






# SPECIFICATIONS

**CUSTOMER** : \_\_\_\_\_  
**MODEL NO.** : **GFOR128032C-WG**  
**VERSION** : **B**  
**DATE** : **2023.03.02**  
**CERTIFICATION** : **ROHS**

Customer Sign	Approved By	Prepared By	Prepared By
			

晶發科技股份有限公司  
GI FAR TECHNOLOGY CO.,LTD

新北市樹林區東豐街 81 號

No. 81, Dongfeng St, Shulin District, 238034, New Taipei City, Taiwan, R.O.C.

TEL: +886-2-8684-1188 FAX: +886-2-8684-8532





# CONTENTS

<b>1. Basic Specifications .....</b>	<b>4-5</b>
1.1 Display Specifications .....	4
1.2 Mechanical Specifications.....	4
1.3 Active Area / Address Mapping & Character Construction .....	4
1.4 Pin Definition.....	5
1.5 Startup Screen .....	5
<b>2. Absolute Maximum Ratings .....</b>	<b>5</b>
<b>3. Optics &amp; Electrical Characteristics(FOR OLED).....</b>	<b>6</b>
3.1 Optics Characteristics.....	6
3.2 DC Characteristics .....	6
<b>4. Reliability.....</b>	<b>7</b>
<b>5. Command Summary.....</b>	<b>8-11</b>
<b>6. Note.....</b>	<b>12</b>
<b>7. Operation Precautions.....</b>	<b>12</b>
<b>8. Mechanical Drawing .....</b>	<b>13</b>
<b>9. Inspection Standard .....</b>	<b>14-17</b>



