SPECIFICATIONS

CUSTOMER : _____

MODEL NO. : ___ **GFR128032CA-BNFA** ___

VERSION : _____ **E** _____

DATE : _____ **2022.08.18** _____

CERTIFICATION : _____ **ROHS** _____

Customer Sign	Approved By	Prepared By	Prepared By
	GIFAR 2022.08.18 Sidney	GIFAR 2022.08.18 Roger	GIFAR 2022.08.18 Hazel

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Revision Record

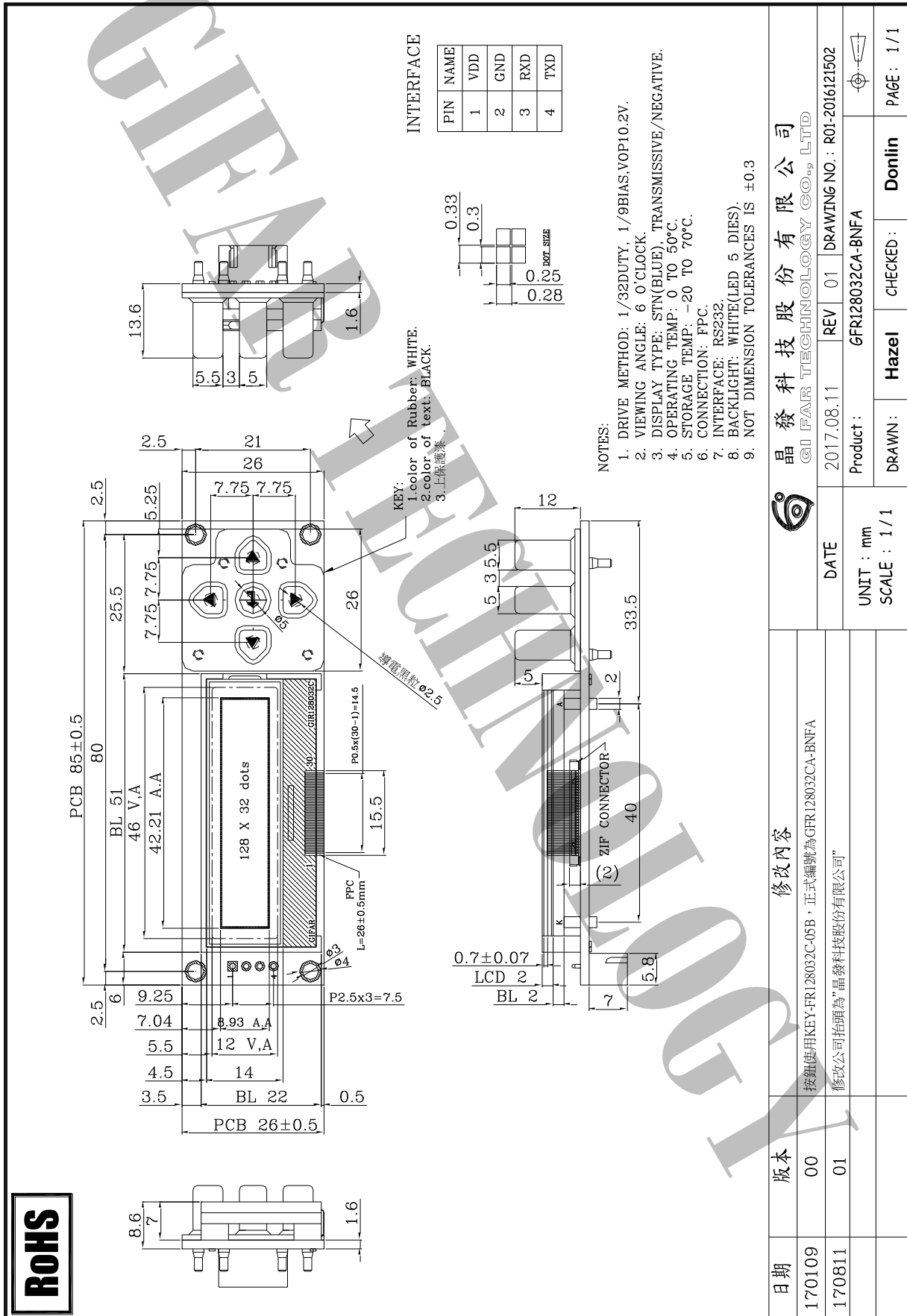| Data(y/m/d)	Ver.	Description	Note	page
2017.03.02	A	New		
2017.08.11	B	修改公司抬頭、格式統一		
2020.05.08	C	1. 修改 Interface Pin Description 2.增加包裝方式 3.增加開機畫面		5、18、21

2022.05.31	D	1.Modify command description
		  LCD12232 → LCD12832.
		  122 (0x7A) → 128 (0x80).
		 2.增加晶發信賴性測試標準 8.Reliability
				6、9、12、16、20

2022.08.18	E	更新開機畫面照片為整個模組照片		5

OUTLINE DRAWING

INTERFACE

PIN	NAME
1	VDD
2	GND
3	RXD
4	TXD

NOTES:
1. DRIVE METHOD: 1/32DUTY, 1/9BIAS, VOP10.2V.
2. VIEWING ANGLE: 6 O'CLOCK.
3. DISPLAY TYPE: STN(BLUE), TRANSMISSIVE/NEGATIVE.
4. OPERATING TEMP: 0 TO 50°C.
5. STORAGE TEMP: −20 TO 70°C.
6. CONNECTION: FPC.
7. INTERFACE: RS232.
8. BACKLIGHT: WHITE(LED 5 DIES).
9. NOT DIMENSION TOLERANCES IS ±0.3

KEY:
1.color of Rubber: WHITE.
2.color of text: BLACK.
3.上保護漆.

