



华芯科技有限公司

HUAXIN TECHNOLOGY CO., LTD

SPECIFICATION

CUSTOMER :

MODULE NO.: ESHXKJ12864D-NGG-NZ#

APPROVED BY: (FOR CUSTOMER USE ONLY)	PCB VERSION:	DATA:
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2021/7/20		First issue

	MODLE NO :
RECORDS OF REVISION	DOC. FIRST ISSUE

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1.Module Classification Information

T G 1 2 8 6 4 D—N G G— NZ#
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① Brand: HuaXin Technology fCo.,Ltd.
- ② Display Type: C→Character Type, G→Graphic Type
- ③ Display Font: 128 x 64 dots
- ④ Model serials no.
- ⑤ Backlight Type:

N→Without backlight	T→LED, White
B→EL, Blue green	A→LED, Amber
D→EL, Green	R→LED, Red
W→EL, White	O→LED, Orange
F→CCFL, White	G→LED, Green
Y→LED, Yellow Green	
- ⑥ LCD Mode:

B→TN Positive, Gray	T→FSTN Negative
N→TN Negative,	
G→STN Positive, Gray	
Y→STN Positive, Yellow Green	
M→STN Negative, Blue	
F→FSTN Positive	
- ⑦ LCD Polarize Type/ Temperature range/ View direction

A→Reflective, N.T, 6:00	H→Transflective, W.T,6:00
D→Reflective, N.T, 12:00	K→Transflective, W.T,12:00
G→Reflective, W. T, 6:00	C→Transmissive, N.T,6:00
J→Reflective, W. T, 12:00	F→Transmissive, N.T,12:00
B→Transflective, N.T,6:00	I→Transmissive, W. T, 6:00
E→Transflective, N.T.12:00	L→Transmissive, W.T,12:00
- ⑧ Special Code

N : without Negative Voltage;	Z: NT7086
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#:Fit in with the ROHS Directions and regulations

2.Precautions in use of LCD Modules

- (1)Avoid applying excessive shocks to the module or making any alterations or modifications to it.
- (2)Don't make extra holes on the printed circuit board, modify its shape or change the components of LCD module.
- (3)Don't disassemble the LCM.
- (4)Don't operate it above the absolute maximum rating.
- (5)Don't drop, bend or twist LCM.
- (6)Soldering: only to the I/O terminals.

- (7)Storage: please storage in anti-static electricity container and clean environment.
- (8). HUAXIN have the right to change the passive components
(Resistors,capacitors and other passive components will have different appearance and color caused by the different supplier.)
- (9). HUAXIN have the right to change the PCB Rev.

3.General Specification

Item	Dimension	Unit
Number of Characters	128 x 64 dots	—
Module dimension	78.0 x 70.0 x 9.7(MAX)	mm
View area	62.0 x 44.0	mm
Active area	56.3 x 38.38	mm
Dot size	0.42 x 0.58	mm
Dot pitch	0.44 x 0.60	mm
LCD type	STN Positive, Gray Reflective, (In LCD production, It will occur slightly color difference. We can only guarantee the same color in the same batch.)	
Duty	1/64	
View direction	6 o'clock	
Backlight Type	Without backlight	

4.Absolute Maximum Ratings

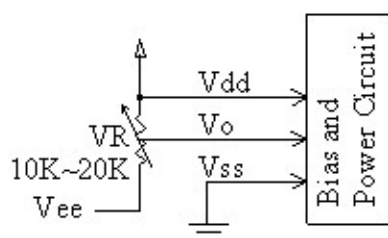
Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T _{OP}	-20	—	+70	℃
Storage Temperature	T _{ST}	-30	—	+80	℃
Input Voltage	V _I	V _{SS}	—	V _{DD}	V
Supply Voltage For Logic	V _{DD} -V _{SS}	-0.3	—	+7	V
Supply Voltage For LCD	V _{DD} -V ₀	0	—	15	V

Negative Voltage Output	V_{EE}	—	10	—	V
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5. Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	$V_{DD}-V_{SS}$	—	4.75	5.0	5.25	V
Supply Voltage For LCD *Note	$V_{DD}-V_0$	$T_a=-20^{\circ}\text{C}$	—	—	9.8	V
		$T_a=25^{\circ}\text{C}$	—	8.5	—	V
		$T_a=+70^{\circ}\text{C}$	7.6	—	—	V
Input High Volt.	V_{IH}	—	$V_{DD}-2.2$	—	V_{DD}	V
Input Low Volt.	V_{IL}	—	0	—	0.8	V
Output High Volt.	V_{OH}	—	$V_{DD}-0.3$	—	V_{DD}	V
Output Low Volt.	V_{OL}	—	0	—	0.3	V
Supply Current	I_{DD}	$V_{DD}=5\text{V}$	10.5	12.0	13.0	mA