# 1. Basic Specifications

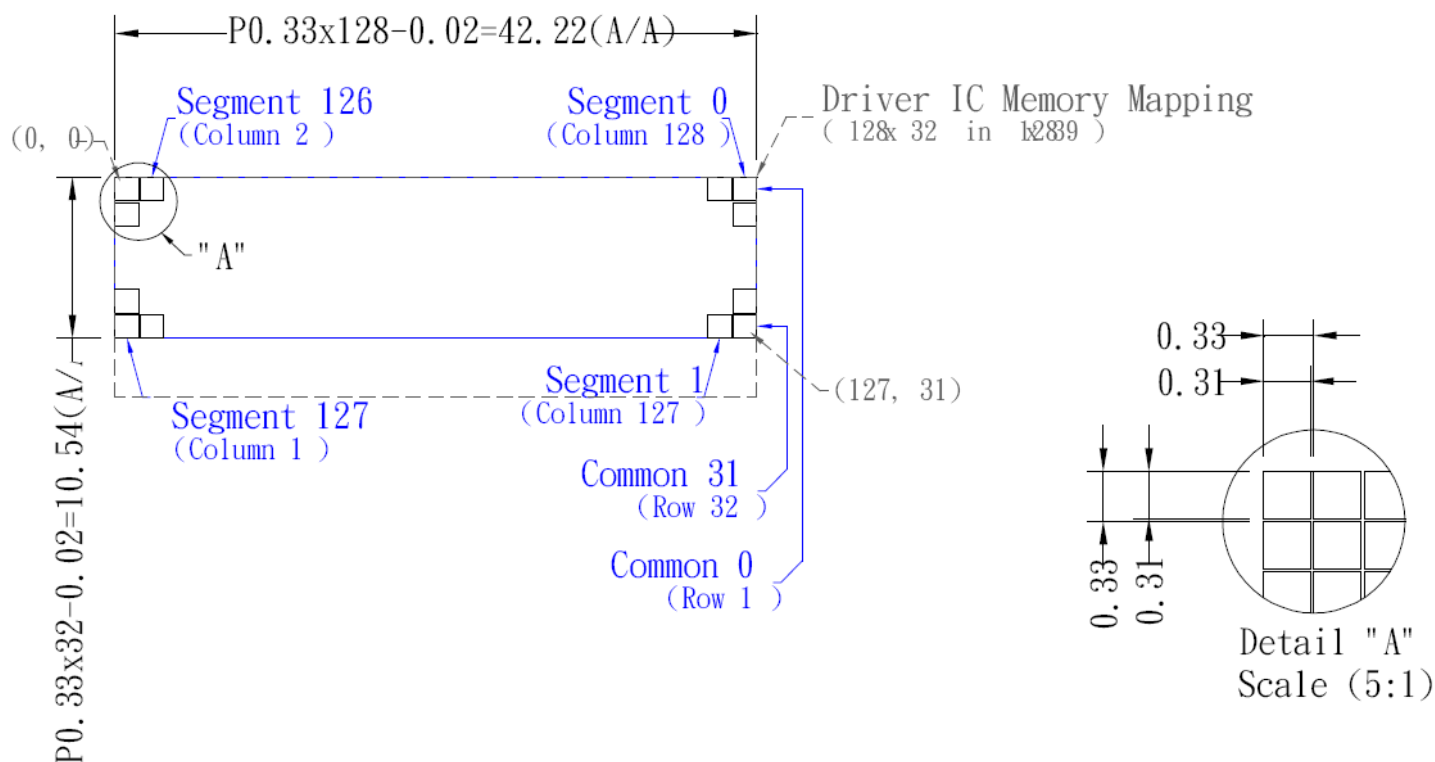
## 1.1 Display Specifications

- 1) Display Mode: Passive Matrix
- 2) Display Color: Monochrome (White)
- 3) Drive Duty: 1/32Duty
- 4) Interface: RS232

## 1.2 Mechanical Specifications

- 1) Outline Drawing: According to the annexed outline drawing
- 2) Number of Pixels: 128 × 32
- 3) Module Size: 65 × 32 × (20.8) (mm)
- 4) Panel Size: 50.50 × 15.75 × 2.0 (mm)
- 5) Active Area: 42.22 × 10.54 (mm).
- 6) Pixel Pitch: 0.33 × 0.33 (mm)
- 7) Pixel Size: 0.31 × 0.31 (mm)

## 1.3 Active Area / Memory Mapping & Pixel Construction



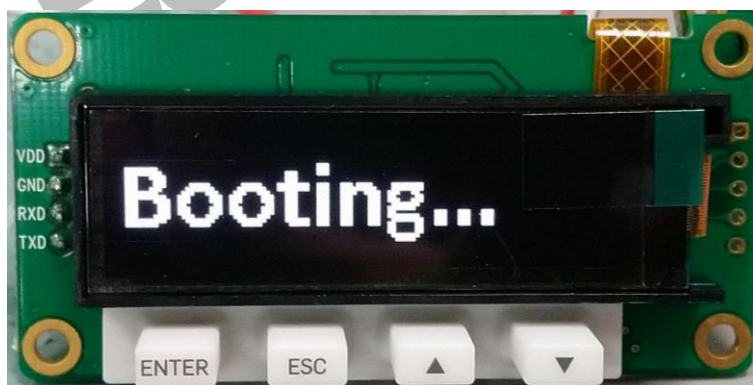


## 1.4 Pin Definition

### Connector CN1

No	Signal	direction	Function description
1	VDD	DC Power VDD	VDD
2	GND	DC Power ground	Signal ground
3	RXD	LCM to PC	Transmit data
4	TXD	PC to LCM	Receiver data

## 1.5 Startup Screen



## 2. Absolute Maximum Ratings

Supply Voltage ( $V_{DD}$ ).....	+ 6V
$V_{+}$ .....	( $V_{DD}-0.3V$ ) to +11 .0V
$V_{-}$ .....	-11 .0V
Input Voltages	
$T_{in}$ .....	-0.3V to ( $V_{DD} + 0.3V$ )
$R_{in}$ .....	+/-15V
Output Voltages	
$T_{out}$ .....	( $V_{+}, +0.3V$ ) to ( $V_{-}, -0.3V$ )
$R_{out}$ .....	-0.3V to ( $V_{DD} + 0.3V$ )



### 3. Optics & Electrical Characteristics(OLED)

#### 3.1 Optics Characteristics

Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Brightness	$L_{br}$	Note 5	120	150	-	cd/m <sup>2</sup>
C.I.E. (White)	(x)	C.I.E. 1931	0.25	0.29	0.33	
	(y)		0.27	0.31	0.35	
Dark Room Contrast	CR		-	>10,000:1	-	
View Angle			-	Free	-	degree
Life Time (150 cd/m <sup>2</sup> )		Note 1	10,000	-	-	hour
Life Time (120 cd/m <sup>2</sup> )		Note 1	15,000	-	-	hour
Life Time (80 cd/m <sup>2</sup> )		Note 1	30,000	-	-	hour

\* Optical measurement taken at  $V_{DD} = 2.8V$ ,  $V_{CC} = 12.0V$ .

