

**SPECIFICATIONS FOR
LCD MODULE**

Module No. JHB25664A

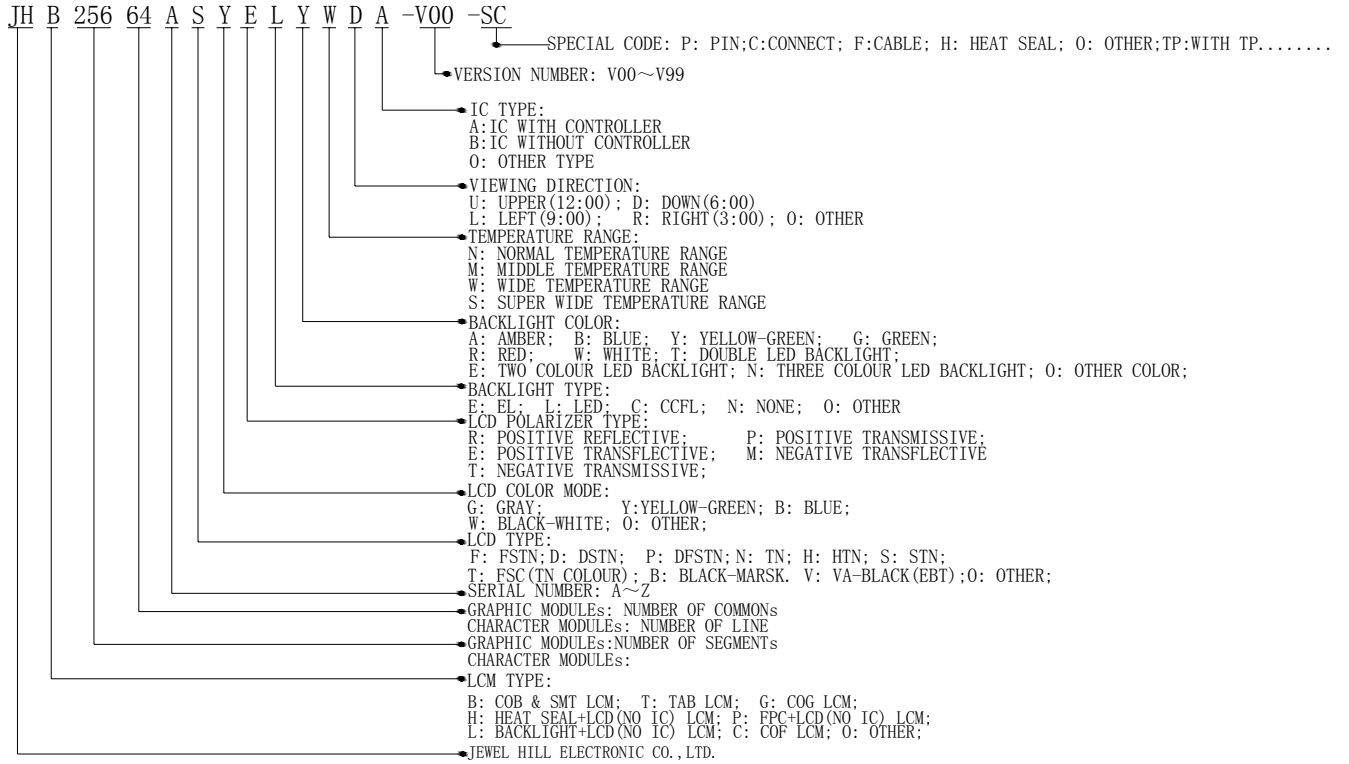
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LCM Number System



1. GENERAL DESCRIPTION

The JHB25664A is a 256× x 64 Dots Graphics LCD module. It has a STN panel composed of 256segments and 64 commons. The LCM can be easily accessed by micro-controller via parallel interface.