DOT SIZE
0.33
0.3
0.25
0.28

128 X 32 dots

ZIF CONNECTOR

導電黑粒 Ø2.5

FPC L=26±0.5mm

晶 發 科 技 股 份 有 限 公 司
GI FAR TECHNOLOGY CO., LTD

DATE	2017.08.11	REV	01	DRAWING NO. : R01-2016121502
Product :				GFR128032CA-BNFA
DRAWN :	Hazel	CHECKED :		Donlin
UNIT : mm				
SCALE : 1/1				PAGE : 1/1

修改內容

日期	版本	
170109	00	按鈕使用KEY-FR128032C-05B，正式編號為GFR128032CA-BNFA
170811	01	修改公司抬頭為"晶發科技股份有限公司"

RoHS

Table of Contents

Appendix : Inspection Standard

1. Introduction

1.1. Introduction

The GFR128032CA-BNFA is a graphical LCD which user can show both text and graphics at the same time via a connection of a computer/appliance/server. The module includes a set of simple commands that allows user to develop his own LCD environment easily.

1.2. Features

- 21 columns × 4 lines text display
- 128 × 32 dots graphic display
- Text wrap, scroll and inverse capability
- Built in characters plus 16 user defined characters
- Communicate over RS232 interface
- Baud rate speed selection between 9600 and 19200 bps
- Programmable on/off and brightness of the LED backlight
- Horizontal and vertical bar charts
- 32 bytes reserved non-volatile memory spaces for user settings
- 5 buttons keypad
- Fit in a standard 3.5" floppy drive bay
- startup screen
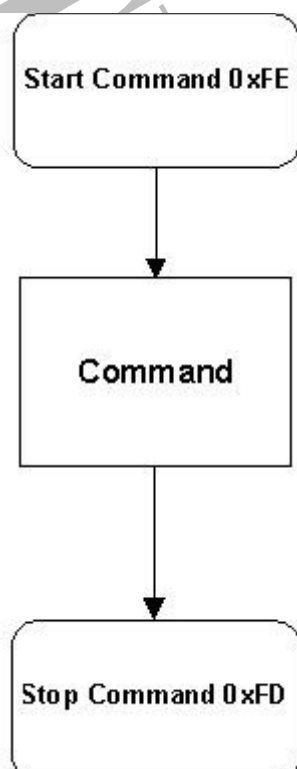
2. Module Programming

2.1. Command Sending

Commands are sent via the RS232 port together with 2 other numbers, the command starts with [254] and ends at [253].

For example, in PC, user will need to write the following lines in order to send a complete command to LCD12832.

```
Void LCD_Write_Command(BYTE [command])
{…………
LCD_Write(254);
LCD_Write([command]);
LCD_Write(253);
………..
};
```

2.2. Flowchart

Drawing 5 Flowchart.

3. Text Mode

3.1. Built in Characters

Size of all built in characters is defined by a 6 x 8 dot matrix. User is required to send the ASCII code of the corresponding character in order to display it. Details of the ASCII information of each character are listed as the following table. A font table is available in the appendix of this manual. Note: UD stands for User Defined.

ASCII	Character	ASCII	Character	ASCII	Character	ASCII	Character
1	UD	44	,	72	H	100	d
2	UD	45	-	73	I	101	e
3	UD	46	.	74	J	102	f
4	UD	47	/	75	K	103	g
5	UD	48	0	76	L	104	h
6	UD	49	1	77	M	105	i
7	UD	50	2	78	N	106	j
8	UD	51	3	79	O	107	k
9	UD	52	4	80	P	108	l
10	UD	53	5	81	Q	109	m
11	UD	54	6	82	R	110	n
12	UD	55	7	83	S	111	o
13	UD	56	8	84	T	112	p
14	UD	57	9	85	U	113	q
15	UD	58	:	86	V	114	r
16	UD	59	;	87	W	115	s
32	[space]	60	<	88	X	116	t
33	!	61	=	89	Y	117	u
34	"	62	>	90	Z	118	v
35	#	63	?	91	[	119	w
36	$	64	@	92	\	120	x
37	%	65	A	93	]	121	y
38	&	66	B	94	^	122	z
39	'	67	C	95	_	123	{
40	(	68	D	96	`	124		
41	)	69	E	97	a	125	}
42	*	70	F	98	b	126	~
43	+	71	G	99	c		

Table 1 Characters table

Apart from the built in characters listed in the above table, user can define his own characters in spaces from [0x01] to [0x10]. Details of how to define a character may refer to section 4.2.7.

3.2. Writing Text to GFR128032CA-BNFA

When user sends a character to GFR128032CA-BNFA, it displays at location which specified before. The next character will automatically display at the location next to the previous character. Characters which are drawn please refer to the built in characters table showed above. User is required to define his own character sets before he can show it.

3.3. Text Commands

User may use the following commands to program GFR128032CA-BNFA. It is recommended to read chapter 2 to have better knowledge of how to send these commands accordingly. The numbers showed below are measured in decimal. A summary of different kinds of number system is shown in chapter 6.

3.3.1. Auto Line Wrap ON (254 67 253)

This command enables word wraps to next line when character reaches the end of a line. **Default is OFF**.

3.3.2. Auto Line Wrap OFF (254 68 253)

Disables line wrap. Character will return to the first position of the original line if it reaches the end of a line. **Default is OFF**.

3.3.3. Auto Scroll ON (254 81 253)

This command allows GFR128032CA-BNFAto shift the entire screen one line up if character reaches the last character position of the fourth line. **Default is OFF**.

3.3.4. Auto Scroll OFF (254 82 253)

Character will wrap up to the first character position of the first line if the character reaches the last character position of the fourth line. **Default is OFF**.

3.3.5. Text Insertion Point (254 71 [column] [row] 253)

This command moves the text insertion point to the location which specified by [column] and [row]. Column has the value ranging from 0 (0x00) to 19 (0x13) and row has the value ranging from 0 (0x00) to 3 (0x03).

3.3.6. Set Text Insertion Point to Top Left (254 72 253)

This command sets the text insertion point to top left of the LCD. ie. [column] = 0 and [row] = 0.

3.3.7. Turn On Underline Cursor (254 74 [column] [row] 253)

Turn on the underline cursor at position [column] and [row]. **Default is OFF**.