Note 1:  $V_{CC} = 12.0V$ ,  $T_a = 25^{\circ}C$ , 50% Checkerboard.

End of lifetime is specified as 50% of initial brightness reached. The average operating lifetime at room temperature is estimated by the accelerated operation at high temperature conditions.

#### 3.2 DC Characteristics

Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage for Logic	$V_{DD}$		1.65	2.8	3.3	V
Supply Voltage for Display	$V_{CC}$	Note 5	11.5	12.0	12.5	V
High Level Input	$V_{IH}$	$I_{OUT} = 100\mu A$ , 3.3MHz	$0.8 \times V_{DD}$	-	$V_{DD}$	V
Low Level Input	$V_{IL}$	$I_{OUT} = 100\mu A$ , 3.3MHz	0	-	$0.2 \times V_{DD}$	V
High Level Output	$V_{OH}$	$I_{OUT} = 100\mu A$ , 3.3MHz	$0.9 \times V_{DD}$	-	$V_{DD}$	V
Low Level Output	$V_{OL}$	$I_{OUT} = 100\mu A$ , 3.3MHz	0	-	$0.1 \times V_{DD}$	V
Operating Current for $V_{DD}$	$I_{DD}$		-	180	300	$\mu A$
Operating Current for $V_{CC}$	$I_{CC}$	Note 6	-	8.2	10.3	mA
		Note 7	-	11.9	14.9	mA
		Note 8	-	19.4	24.3	mA
Sleep Mode Current for $V_{DD}$	$I_{DD, SLEEP}$		-	1	10	$\mu A$
Sleep Mode Current for $V_{CC}$	$I_{CC, SLEEP}$		-	2	10	$\mu A$

Note 5: Brightness ( $L_{br}$ ) and Supply Voltage for Display ( $V_{CC}$ ) are subject to the change of the panel characteristics and the customer's request.

Note 6:  $V_{DD} = 2.8V$ ,  $V_{CC} = 12.0V$ , 30% Display Area Turn on.

Note 7:  $V_{DD} = 2.8V$ ,  $V_{CC} = 12.0V$ , 50% Display Area Turn on.

Note 8:  $V_{DD} = 2.8V$ ,  $V_{CC} = 12.0V$ , 100% Display Area Turn on.



## 4. Reliability

NO.	ITEM	CONDITION		STANDARD	NOTE
1	High Temp. Storage	80°C	120 hrs	Appearance Without defect	
2	Low Temp. Storage	-30°C	120 hrs	Appearance Without defect	
3	High Temp. & High Humi. Storage	40°C 90% RH	120 hrs	Appearance Without defect	
4	High Temp. Operating Display	70°C	120 hrs	Appearance Without defect	
5	Low Temp. Operating Display	-20°C	120 hrs	Appearance Without defect	
6	Thermal Shock	-20°C, 30min. → 70°C, 30min. ↑ (1cycle)		Appearance Without defect	10 cycles

\*\* Dissipation current, contrast and display functions

\*\* Polarizing filter deterioration, other appearance defects

\*\* The function test shall be conducted after 4hours storage at the normal temperature and humidity after remove from the test chamber.