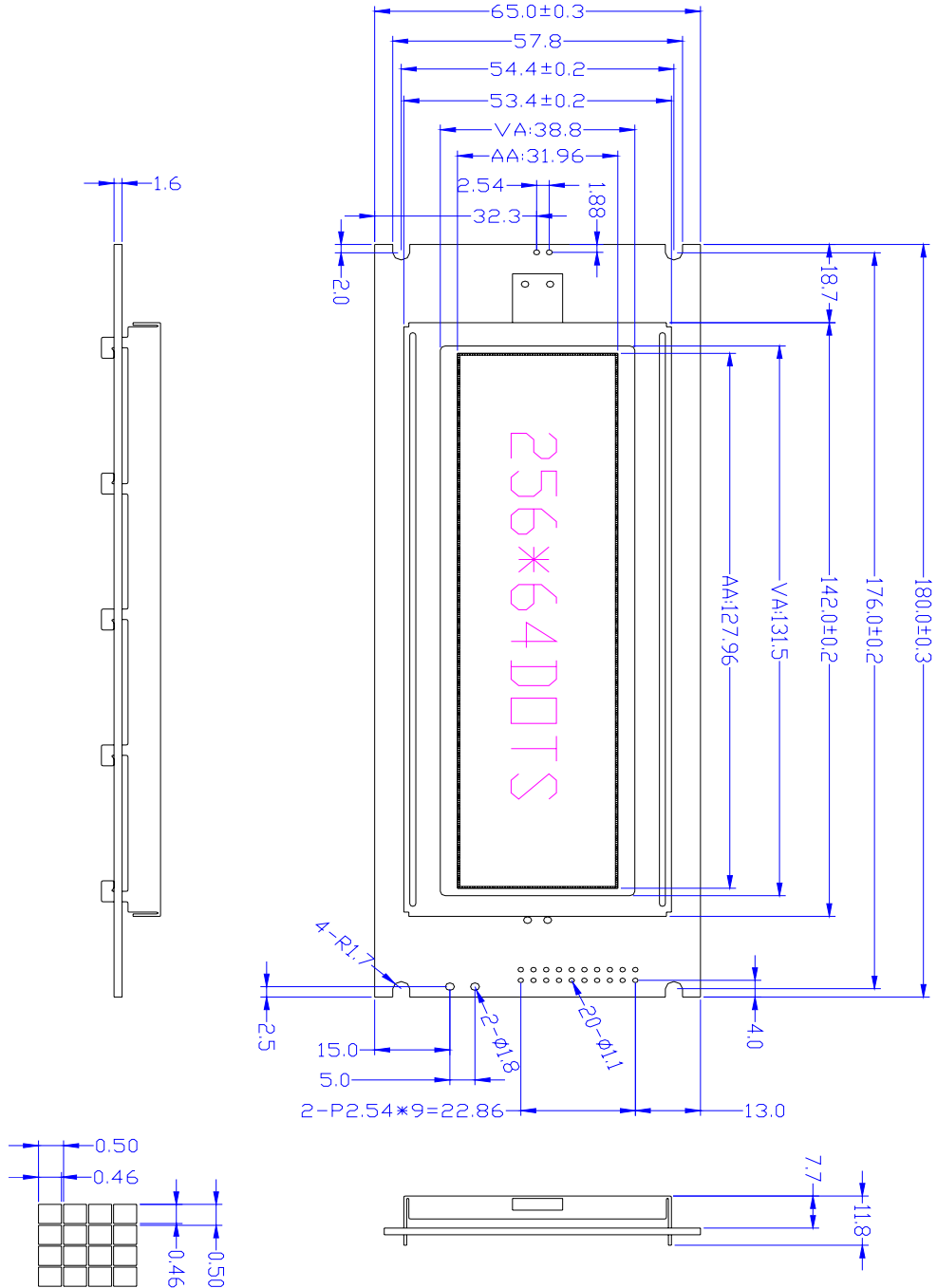
2. FEATURES

Display Mode	Transflective and Positive
	STN(Y-G) module
Display Format	Graphic 256 x 64 dots
Input Data	Parallel data input from MPU
Multiplexing Ratio	1/32 Duty
Bias	1/6 Bias
Viewing Direction	6 O'clock
Backlight	LED (Y-G)
DC-DC	Build-in DC-DC Converter for Negative Voltage