3.3.8. Turn Off Underline Cursor (254 75 253)

Turn off the underline cursor. **Default is OFF.**

3.3.9. Move Cursor Left (254 76 253)

Move the underline cursor to left.

3.3.10. Move Cursor Right (254 77 253)

Move the underline cursor to right.

3.3.11. Turn On Text Inverse (254 102 253)

Turn on text inverse mode. Color of character displayed will be inversed if this option is enabled. That is, dots which are originally ON will be OFF and dots which are originally OFF will be ON. Notice the command will only valid from ASCII character 32 to 126. It has no effect on user defined characters. **Default is OFF**.

3.3.12. Turn Off Text Inverse (254 103 253)

Turn off text inverse mode. **Default is OFF.**

4. Bar Charts, User Defined Characters and Graphics

4.1. Introduction

The GFR128032CA-BNFA offers the ability of drawing horizontal graphs, vertical graph and text simultaneously on the same screen. Details of how to draw the graphs are described as the followings.

4.2. Command List

4.2.1. Initialize Wide Vertical Bar Graph (254 118 253)

This command defines the width of the vertical bar to 5 pixels. **Default is ON**.

4.2.2. Initialize Narrow Vertical Bar Graph (254 115 253)

This command defines the width of the vertical bar to 2 pixels. **Default is OFF**.

4.2.3. Draw Vertical Bar Graph (254 61 [column] [height] 253)

The vertical bar graph is drawn at position [column] and row = 3 (bottom of the screen) with the height [height] specified. The height can be ranging from 0 (0x00) to 32 (0x20).

4.2.4. Erase Vertical Bar Graph (254 45 [column] [height] 253)

The vertical bar graph is erased at position [column] and row = 3 (bottom of the screen) with the height [height] specified. The height can be ranging from 0 (0x00) to 32 (0x20).

4.2.5. Draw Horizontal Bar Graph (254 124 [column] [row] [length] 253)

The horizontal bar graph is drawn at position [column] and [row] with length [length] and goes from left to right. The length can be ranging from 0 (0x00) to 128 (0x80)

4.2.6. Erase Horizontal Bar Graph (254 43 [column] [row] [length] 253)

The horizontal bar graph is erased at position [column] and [row] with length [length] and goes from left to right. The length can be ranging from 0 (0x00) to 128 (0x80)

4.2.7. Define Custom character (254 78 [cc] [6 bytes] 253)

The GFR128032CA-BNFA allows user to define 16 extra characters by himself. These defined characters are stored in location starting from [0x01] to [0x10] with the ASCII value listed in Table 1.
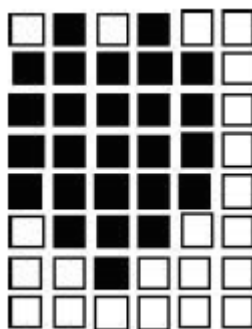
The characters are defined by sending the command 254 78 [cc] followed by 6 bytes. [cc] is the character number starting from [0x01] to [0x10]. The 6 bytes are mapped as the following table.

| Data Byte	1	2	3	4	5	6
LSB	1	9	17	25	33	41
	2	10	18	26	34	42
	3	11	19	27	35	43
	4	12	20	28	36	44
	5	13	21	29	37	45
	6	14	22	30	38	46
	7	15	23	31	39	47
MSB	8	16	24	32	40	48

Table 2 User defined characters bit mapping.

A "1" bit represents an **ON** (Dark) pixel while a "0" represents an **OFF** (Clear) pixel. For instance, if user wants to define the following heart in the character space 0x01, he may need to send the following bytes to GFR128032CA-BNFA.


0xfe [start byte],
0x4e [command byte],
0x01 [character location],
0x1e, 0x3f, 0x7e, 0x3f, 0x1e, 0x00 [6 bytes],
0xfd[stop byte]

Once defined, a character can be displayed simply by sending a value within [0x01] and [0x10], which is corresponding to the character number.
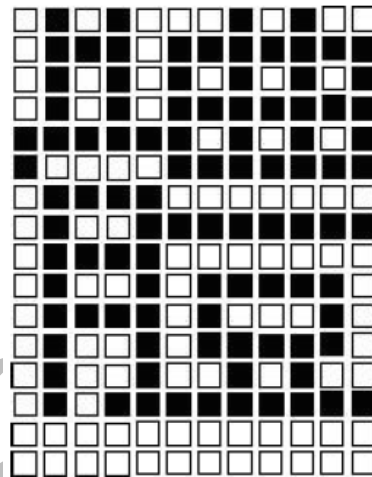
User may also define 4 characters as 1 Chinese character, see the example below,

The above Chinese character composes 4 general character spaces. So, user may simply define 4 char -

acters starting from [cc] = 0x01 to 0x04. And, display the 4 characters accordingly onto the display.
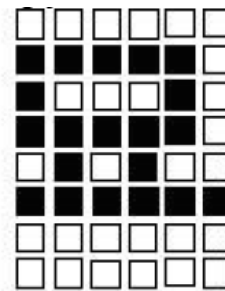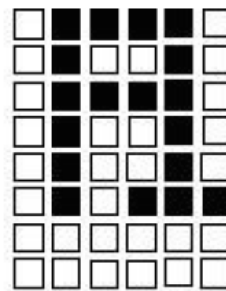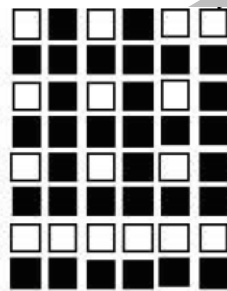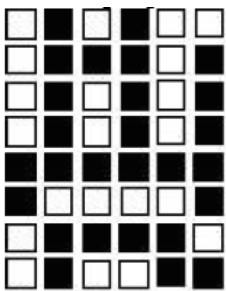
Say, if user wants to display this Chinese character in position [0,0], then set the following commands,

Configure the 4 characters accordingly as above.