## 5. Command Summary

Command	Syntax	Default	Description
Auto line wrap on	FE 43 FD 254 67 253 254 'C' 253	off	Enables line wrapping. Character will wrap to first position of next line if it reaches the end of a line.
Auto line wrap off	FE 44 FD 254 68 253 254 'D' 253	off	Disables line wrapping. Character will go to the first position of the original line if it reaches the end of a line.
Auto scroll on	FE 51 FD 254 81 253 254 'Q' 253	off	Enables line scrolling. Shift entire screen up by 1 line to make room for the last row.
Auto scroll off	FE 52 FD 254 82 253 254 'R' 253	off	Disables line scrolling
Set text insertion point	FE 47 [col] [row] FD 254 71 253 254 'G' 253	N/A	Sets the text insertion point to [col] and [row].
Set text insertion point home	FE 48 FD 254 72 253 254 'H' 253	N/A	Sets the text insertion point to [0] and [0].
Underline cursor on	FE 4A [col] [row] FD 254 74 [col] [row] 253 254 'J' [col] [row] 253	off	Turns on the underline cursor and sets it at [col] and [row].
Underline cursor off	FE 4B FD 254 75 253 254 'K' 253	off	Turns off the underline cursor.
Cursor left	FE 4C FD 254 76 253 254 'L' 253	N/A	Moves the underline cursor to left. It will move to the end of the same line if it reaches the beginning of a line.
Cursor right	FE 4D FD 254 77 253 254 'M' 253	N/A	Moves the underline cursor to right. It will move to the beginning of the same line if it reaches the end of a line.
Inverse text on	FE 66 FD 254 102 253 254 'f' 253	off	Text inverse on.
Inverse text off	FE 67 FD 254 103 253 254 'g' 253	off	Text inverse off.





Command	Syntax	Default	Description
Initial thick vertical bar graph	FE 76 FD	on	Initializes 5 pixels width as the vertical bar.
	254 118 253		
	254 'v' 253		
Initial thin vertical bar graph	FE 73 FD	off	Initializes 2 pixels width as the vertical bar.
	254 115 253		
	254 's' 253		
Define custom character	FE 4E [cc] [6 bytes] FD	N/A	Defines custom character. [cc] goes from [
	254 104 [cc] [6 bytes] 253		[0x01] to 0x10]. The other 6 bytes are
	254 'N' [cc] [6 bytes] 253		described in section 4.2.7
Draw vertical bar graph	FE 3D [col] [height] FD	N/A	Draws vertical bar at position [col] of the last
	254 61 [col] [height] 253		row with height [height]. [height] ranges from
	254 '=' [col] [height] 253		[0x00] to [0x20].
Draw horizontal bar graph	FE 7C [col] [row] [len] FD	N/A	Draws horizontal bar at position [col] and [row]
	254 124 [col] [row] [len] 253		With length [length]. [length] ranges from
	254 ' ' [col] [row] [len] 253		[[0x00] to 0x7A].
Erase horizontal bar graph	FE 2B [col] [row] [len] FD	N/A	Erases horizontal bar at position [col] and [row] with
	254 43 [col] [row] [len] 253		length [length]. [length] ranges from [0x00] to
	254 '+' [col] [row] [len] 253		[0x7A].
Draw byte	FE 3E [x] [row] [byte] [4 dummy bytes] FD	N/A	Draws a byte at location (x, row). x ranges
	254 62 [x] [row] [byte] [4 dummy bytes] 253		from 0 to 121 and row ranges from 0 to 3.
	254 '>' [x] [row] [byte] [4 dummy bytes] 253		

FOOTPRINT



Command	Syntax	Default	Description
Read Model Number	FE 30 FD	N/A	Reads 2 bytes back from LCD
	254 48 253		
	254 '0' 253		
Read Firmware Version	FE 31 FD	N/A	Reads 2 bytes back from LCD
	254 49 253		
	254 '1" 253		
Soft Reset	FE 56 FD	N/A	Soft Reset
	254 86 253		
	254 'V' 253		
Clear display	FE 58 FD	off	Clears screen of LCD and places the text
	254 88 253		insertion point to top left.
	254 'X' 253		
Auto key hole on	FE 32 FD	off	Auto key hold on.
	254 50 253		
	254 '2' 253		
Auto key hold off	FE 33 FD	off	Auto key hold off.
	254 51 253		
	254 '3' 253		
Set RS232 port speed	FE 39 [speed] FD	19200	Sets RS232 port speed. Refer to section 5.1.6
	254 57 [speed] 253		for details.
	254 '9' [speed] 253		
Save user defined characters	FE 4F [cc] FD	N/A	Save user defined characters. [cc] ranges from
	254 79 [cc] 253		1 to 16.
	254 'O' [cc] 253		
Load user defined characters	FE 50 [cc] FD	N/A	Load user defined characters. [cc] ranges from
	254 80 [cc] 253		1 to 16.
	254 'P' [cc] 253		