3. MECHANICAL SPECIFICATION

Item	Specifications	Unit
Dimensional outline	180.0 x 65.0 x 11.8(max)	mm
Resolution	256segs x 64coms	dots
View area	131.5(W) x 38.8(H)	mm
Active area	127.96(W) x 31.96(H)	mm
Dots pitch	0.5 (W)×0.5(H)	mm
Dots size	0.46(W)×0.46 (H)	mm

4. MECHANICAL DIMENSION



NO.	SYMBOL
1	FG
2	VSS
3	VDD
4	NC
5	R/W
6	E1
7	E2
8	RS
9	NC
10	RST
11	DB0
12	DB1
13	DB2
14	DB3
15	DB4
16	DB5
17	DB6
18	DB7
19	LEDA
20	LEDK

5. MAXIMUM RATINGS

Item	Symbol	Min	Max	Unit	Note
Supply voltage	$V_{DD} - V_{SS}$	-0.3	7.0	V	
	V_{LCD}	3.0	7.0	V	
Input Voltage	V_{IN}	-0.3	$V_{DD} + 0.3$	V	
Operating temperature	T_{OPR}	-20	+70	°C	
Storage temperature	T_{STR}	-30	+80	°C	
Humidity	---	---	90	%RH	

6. ELECTRICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	Logic	V_{DD}	---	-	5.0	5.5	V
Input Voltage	H level	V_{IH}	---	$0.7V_{DD}$	---	V_{DD}	V
	L level	V_{IL}		-0.3	---	0.6	
Current Consumption (LCD DRIVER)		I_{DD}	$V_{DD}=5.0V$; $V_{LCD}=6.6V$; $T_{amb}=25^{\circ}C$;	---	6.0	8.0	mA
LCD Driving Voltage		V_{LCD}	Bias=1/6 $V_{LCD}=V_0 - V_{SS}$	6.3	6.6	6.8	V
Power Supply for LED		V_f	$I_f=230mA$	4.8	5.0	5.2	V
Current Consumption (With LED BackLight)		I_f	$V_{DD}=5.0V$; $V_f=5.0V, T_{amb}=25^{\circ}C$;	---	230	280	mA

7. MODULE FUNCTION DESCRIPTION

7.1. PIN DESCRIPTION

Pin No.	Symbol	Description
1	FG	Frame Ground
2	VSS	Power supply for Ground (0V)
3	VDD	Power supply for positive (+5V)
4	NC	No Connect
5	R/W	Read Enable signed, “L”: Read
6	E1	Chip Enable Signal for Chip1
7	E2	Chip Enable Signal for Chip2
8	RS	H:Intrraction; L:Data
9	NC	No Connect
10	/RST	Reset signal
11	DB0	8-bit bi-directional data bus
12	DB1	
13	DB2	
14	DB3	
15	DB4	
16	DB5	
17	DB6	
18	DB7	
19	LEDA	Supply voltage for LED Positive
20	LEDK	Supply voltage for LED Negative

7.2 TIMING CHARACTERISTICS

AC Characteristics ($T_A = 25^\circ\text{C}$, $V_{DD} = 4.5\text{V}$) Parallel Mode Interface