Set text insertion point to top left (254 72 253)

0x01

0x02

Set text insertion point to the first position of the 2ₙd row (254 71 [0x00] [0x01] 253)

0x03

0x04

4.2.8. Put Pixel (254 112 [x] [y] 253)

This command draws a pixel (turns on the pixel) at location (x, y). x is ranging from 0 (0x00) to 121 (0x79) and y is ranging from 0 (0x00) to 31 (0x1F).

4.2.9. Clear Pixel (254 113 [x] [y] 253)

This command clears the pixel (turns off the pixel) at location (x, y). x is ranging from 0 (0x00) to 121 (0x79) and y is ranging from 0 (0x00) to 31 (0x1F).

4.2.10. Draw Byte (254 62 [x] [row] [byte] [4 dummy bytes] 253)

This command allows user to draw a single byte on GFR128032CA-BNFA at location specified by [x] and [row]. [x] ranges from 0 to 121 and [row] ranges from 0 to 3. For this command, 4 dummy bytes are required to send and these 4 bytes are "DON'T CARE" for the GFR128032CA-BNFA.

5. Miscellaneous Commands

5.1. General Command List

5.1.1. Read Model Number (254 48 253)

This command enables user to read back the model number of GFR128032CA-BNFA. 2 bytes 128 [0x80] and 32 [0x20], which represent matrix size, will be sent accordingly from GFR128032CA-BNFA to the host after this request command is sent.

5.1.2. Read Firmware Version (254 49 253)

This command enables user to read back the firmware version of GFR128032CA-BNFA. For example, 2 bytes 0x01 and 0x00, which represent version V1.0, will be sent accordingly from GFR128032CA-BNFA to the host after this request command is sent.

5.1.3. Soft Reset (254 86 253)

This command resets the GFR128032CA-BNFA. Everything will start from startup screen again.

5.1.4. Clear Display (254 88 253)

This command clears the entire screen and set the text insertion point to top left. ie. [Column] = 0 and [Row] = 0.

5.1.5. Set Display Contrast (254 104 [contrast] 253)

This command sets the contrast of the display. Contrast values are ranged from 0x00 to 0x1C. 0x1C being the brightest.

5.1.6. Set RS232 port speed (254 57 [speed] 253)

This command sets the RS232 port speed specified by [speed]. [speed] is a single byte which specifies a desired port speed. Details of [speed] can refer to the following table.

Speed Byte	Baud Rate
0x20	9600
0x0F	19200

*Table 3 Baud rate table. **Default is 19200**.*

5.1.7. Save screen as boot-up logo(254 106 253)

This command stores whatever shows on the current screen to the non-volatile memory as the boot-up logo.

One way to define your own boot up logo is to draw your own boot up logo on the screen using the Draw Byte command. After verifying the screen is displaying the correct graphics, issue the "save screen as bootup logo".

```
254 106 253
```

The graphics currently displayed on the screen is saved to the non-volatile memory as the boot-up logo.

5.1.8. Display boot-up logo(254 105 253)

This command displays the boot-up logo on the screen.

5.1.9. Restore factory default boot-up logo(254 107 253)

This command erases the user-defined boot-up logo, and restores the factory default boot-up logo.

5.2. Backlight Command List

5.2.1. Backlight On (254 66 253)

This command turns on the LED backlight of the LCD with maximum brightness. **Default is ON**.

5.2.2. Backlight Off (254 70 253)

This command turns off the LED backlight of the LCD. **Default is OFF.**

5.2.3. Backlight Brightness (254 65 [brightness] 253)

User can adjust the brightness of the backlight LED by sending this command with 7 levels of brightness. [brightness] ranges from 1 to 7 and 7 is the maximum while 1 is the minimum. Please notice the maximum brightness can be obtained by the backlight on command and minimum brightness is obtained by the backlight off command.

5.3. Keypad Command List

5.3.1. Auto Key Hold On (254 50 253)

This command enables the GFR128032CA-BNFA to send a character back continuously for every 0.5s if one of the keys on the keypad is continuously hold down. **Default is OFF.**

5.3.2. Auto Key Hold Off (254 51 253)

This command makes the GFR128032CA-BNFA only to send a single character back when one of the keys on the keypad is pressed or continuously hold down. **Default is OFF.**

5.3.3. Keypad Mapping

GFR128032CA-BNFA produces a single ASCII character while anyone of the keys is pressed. The single bay panel buttons will produce the following characters. Notice all buttons have no direct effect on the display. Characters are only sent to PC's serial input. User must provide a control program in PC such that correlates the button pressed to the desire function.

Key	*Character Return*
Up	"A" (Dec 65, 0x41h)
Down	"B" (Dec 66, 0x42h)
Left	"C" (Dec 67, 0x43h)
Right	"D" (Dec 68, 0x44h)
Confirm	"E" (Dec 69, 0x45h)

Table 4 Keypad character return.

5.4. Non-Volatile Memory Command List

5.4.1. Save User Defined Character in Non-Volatile Memory (254 79 [cc] 253)

User can save his predefined characters in the non-volatile memory and this will save much time in redefining it again after the power of GFR128032CA-BNFA is switched off and on. [cc] is the character number starting from [0x01] to [0x10].

5.4.2. Load User Defined Character in System RAM (254 80 [cc] 253)

During power up, user can load his predefined characters from non-volatile memory into the system RAM by sending this command to GFR128032CA-BNFA. [cc] is the character number starting from [0x01] to [0x10].

5.4.3. Save User Settings in Non-Volatile Memory (254 83 [ud] [4 bytes] [2 dummy bytes] 253)

The GFR128032CA-BNFA reserves 32 bytes of non-volatile memory for arbitrary use by the host. This memory could be used to store a serial number, IP address, gateway address, netmask or any other data required.

[ud], which starts from 1 [0x01] to 8 [0x08], is the location of a data.

5.4.4. Read User Settings from Non-Volatile Memory (254 84 [ud] 253)

User predefined settings can be retrieved by sending this command to GFR128032CA-BNFA. [ud] is the location

of the data. 4 bytes will be sent from GFR128032CA-BNFA to the host right after the command is sent.