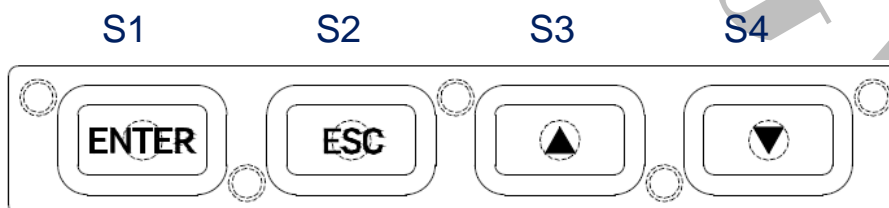
2009Y



Save user settings	FE 53 [ud] [4 bytes] [2 dummy bytes] FD	N/A	Save user settings. User is required to save 4 bytes at a time.
	254 83 [ud] [4 bytes] [2 dummy bytes] 253		[ud] ranges from 1 to 8.
	254 'S' [ud] [4 bytes] [2 dummy bytes] 253		
Read user settings	FE 54 [ud] FD	N/A	Read user settings. 4 bytes are returned at each time.
	254 84 [ud] 253		
	254 'T' [ud] 253		
Set Contrast	FE 68 [contrast] FD	N/A	Set display contrast, range 0x00 - 0x1C
	254 104 253		
	254 'h' 253		
Clear boot-up logo	FE 6A FD	N/A	Clear boot-up logo
	254 105 253		
	254 'i' 253		
Display boot-up logo	FE 69 FD	N/A	Draw the boot-up logo on display
	254 106 253		
	254 'j' 253		
Restore factory default logo	FE 6B FD	N/A	Restore factory default boot-up logo.
	254 107 253		
	254 'k' 253		

## Keypad Mapping

Keypad	Character Return
S1	" A " (0x41h)
S2	" B " (0x42h)
S3	" C " (0x43h)
S4	" D " (0x44h)





## 6. NOTES

### ▪ Safety

- If the LCD panel breaks, be careful not to get the liquid crystal in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and plenty of water.

### Handling

- Avoid static electricity as this can damage the CMOS LSI.
- The LCD panel is plate glass; do not hit or crush it.
- Do not remove the panel or frame from the module.
- The polarizing plate of the display is very fragile; handle it very carefully

### Mounting and Design

- Mount the module by using the specified mounting part and holes.
- To protect the module from external pressure, leave a small gap by placing transparent plates (e.g. acrylic or glass ) on the display surface, frame, and polarizing plate
- Design the system so that no input signal is given unless the power-supply voltage is applied.
- Keep the module dry. Avoid condensation, otherwise the transparent electrodes may break.

### Storage

- Store the module in a dark place where the temperature is  $25\text{ }^{\circ}\text{C}\pm 10\text{ }^{\circ}\text{C}$  and the humidity below 65% RH.
- Do not store the module near organic solvents or corrosive gases.
- Do not crush, shake, or jolt the module (including accessories).

### Cleaning

- Do not wipe the polarizing plate with a dry cloth, as it may scratch the surface.
- Wipe the module gently with soft cloth soaked with a petroleum benzine.
- Do not use ketonic solvents (ketone and acetone) or aromatic solvents (toluene and xylene), as they may damage the polarizing plate.

## 7. OPERATION PRECAUTIONS

Any changes that need to be made in this specification or any problems arising from it will be dealt with quickly by discussion between both companies.

Quality warranty period: Within one year after shipment date (excluding abnormal usage way and abnormal environments.)





## 9. Outgoing Quality Control Specifications

### 9.1 Environment Required

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

Temperature:	23 ± 5°C
Humidity:	55 ± 15 %RH
Fluorescent Lamp:	30W
Distance between the Panel & Lamp:	≥ 50 cm
Distance between the Panel & Eyes of the Inspector:	≥ 30 cm
Finger glove (or finger cover) must be worn by the inspector.	
Inspection table or jig must be anti-electrostatic.	