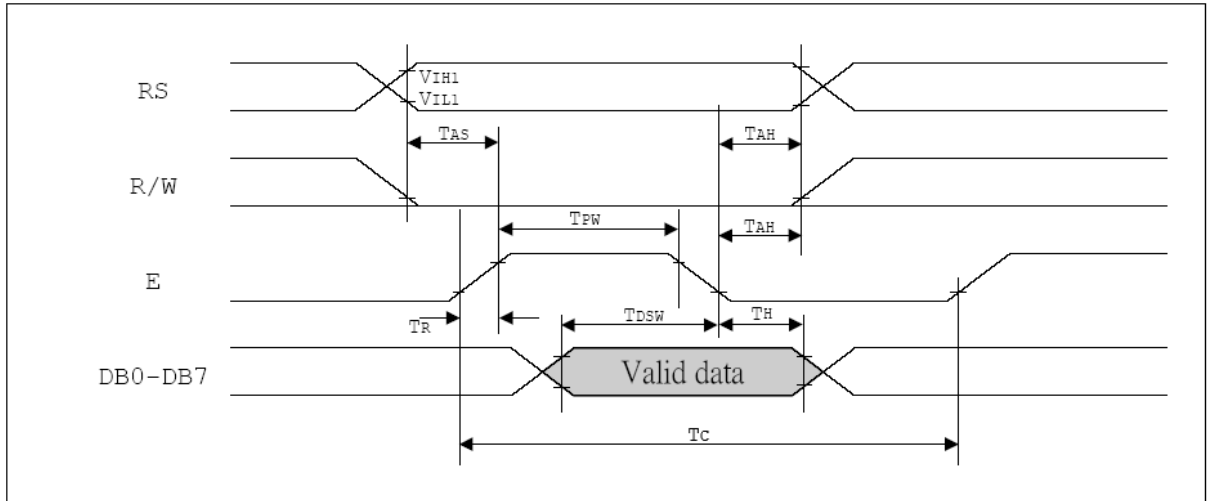
Symbol	Characteristics	Test Condition	Min.	Typ.	Max.	Unit
<i>Internal Clock Operation</i>						
f_{OSC}	OSC Frequency	R = 33K Ω	480	540	600	KHz
<i>External Clock Operation</i>						
f_{EX}	External Frequency	-	480	540	600	KHz
	Duty Cycle	-	45	50	55	%
T_R, T_F	Rise/Fall Time	-	-	-	0.2	μs
<i>Write Mode (Writing data from MPU to ST7920)</i>						
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
<i>Read Mode (Reading Data from ST7920 to MPU)</i>						
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
<i>Interface Mode with LCD Driver(ST7921)</i>						
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

AC Characteristics ($T_A = 25^{\circ}\text{C}$, $V_{DD} = 2.7\text{V}$) Parallel Mode Interface

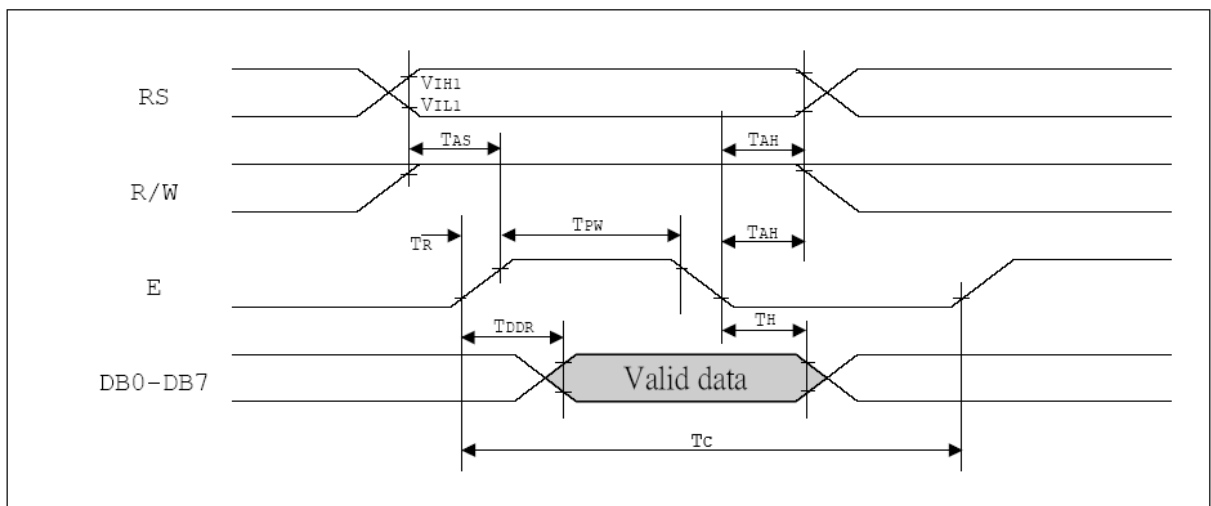
Symbol	Characteristics	Test Condition	Min.	Typ.	Max.	Unit
<i>Internal Clock Operation</i>						
f_{OSC}	OSC Frequency	R = 18K Ω	470	530	590	KHz
<i>External Clock Operation</i>						
f_{EX}	External Frequency	-	470	530	590	KHz
	Duty Cycle	-	45	50	55	%
$T_{\text{R}}, T_{\text{F}}$	Rise/Fall Time	-	-	-	0.2	μs
<i>Write Mode (Writing data from MPU to ST7920)</i>						
T_{C}	Enable Cycle Time	Pin E	1800	-	-	ns
T_{PW}	Enable Pulse Width	Pin E	160	-	-	ns
$T_{\text{R}}, T_{\text{F}}$	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
<i>Read Mode (Reading Data from ST7920 to MPU)</i>						
T_{C}	Enable Cycle Time	Pin E	1800	-	-	ns
T_{PW}	Enable Pulse Width	Pin E	320	-	-	ns
$T_{\text{R}}, T_{\text{F}}$	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	-	-	260	ns
T_{H}	Data Hold Time	Pins: DB0 - DB7	20	-	-	ns
<i>Interface Mode with LCD Driver(ST7921)</i>						
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