6. Command Summary

6.1. Text Command Summary

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

Table 5 Summary for text commands

6.2. Bar Charts and Graphic Command Summary

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].
Erase vertical bar graph	FE 2D [col] [height] FD	N/A	Erases vertical bar at position [col] of the last row with
	254 45 [col] [height] 253		height [height]. [height] ranges from [0x00] to
	254 '-' [col] [height] 253		[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[0x80]].
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		[0x80].
Put pixel	FE 70 [x] [y] FD	N/A	Draws a pixel at location (x,y). x ranges from 0
	254 112 [x] [y] 253		to 121 and y ranges from 0 to 31.
	254 'p' [x] [y] 253		
Clear pixel	FE 71 [x] [y] FD	N/A	Clears a pixel at location (x, y). x ranges from
	254 113 [x] [y] 253		0 to 121 and y ranges from 0 to 31.
	254 'q' [x] [y] 253		
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		

Table 6 Summary for graphic commands
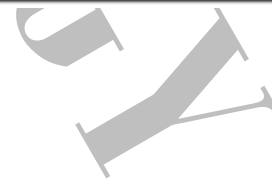
6.3. Miscellaneous Command Summary

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	Resets GFR128032CA-BNFA
	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		
Backlight on	FE 42 FD	on	Turns on the backlight.
	254 66 253		
	254 'B' 253		
Backlight off	FE 46 FD	off	Turns off the backlight.
	254 70 253		
	254 'F' 253		
Backlight brightness	FE 41 [brightness] FD	N/A	Adjust LED brightness. [brightness] ranges from
	254 64 [brightness] 253		1 to 7.
	254 'A' [brightness] 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		

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
	254 84 [ud] 253		each time.
	254 'T' [ud] 253		
Set Contrast	FE 68 [contrast] FD	N/A	Set display contrast, range 0x00 - 0x1C
	254 104 253		
	254 'h' 253		
Save boot-up logo	FE 6A FD	N/A	Save current screen as 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		

Table 7 Summary for miscellaneous commands

Keypad Mapping

KEY	Character Return
S2	" A " (0x41h)
S3	" B " (0x42h)
S4	" C " (0x43h)
S5	" D " (0x44h)
S6	" E " (0x45h)

Connector CN1

No	Signal	direction	Function description
1	DC 5V	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

6.4. Text Mode Coordinates
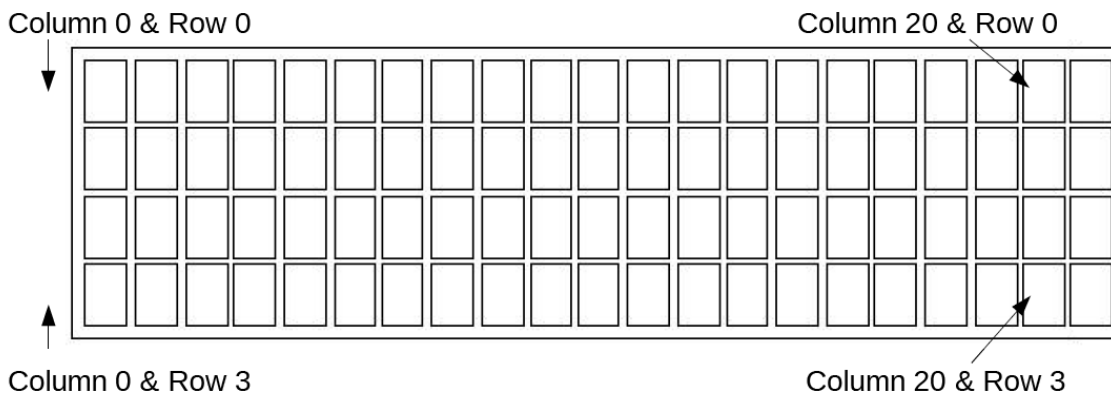
7. LCD Specifications

7.1. Features

- Full dot-matrix structure with 128 x 32 dots

- 1/64 Duty, 1/9 bias

- STN LCD, Negative, BLUE

- Transmissive LCD

- 6 o' clock viewing angle

- Built-in LED backlight

7.2. Mechanical Specifications

Item	Detail	Unit
Viewing area	46.0 x 12	mm
Active area	42.21 x 8.93	mm

Table 8 Mechanical Specifications

7.3. Absolute Maximum Ratings

Item	Min.	Typ.	Max.	Unit
Supply voltage	4.5	5	5.5	V
Supply current (BL off)		20	22	mA
Supply current (BL on)		50	55	mA
Operating temperature		0	50	oC
Storage temperature		-20	70	oC
Humidity			90	%RH

Table 9 Absolute Maximum Ratings

7.4. Luminance

Item	Min.	Typ.	Unit
Luminance	160	254	cd/m^2

Table 10 Luminance
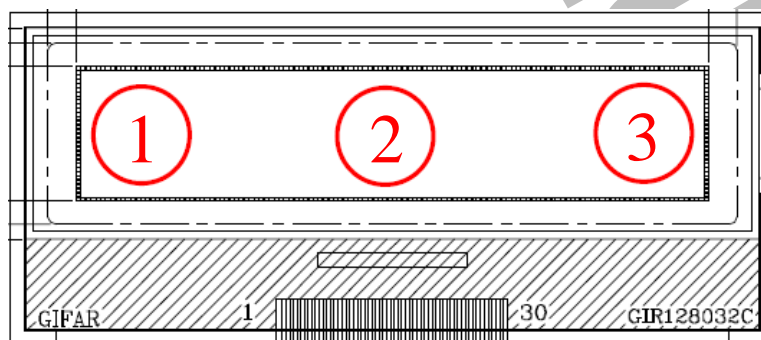
[亮度取 3 點平均]

8. Reliability

NO.	ITEM	CONDITION		STANDARD	NOTE
1	High Temp. Storage	70℃	120 hrs	Appearance Without defect	
2	Low Temp. Storage	-20℃	120 hrs	Appearance Without defect	
3	High Temp. & High Humi. Storage	40℃ 90% RH	120 hrs	Appearance Without defect	
4	High Temp. Operating Display	50℃	120 hrs	Appearance Without defect	
5	Low Temp. Operating Display	0℃	120 hrs	Appearance Without defect	
6	Thermal Shock	0℃, 30min. → 50℃,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.