### 9.2 Sampling Plan

Level II, Normal Inspection, Single Sampling, MIL-STD-105E

### 9.3 Criteria & Acceptable Quality Level

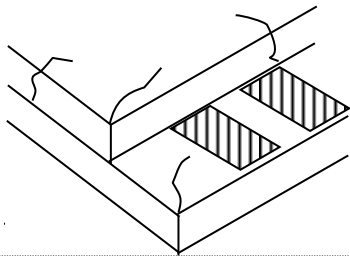

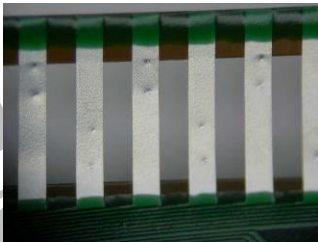
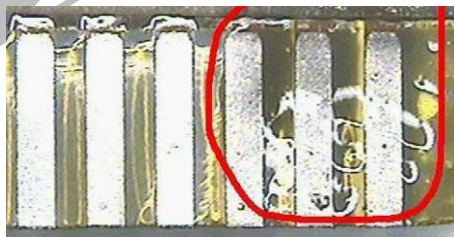
Partition	AQL	Definition
Major	0.65	Defects in Pattern Check (Display On)
Minor	1.0	Defects in Cosmetic Check (Display Off)

#### 9.3.1 Cosmetic Check (Display Off) in Non-Active Area

Check Item	Classification	Criteria
Panel General Chipping	Minor	<p>X &gt; 6 mm (Along with Edge) Y &gt; 1 mm (Perpendicular to edge)</p>

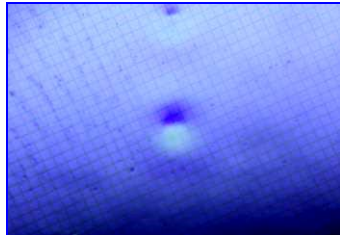


9.3.1 Cosmetic Check (Display Off) in Non-Active Area (Continued)

Check Item	Classification	Criteria
Panel Crack	Minor	Any crack is not allowable. 
Copper Exposed (Even Pin or Film)	Minor	Not Allowable by Naked Eye Inspection
Film or Trace Damage	Minor	
Terminal Lead Prober Mark	Acceptable	
Glue or Contamination on Pin (Couldn't Be Removed by Alcohol)	Minor	
Ink Marking on Back Side of panel (Exclude on Film)	Acceptable	Ignore for Any

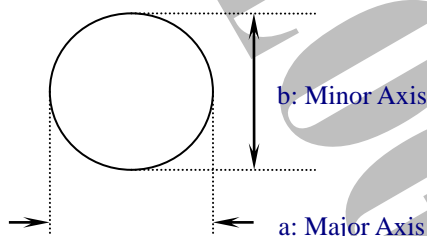
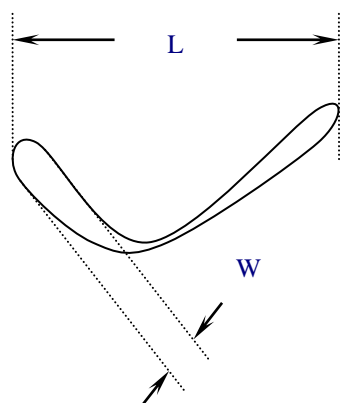


9.3.2 Cosmetic Check (Display Off) in Active Area

Check Item	Classification	Criteria
Any Dirt & Scratch on Polarizer's Protective Film	Acceptable	Ignore for not Affect the Polarizer
Scratches, Fiber, Line-Shape Defect (On Polarizer)	Minor	$W \leq 0.1$ Ignore $W > 0.1,$ $L \leq 2$ $n \leq 1$ $L > 2$ $n = 0$
Dirt, Black Spot, Foreign Material, (On Polarizer)	Minor	$\Phi \leq 0.1$ Ignore $0.1 < \Phi \leq 0.25$ $n \leq 1$ $0.25 < \Phi$ $n = 0$
Dent, Bubbles, White spot (Any Transparent Spot on Polarizer)	Minor	$\Phi \leq 0.5$ → Ignore if no Influence on Display $0.5 < \Phi$ $n = 0$ 
Fingerprint, Flow Mark (On Polarizer)	Minor	Not Allowable

\* Protective film should not be tear off when cosmetic check.

\*\* Definition of W & L &  $\Phi$  (Unit: mm):  $\Phi = (a + b) / 2$







9.3.3 Pattern Check (Display On) in Active Area

Check Item	Classification	Criteria
No Display	Major	
Missing Line	Major	
Pixel Short	Major	
Darker Pixel	Major	
Wrong Display	Major	
Un-uniform	Major	