* Note: Please design the VOP adjustment circuit on customer's main board

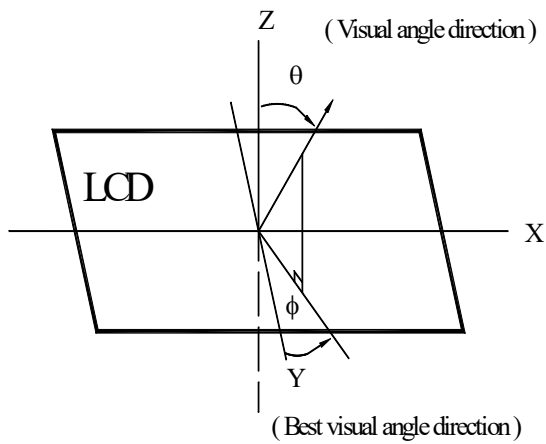


6. Optical Characteristics

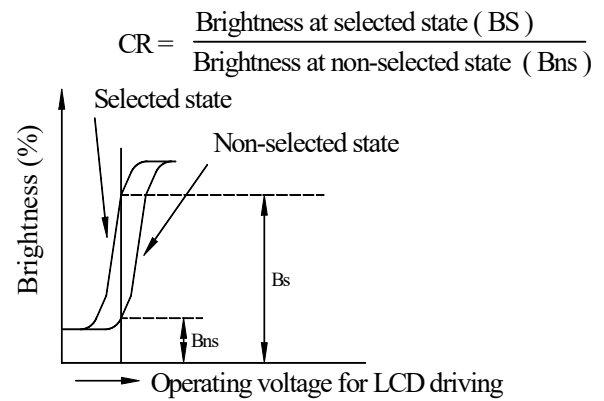
ITEM	SYMBAL	CONDITION	MIN.	TYP.	MAX.	UNIT
View Angle	(V) θ	$CR \geq 2$	20		40	deg
	(H) φ	$CR \geq 2$	-30		30	deg
Contrast Ratio	CR	-		3		-
Response Time	T rise	-		150	200	ms
	T fall	-		150	200	ms