9. Appendix
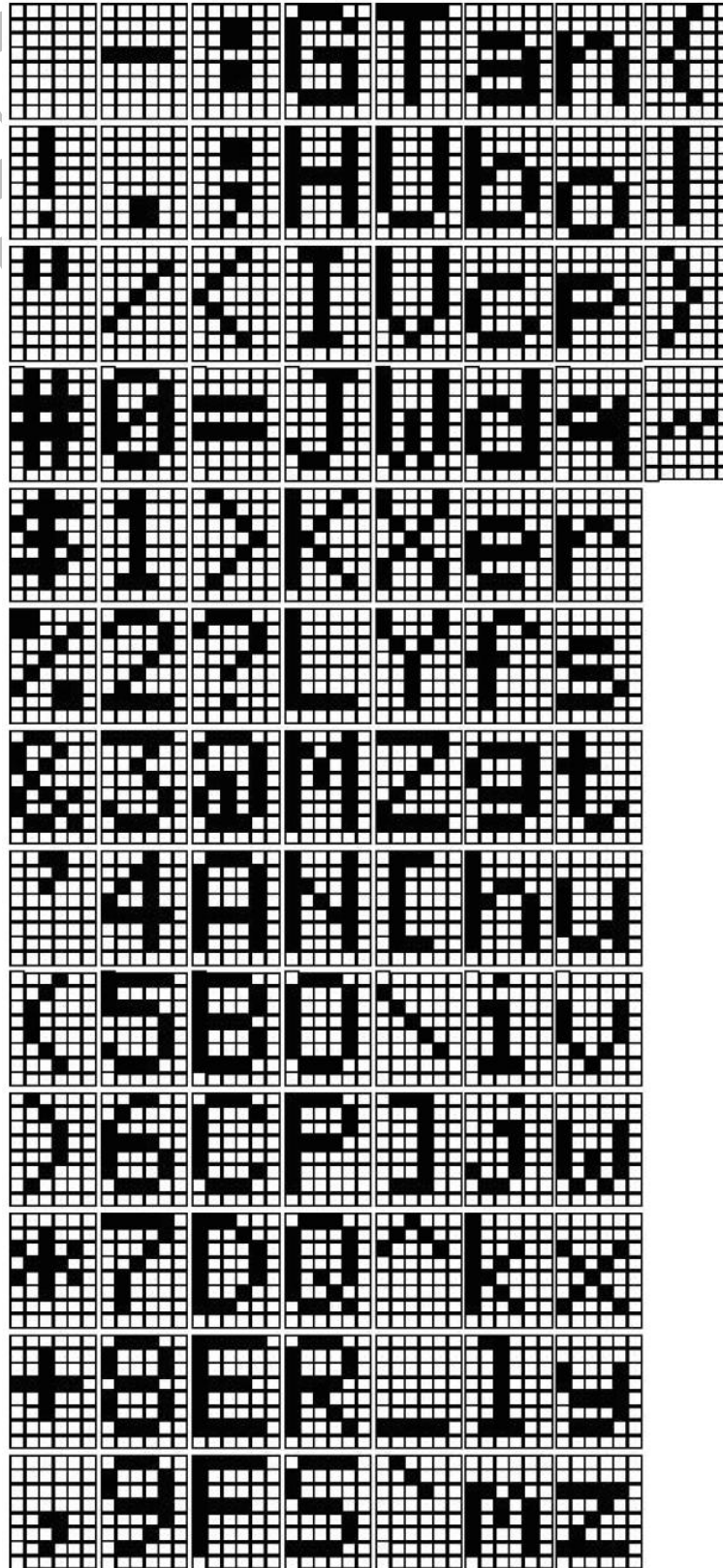
Drawing 7 Default characters.

10. PACKAGE INFORMATION

1	1 Tray	:	20 pcs (modules)
2	1 stack	:	8 tray + 1 Cover tray
3	1 Carton	:	(1 Cover tray + 8 tray)x 2 stack
4	Total pcs	:	1 Carton (20 pcs* 8 tray * 2 stack) = 320 pcs
5	Carton size = NO. 17	:	495 * 315 * 435mm
7	Net weight	:	TBD KG
8	Gross weight	:	TBD KG

** Packaging information**

- **1 Tray = 20 pcs**

- **1 stack=8tray+1 Cover tray**   ****Each layer of tray should be staggered stacked**

- **1 Carton = 2 stack,   Total pcs = 320 pcs**

出貨檢驗標準書
Shipping inspection standard

核准 Approved by	審核 Checked by	作成 Made by
ANDY	JACKY	RUBY

1.目的 Purpose：
規範出貨產品之檢驗項目及判斷標準，確保產品出貨能滿足客戶要求。
Standardize the inspection items and judgment standards to ensure the products that shipped out can meet customer's requirements.

2.範圍 Area：
適用於出廠之所有產品。
Applicable to all products shipped from the factory.

3.名詞解釋 Explanation of terms：
3-1 主要缺陷：亦會造成功能缺失或嚴重外觀缺陷。
Major Defects: It also causes loss of function or serious appearance defects.

3-2 次要缺陷：稍有缺陷但不影響客戶使用。
Minor defect: Slightly defective but does not affect customer use.

4.檢驗體制 Inspection system：
4-1 抽樣計劃：依 ANSI/ASQ Z1.4 一般檢驗水準Ⅱ 之 正常檢驗一次抽驗方案。
Sampling plan: According to ANSI/ASQ Z1.4 general inspection level Ⅱ the normal inspection one-time sampling plan.

4-2 允收水準 Acceptable Level：(AQL)
主要缺陷 Major defect：0.4 %
次要缺陷 Minor defect：0.65 %

5.檢驗條件 Inspection conditions：
5-1 使用相關之檢測儀器及測試、量測工具。
Use relevant testing instrument, testing and measuring tools .

