays

If any non-conforming displays are found during customer acceptance inspection which Densitron is clearly responsible for, return them to Densitron.

Both Densitron and customer should analyse the reason and discuss the handling of non-conforming displays when the reason is not clear.

Equally, both sides should discuss and come to agreement for issues pertaining to modification of Densitron quality assurance standard.

8. Reliability Specification

8.1 Reliability Tests

Test Item	Test Condition	Inspection After Test
High Temperature Operating	70ºC, 300 hrs	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD. 2.Non-display. 3.Missing segments/line. 4.Glass crack. 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-20ºC, 300 hrs	
High Temperature Storage	85ºC, 300 hrs	
Low Temperature Storage	-40ºC, 300 hrs	
High Temperature & High Operating	60ºC, 93% RH, 96 hours.	
Thermal Shock (Non-operation)	-40ºC, 30 min ↔85ºC, 30 min, Change time:5min 30CYC.	
ESD Test	C=150pF, R=330,5points/panel Air:±9KV, 5times; Contact:±10KV, 5 times	
Vibration (Non-operation)	1.5Grma 10~500Hz Random X Y Z 1H	
Packing Drop(Non-operation)	60cm height, 6-faces, 3-edges	

Note 1: The test samples should be applied to only one test item.

Note 2: Sample size for each test item is 5~10pcs.

Note 3: For Damp Proof Test, Pure water(Resistance＞10MΩ) should be used.

Note 4: In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

Note 5: Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

**Note 6:** The color fading mura of polarizing filter should not care

8.1.1 Failure Check Standard

After the completion of the described reliability test, the samples were left at room temperature for 2 hrs prior to conducting the failure teat at 23±5 ℃：55±15% RH.

9. Handling Precautions

9.1 Handling Precautions

1) Since the display panel is being made of glass, do not apply mechanical impacts such us dropping from a high position.

2) If the display panel is broken by some accident and the internal organic substance leaks out, be careful not to inhale nor lick the organic substance.

3) If pressure is applied to the display surface or its neighborhood of the OEL display module, the cell structure may be damaged and be careful not to apply pressure to these sections.

4) The polarizer covering the surface of the OEL display module is soft and easily scratched. Please be careful when handling the OEL display module.

5) When the surface of the polarizer of the OEL display module has soil, clean the surface. It takes advantage of by using following adhesion tape.

    a. Scotch Mending Tape No. 810 or an equivalent

    b. Never try to breathe upon the soiled surface nor wipe the surface using cloth containing solvent such as ethyl alcohol, since the surface of the polarizer will become cloudy.

    c. Also, pay attention that the following liquid and solvent may spoil the polarizer:

        • Water

        • Ketone

        • Aromatic Solvents

6) Hold OEL display module very carefully when placing OEL display module into the system housing. Do not apply excessive stress or pressure to OEL display module. And, do not over bend the film with electrode pattern layouts. These stresses will influence the display performance. Also, secure sufficient
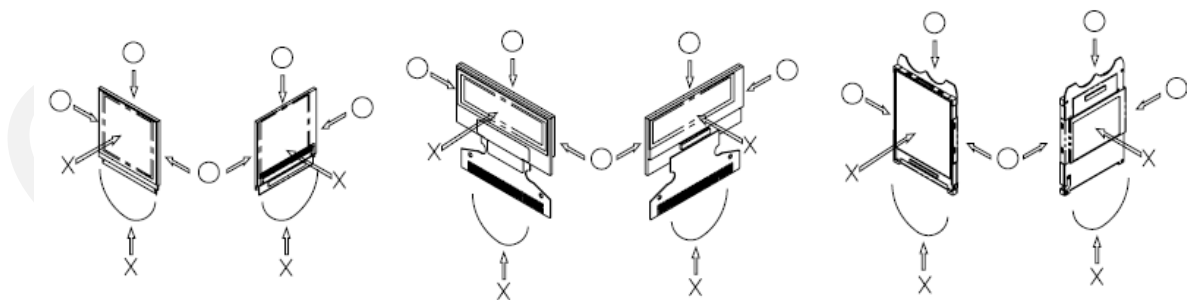
rigidity for the outer cases.