6.1 Definitions

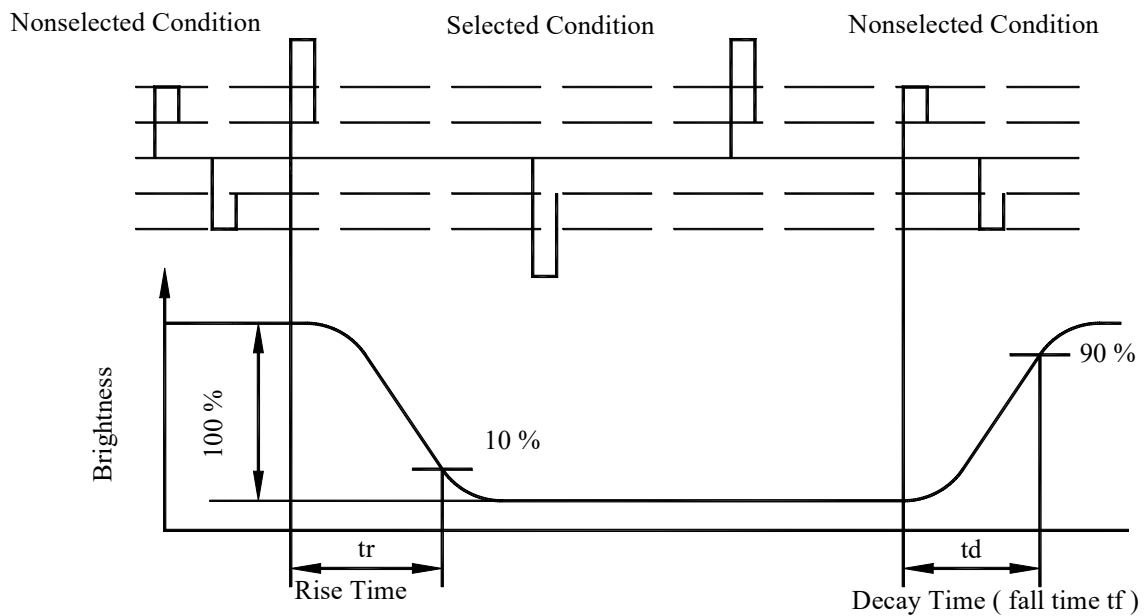
■ View Angles



■ Contrast Ratio



■ Response Time

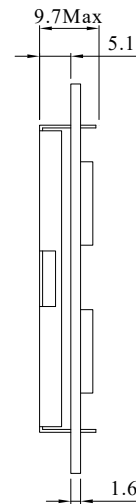
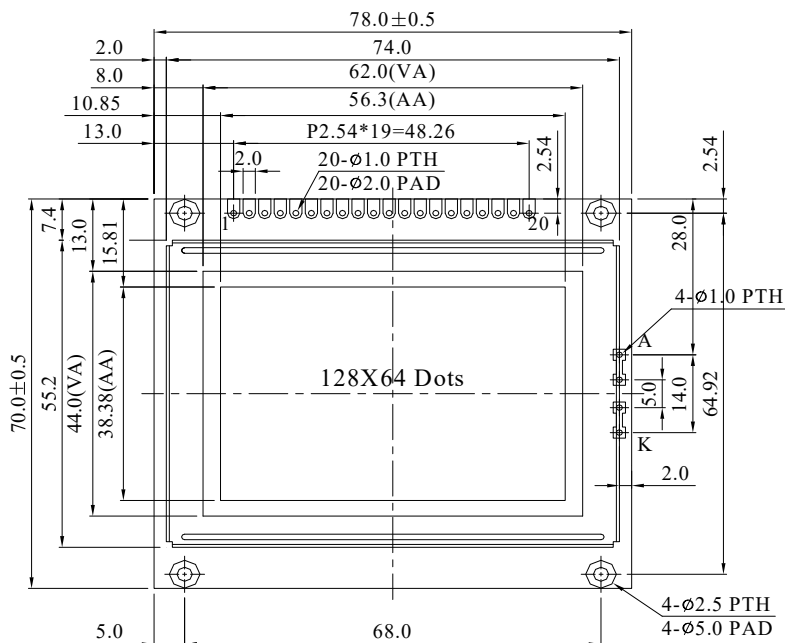


7. Interface Pin Function

Pin No.	Symbol	Level	Description
1	FG		Frame Ground
2	Vss		GND
3	Vdd		Power supply (+5 V)

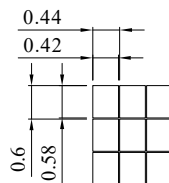
4	Vo		Power supply for LCD driver
5	WR	L	Data write. Write data into T6963C when WR = L
6	RD	L	Data read. Read data from T6963C when RD = L
7	CE	L	L : Chip enable
8	C/D	H / L	WR=L , C/D=H : Command Write C/D=L: Data write RD=L , C/D=H : Status Read C/D=L: Data read
9	RESET	H / L	H : Normal ; L : Initialize T6963C
10	DB0	H / L	Data bus line
11	DB1	H / L	Data bus line
12	DB2	H / L	Data bus line
13	DB3	H / L	Data bus line
14	DB4	H / L	Data bus line
15	DB5	H / L	Data bus line
16	DB6	H / L	Data bus line
17	DB7	H / L	Data bus line
18	FS	H / L	Pins for selection of font ; H : 6 * 8 , L : 8 * 8
19	K		NC
20	A		NC