5-2 環境要求：其條件需控制在常溫下 23℃±3℃及溼度 70%RH 以下。
Environmental requirements: The conditions should be controlled at room temperature 23℃±3℃ and humidity below 70%RH.

5-3 外觀檢驗：須在 380±20% LUX 的白色日光燈下，其目視距離需於產品離 30±5 cm 檢驗。
Appearance inspection: Under the white fluorescent lamp of 380±20% LUX , the visual distance shall be checked above the product 30 ± 5 cm.

5-4 電性測試 Electrical Testing：
5-4-1 有背光之產品需關燈並在 5~300Lux±3%下檢驗。
The products with backlight should be tested at 5~300±3% Lux.
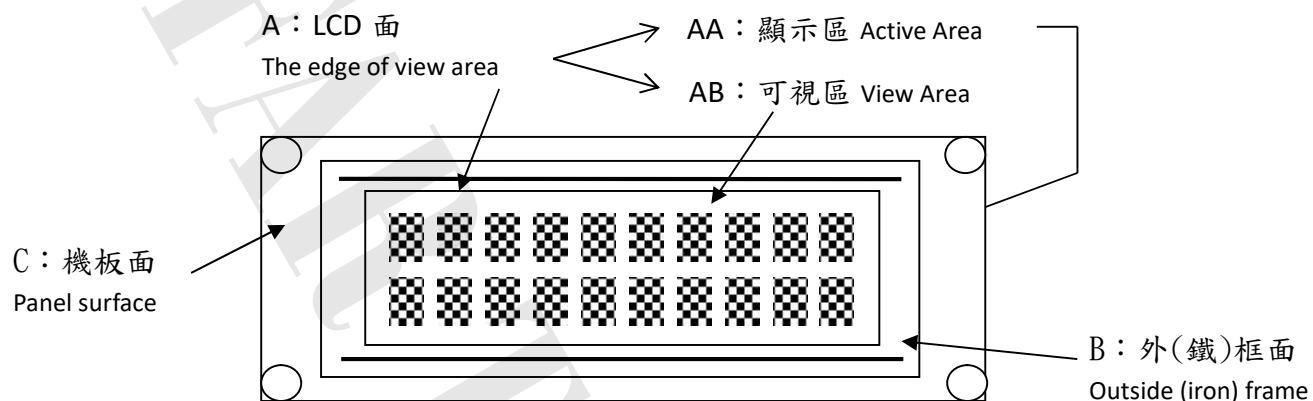
5-4-2 無背光之產品需開燈並在 60~300Lux±3%白色日光燈下檢驗。
Products without backlight need to be turned on and tested under 60~300 ± 3% LUX white fluorescent lamps .
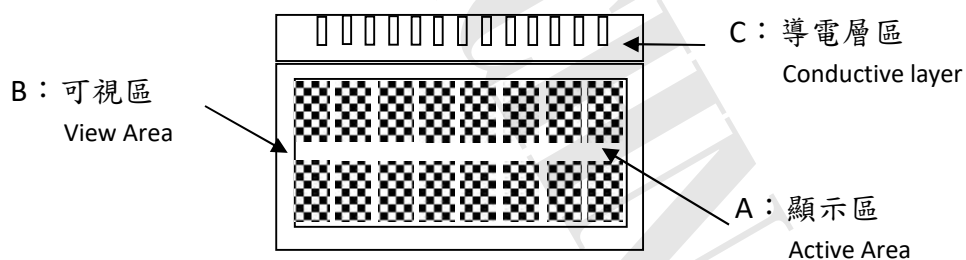
5-5 檢查視角依產品視角方向。
Check the viewing angle according to the product viewing angle.

5-6 其不良現象檢視區域 Bad phenomenon View area
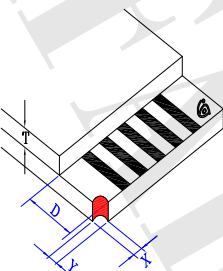
　5-6-1 適用種類 Applicable category：COB、TFT

A：LCD 面
The edge of view area

AA：顯示區 Active Area

AB：可視區 View Area

C：機板面
Panel surface

B：外（鐵）框面
Outside (iron) frame

　5-6-2 適用種類 Applicable category：COG、TAB、TN

B：可視區
View Area

C：導電層區
Conductive layer

A：顯示區
Active Area

GI FAR TECHNOLOGY CO.,LTD　　*Work Instruction*

種類 Category		COG				
編號 No.	檢驗項目 Item	檢驗內容及判定標準 Inspection Content & Standard		區域 Zone	類別 Category	缺陷等級 Level
1	點類(一) Dot(1)	黑點、刺傷…等圓狀 Black dot、Stab…and other round shape $\omega = \dfrac{(X+Y)}{2}$	兩點距離須超過 5 ㎜ Two points have to be ≧ 5 mm <table><tr><td>φ (mm)</td><td>允收數 Acceptance Qty</td></tr><tr><td>φ ≦ 0.1</td><td>無視 Ignore</td></tr><tr><td>0.1 < φ ≦ 0.25</td><td>3</td></tr><tr><td>0.25 < φ ≦ 0.3</td><td>1</td></tr><tr><td>φ > 0.3</td><td>0</td></tr></table>	A B	外觀 Appearance	次要 Minor AQL0.65%
2	點類(二) Dot(2)	氣泡、凹凸點 Bubble、Uneven dots $\omega = \dfrac{(X+Y)}{2}$	兩點距離須超過 5 ㎜ Two points have to be ≧ 5 mm <table><tr><td>φ (mm)</td><td>允收數 Acceptance Qty</td></tr><tr><td>φ ≦ 0.2</td><td>無視 Ignore</td></tr><tr><td>0.2 < φ ≦ 0.5</td><td>2</td></tr><tr><td>φ > 0.5</td><td>0</td></tr></table>	A B	外觀 Appearance	次要 Minor AQL0.65%
3	線類 Line	刮傷、毛屑…等線狀 Scratch、Fiber.. and other linear shape. W / L	<table><tr><td>L (mm)</td><td>W (mm)</td><td>允收數 Acceptance Qty</td></tr><tr><td>--</td><td>W ≦ 0.02</td><td>無視 Ignore</td></tr><tr><td>L ≦ 5</td><td>W ≦ 0.03</td><td>3</td></tr><tr><td>L ≦ 3</td><td>W ≦ 0.05</td><td>2</td></tr><tr><td>L > 5</td><td>W > 0.05</td><td>0</td></tr></table>	A B	外觀 Appearance	次要 Minor AQL0.65%
4	底色 Background color	同批供貨不能有明顯色差 No obvious color difference allowed in same shipment. (必要時與客端制定限度樣) (According to the gold samples if necessary)		B	外觀 Appearance	次要 Minor AQL0.65%
5	FPC 外觀 FPC Appearance	※ FPC 上刺傷導致線路無法導通　拒收 　Stabbing on the FPC causes the line to fail to conduct 　　　　　　　　　　　　　　　　Reject ※ FPC 上髒污或是殘留異物以致線路無法導通　拒收 　Dirty or residual foreign matter on the FPC makes the circuit unable to conduct 　　　　　　　　　　　　　　　　Reject ※ FPC 直角折痕、斷裂　拒收 　FPC right-angle crease and fracture　　Reject		C	外觀 Appearance	主要 Major AQL 0.4%