7) Do not apply stress to the LSI chips and the surrounding molded sections.

8) Do not disassemble nor modify the OEL display module.

9) Do not apply input signals while the logic power is off.

10) Pay sufficient attention to the working environments when handing OEL display modules to prevent occurrence of element breakage accidents by static electricity.

- Be sure to make human body grounding when handling OEL display modules.
- Be sure to ground tools to use or assembly such as soldering irons.
- To suppress generation of static electricity, avoid carrying out assembly work under dry environments.
- Protective film is being applied to the surface of the display panel of the OEL display module. Be careful since static electricity may be generated when exfoliating the protective film.

11) Protection film is being applied to the surface of the display panel and removes the protection film before assembling it. At this time, if the OEL display module has been stored for a long period of time, residue adhesive material of the protection film may remain on the surface of the display panel after removed of the film. In such case, remove the residue material by the method introduced in the above Section 5).

12) If electric current is applied when the OEL display module is being dewed or when it is placed under high humidity environments, the electrodes may be corroded and be careful to avoid the above.

9.2   Storage Precautions

1) When storing OEL display modules, put them in static electricity preventive bags avoiding exposure to direct sun light nor to lights of fluorescent lamps, etc. and, also, avoiding high temperature and high humidity environments or low temperature (less than 0°C) environments. (We recommend you to store these modules in the packaged state when they were shipped from Densitron Technologies Plc.) At that time, be careful not to let water drops adhere to the packages or bags nor let dewing occur with them.

2) If electric current is applied when water drops are adhering to the surface of the OEL display module, when the OEL display module is being dewed or when it is placed under high humidity environments, the electrodes may be corroded and be careful about the above.

9.3   Designing Precautions

1) The absolute maximum ratings are the ratings which cannot be exceeded for OEL display module, and if these values are exceeded, panel damage may be happen.

2) To prevent occurrence of malfunctioning by noise, pay attention to satisfy the VIL and VIH specifications and, at the same time, to make the signal line cable as short as possible.

3) We recommend you to install excess current preventive unit (fuses, etc.) to the power circuit (VDD). (Recommend value: 0.5A)

4) Pay sufficient attention to avoid occurrence of mutual noise interference with the neighboring devices.

5) As for EMI, take necessary measures on the equipment side basically.

6) When fastening the OEL display module, fasten the external plastic housing section.

7) If power supply to the OEL display module is forcibly shut down by such errors as taking out the main battery while the OEL display panel is in operation, we cannot guarantee the quality of this OEL display module.

8) The electric potential to be connected to the rear face of the IC chip should be as follows: RM692H0

*Connection (contact) to any other potential than the above may lead to rupture of the IC.

9.4 Operation Precautions

1) When an OEL display module is operated for a long of time with fixed pattern may remain as an after image or slight contrast deviation may occur. Nonetheless, if the operation is interrupted and left unused for a while, normal state can be restored. Also, there will be no problem in the reliability of the module.

2) To protect OEL display modules from performance drops by static electricity rapture, etc., do not touch the following sections whenever possible while handling the OEL display modules.
    a. Pins and electrodes
    b. Pattern layouts such as the FPC

3) With this OEL display module, the OEL driver is being exposed. Generally speaking, semiconductor elements change their characteristics when light is radiated according to the principle of the solar battery. Consequently, if this OEL driver is exposed to light, malfunctioning may occur.
    a. Design the product and installation method so that the OEL driver may be shielded from light in actual usage.
    b. Design the product and installation method so that the OEL driver may be shielded from light during the inspection processes.

4) Although this OEL display module stores the operation state data by the commands and the indication data, when excessive external noise, etc. enters into the module, the internal status may be changed. It therefore is necessary to take appropriate measures to suppress noise generation or to protect from influences of noise on the system design.

5) We recommend you to construct its software to make periodical refreshment of the operation statuses (re-setting of the commands and re-transference of the display data) to cope with catastrophic noise.

9.5 Other Precautions

1) Request the qualified companies to handle industrial wastes when disposing of the OEL display modules. Or, when burning them, be sure to observe the environmental and hygienic laws and regulations.