8. Contour Drawing & Block Diagram



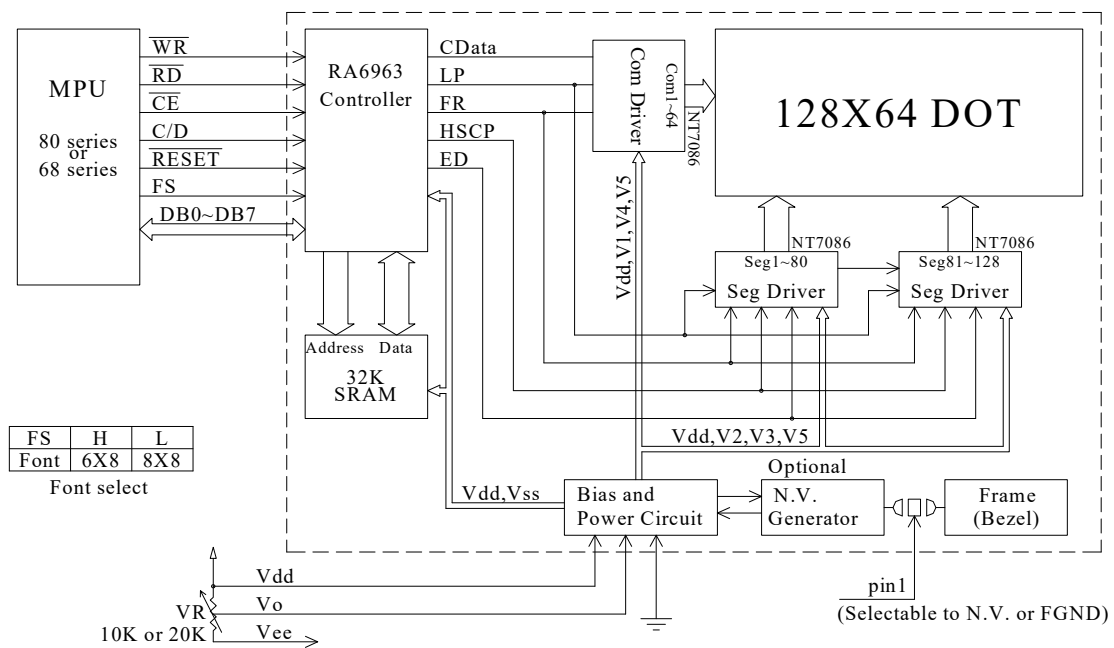
EL or NO B/L

PIN NO.	SYMBOL
1	FG
2	V _{SS}
3	V _{DD}
4	V _O
5	$\overline{\text{WR}}$
6	$\overline{\text{RD}}$
7	$\overline{\text{CE}}$
8	$\overline{\text{CD}}$
9	$\overline{\text{RESET}}$
10	DB0
11	DB1
12	DB2
13	DB3
14	DB4
15	DB5
16	DB6
17	DB7
18	FS
19	K
20	A



DOT SIZE

The non-specified tolerance of dimension is $\pm 0.3\text{mm}$.



External contrast adjustment.

9.Display control instruction

9.1 Communications with MPU

•Status Read

A status check must be performed before data is read or written.

Status Check

The Status of RA6963 can be read from the data lines.

$\overline{\text{RD}}$	$\overline{\text{WR}}$	$\overline{\text{CS}}$	$\text{C}/\overline{\text{D}}$	$\text{SD}[7:0]$
L	H	L	H	Status Word

The RA6963 status word format is as follows:

MSB				LSB			
SD7	SD6	SD5	SD4	SD3	SD2	SD1	SD0
STA7	STA6	STA5	STA4	STA3	STA2	STA1	STA0

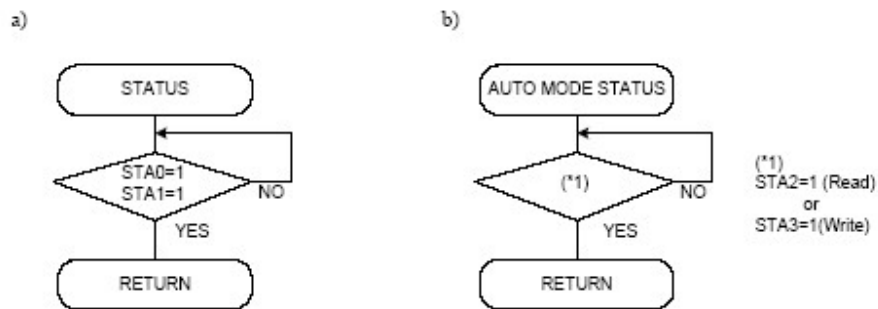
STA0	Check command execution capability	0: Disable 1: Enable
STA1	Check data read/write capability	0: Disable 1: Enable
STA2	Check Auto mode data read capability	0: Disable 1: Enable
STA3	Check Auto mode data write capability	0: Disable 1: Enable
STA4	Not used	
STA5	Check controller operation capability	0: Disable 1: Enable
STA6	Error flag. Used for Screen copy commands.	0: No error 1: Error
STA7	Check the blink condition	0: Display off 1: Normal display

Note 1: It is necessary to check STA0 and STA1 at the same time. There is a possibility of erroneous operation due to a hardware interrupt.

Note 2: For most modes STA0 /STA1 are used as a status check.

Note 3: STA2 and STA3 are valid in Auto mode; STA0 and STA1 are invalid.

Status Checking Flow



Note 4: When using the MSB=0 command, a Status Read must be performed.