COG

6	點、線類 (三) Dot、Line (3)	※ 於全黑、白畫面下看見之區塊狀或線狀不良　拒收 There is a block or linear in the view area under the screen is whole black or white. Reject ※ 但依 2% ND Filter 遮蓋無視　允收 But after inspecting by 2% ND Filter without seeing block or linear, it is confirmed Acceptance	A	電訊 Electronics	次要 Minor AQL0.65%
7	點、線類 (四) Dot、Line (4)	畫面中顯示出現黑、白、亮、異色點或線狀 There is a black, white, bright or other dot or lines showing in the view area. ※ 依編號 1、3 之判定標準 According to the inspection standard: No. 1 and 3.	A	電訊 Electronics	次要 Minor AQL0.65%
8	缺字 Lack of characters	顯示時畫面缺少部份字元　拒收 Lacking part of characters in the view area. Reject	A	電訊 Electronics	主要 Major AQL 0.4%
9	無動作 No reaction	顯示畫面一直處於起始畫面而無法進行切換　拒收 The display (view area) always show in the initial screen and can't be switched to others. Reject	A	電訊 Electronics	主要 Major AQL 0.4%
10	無畫面 No display	通電後，完全無任何畫面顯示　拒收 After connecting to the power, there is no image. Reject	A	電訊 Electronics	主要 Major AQL 0.4%
11	斷線 Broken line	顯示畫面中少直、橫線　拒收 There is a lack of vertical or horizontal lines in the view area. Reject	A	電訊 Electronics	主要 Major AQL 0.4%
12	CROSS TALK	顯示畫面時有局部之條紋或拖影 There are some stripes or shadow/smear showing in the view area. 拒收或與客端簽訂限度樣 Reject or inspect according to the golden sample	A	電訊 Electronics	次要 Minor AQL0.65%
13	I CON	顯示畫面缺少部份顯示圖案　拒收 Lack of partial ICON in the view area. Reject	A	電訊 Electronics	主要 Major AQL 0.4%

COG

14	深淺不一 Color difference	顯示畫面的對比，比其他顯示深或淺並依電氣規格(VOP)值判定 The color contrast of display is obviously lighter or darker than others and according to the VOP value in the electronics specification. 拒收或與客端簽訂限度樣 Reject or inspect according to the golden sample	A	電訊 Electronics	次要 Minor AQL0.65%
15	畫面異常 Abnormal screen	通電後畫面出現未定義之電訊不良現象　拒收 After connecting to the power, there is an undefined electronics appearance showing in the view area. Reject	A	電訊 Electronics	主要 Major AQL 0.4%
16	背光色不均 Uneven color of backlight	※ 點亮後 LED 有明暗不均現象依其均勻度判定　拒收 After lighting LEDs have brightness and darkness uneven the determined according to its uniformity. Reject ※ 點亮後 LED 色澤不一致　拒收 LED color is inconsistent after lighting. Reject	A	電訊 Electronics	次要 Minor AQL0.65%
17	亮度不足 Lack of brightness	波長、色座標、輝度與圖面標示定義不符　拒收 Wave length, chromatic coordinates, brightness don't correspond to the definition of the drawing. Reject	A	電訊 Electronics	主要 Major AQL 0.4%
18	背光腳柱 Backlit foot post	斷裂、長度不一　拒收 Fracture, different length Reject	--	外觀 Appearance	次要 Minor AQL0.65%
19	破損 Damaged	Y：破損寬 X：破損長 Y: Damaged width X: Damaged length 	Y	X	判定 Determination
Y ≦1.0	-- --	允收 Acceptance
未進入可視區 Did not enter the viewing area	≦1/8 玻璃該邊長 ≦1/8 The side length of the glass	允收 Acceptance
進入可視區 Enter the viewing area	-- --	拒收 Reject		B	外觀 Appearance	次要 Minor AQL0.65%

			Y：破損寬　X：破損長 Y: Damaged width　X: Damaged length					
20	角崩 Corner collapse		Y	X	判定 Determination	C	外觀 Appearance	次要 Minor AQL0.65%
			≦1/3D	-- --	允收 Acceptance			
			1/3D < Y ≦ D	≦1/8 玻璃邊長 ≦1/8 The side length of the glass	允收 Acceptance			
			> D	-- --	拒收 Reject			
21	尺寸量測 Size Measurement	未依圖面上標示　拒收 No correspond to the indication on the drawing. 　　　　　　　　　　　　　　　　　　　　　　　　　　　　Reject				ALL	外觀 Appearance	主要 Major AQL 0.4%
22	其他 Other	如發現有上述未定義之不良則與客端簽訂限度樣 If there is another undefined defective situation. It will be listed as others. The inspection standard is according to the golden sample.				ALL	電訊 Electronics 外觀 Appearance	次要 Minor AQL0.65%