If a status check is not carried out, the RA6963 cannot operate normally, even after a delay time.

The hardware interrupt occurs during the address calculation period (at the end of each line).

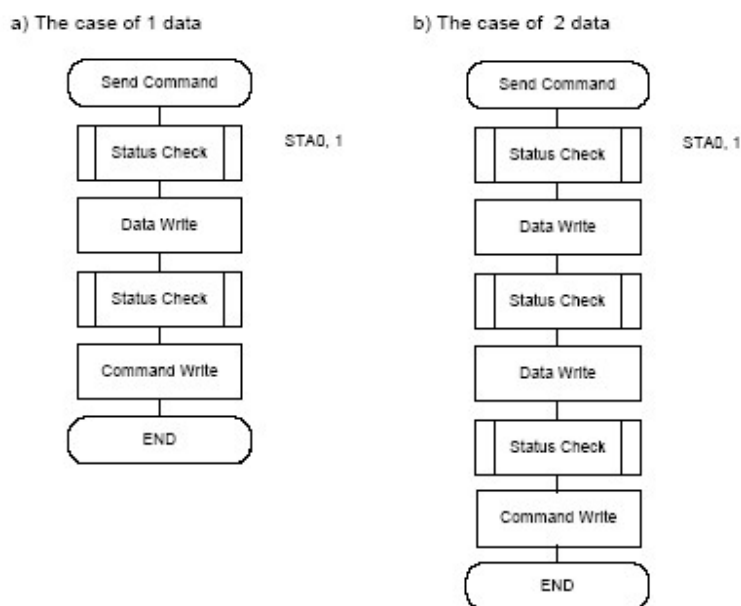
If a MSB=0 command is sent to the RA6963 during this period, the RA6963 enters Wait status.

If a status check is not carried out in this state before the next command is sent, there is the possibility that command or data will not be received.

• Setting Data

When using the RA6963, first set the data, then set the command.

Procedure for Sending a Command



Note: When sending more than two data, the last datum (or last two data) is valid.

• Command Definitions

Command	Code	D1	D2	Function
Registers Setting	00100001	X address	Y address	Set cursor pointer
	00100010	Data	00h	Set Offset Register
	00100100	Low address	High address	Set Address pointer
Set Control Word	01000000	Low address	High address	Set Text Home Address
	01000001	Columns	00h	Set Text Area
	01000010	Low address	High address	Set Graphic Home Address
	01000011	Columns	00h	Set Graphic Area
Mode Set	1000X000	--	--	OR mode
	1000X001	--	--	EXOR mode
	1000X011	--	--	AND mode
	1000X100	--	--	Text Attribute mode
	10000XXX	--	--	Internal CG ROM mode
	10001XXX	--	--	External CG RAM mode
Display Mode	10010000	--	--	Display off
	1001XX10	--	--	Cursor on, blink off
	1001XX11	--	--	Cursor on, blink on
	100101XX	--	--	Text on, graphic off
	100110XX	--	--	Text off, graphic on
	100111XX	--	--	Text on, graphic on
Cursor Pattern Select	10100000	--	--	1-line cursor
	10100001	--	--	2-line cursor
	10100010	--	--	3-line cursor
	10100011	--	--	4-line cursor
	10100100	--	--	5-line cursor
	10100101	--	--	6-line cursor
	10100110	--	--	7-line cursor
	10100111	--	--	8-line cursor
Data Read/Write	11000000	Data	--	Data Write and Increment ADP
	11000001	--	--	Data Read and Increment ADP
	11000010	Data	--	Data Write and Decrement ADP
	11000011	--	--	Data Read and Decrement ADP
	11000100	Data	--	Data Write and Non-variable ADP
	11000101	--	--	Data Read and Non-variable ADP
Data auto Read/Write	10110000	--	--	Set Data Auto Write
	10110001	--	--	Set Data Auto Read
	10110010	--	--	Auto Reset
Screen Peek	11100000	--	--	Screen Peek
Screen Copy	11101000			Screen Copy
Bit Set/Reset	11110XXX	--	--	Bit Reset
	11111XXX	--	--	Bit Set
	1111X000	--	--	Bit 0 (LSB)
	1111X001	--	--	Bit 1
	1111X010	--	--	Bit 2
	1111X011	--	--	Bit 3
	1111X100	--	--	Bit 4
	1111X101	--	--	Bit 5
	1111X110	--	--	Bit 6
	1111X111	--	--	Bit 7 (MSB)