8 bit interface timing diagram

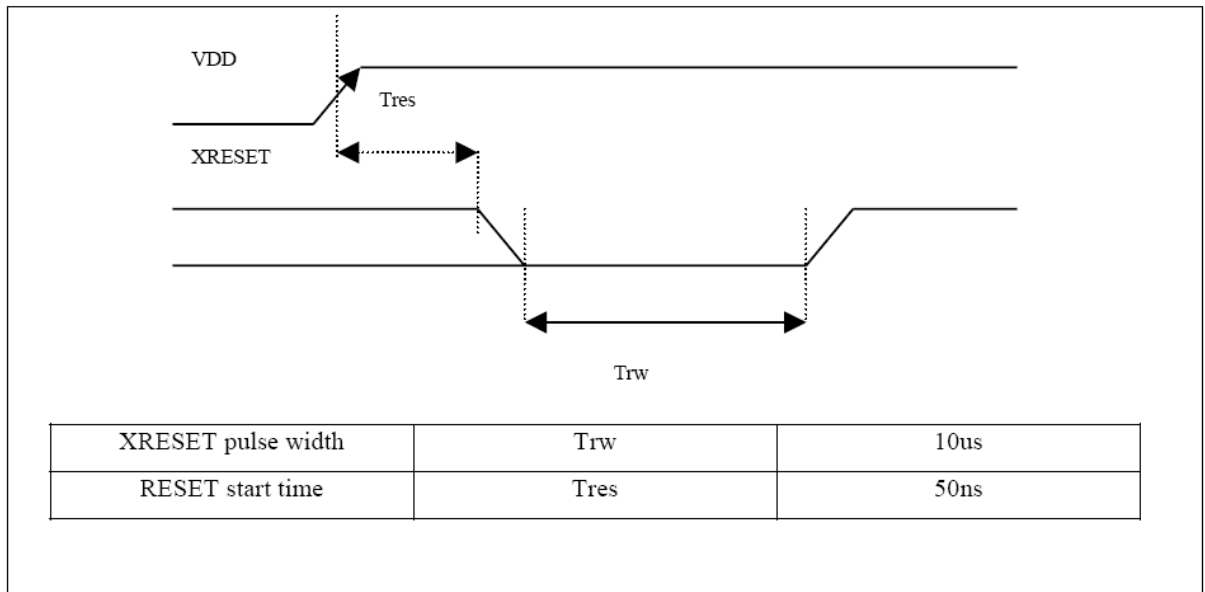
- MPU write data to ST7920



- MPU read data from ST7920

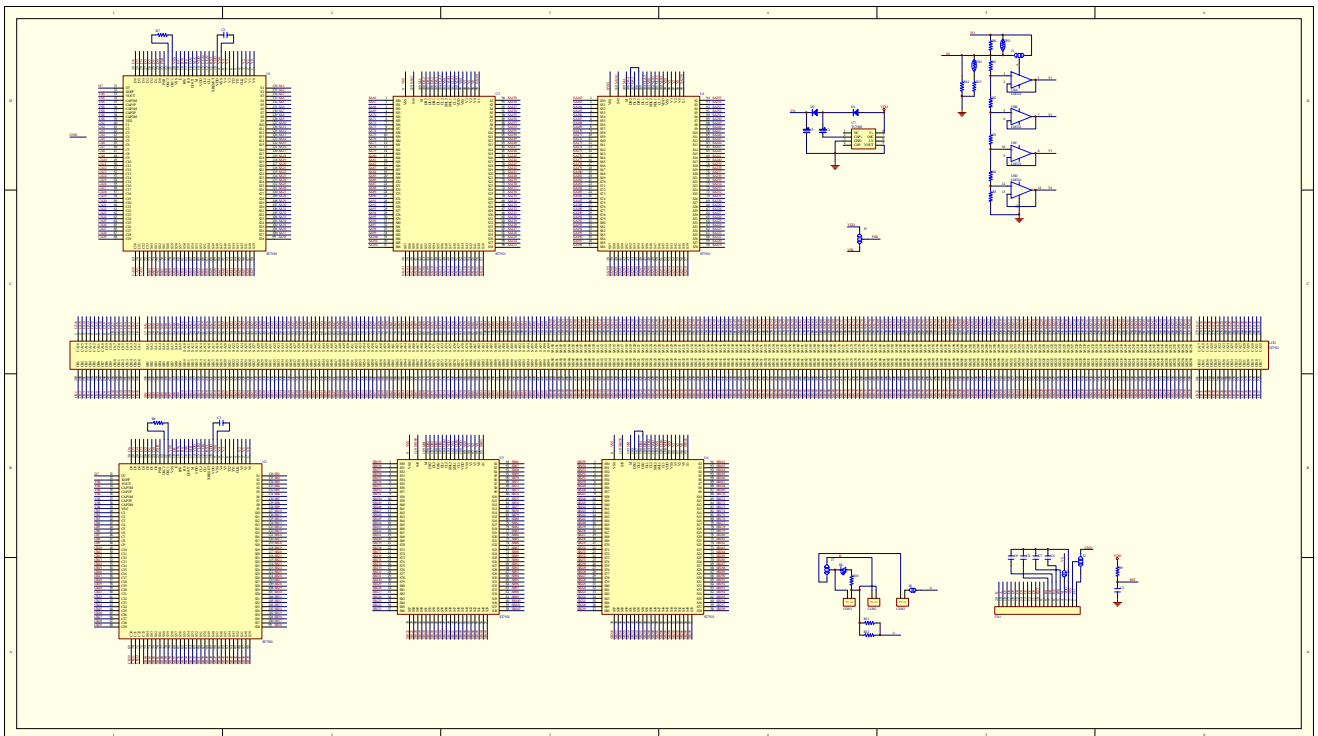


External reset timing



7.3 APPLICATION OF LCM

■Circuit Block Diagram



7.4 TABLE OF COMMAND

Instructions

ST7920 offers basic instruction set and extended instruction set :

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	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	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	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	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	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	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	AC3	AC2	AC1	AC0	0	0	AC5	AC4	AC3	AC2	AC1	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.

Initial setting(Register flag) (RE=0: basic instruction)

Inst.	code										Description
	RS	RW	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	
ENTRY MODE SET	0	0	0	0	0	0	0	1	I/D	S	Cursor move to right ,DDRAM address counter (AC) plus 1
									1	0	
DISPLAY STATUS	0	0	0	0	0	0	1	D	C	B	Display, cursor and blink ALL OFF
								0	0	0	
CURSOR DISPLAY SHIFT	0	0	0	0	0	1	S/C	R/L	X	X	No cursor or display shift operation
							X	X			
FUNCTION SET	0	0	0	0	1	DL	X	0 RE	X	X	8 BIT MPU interface , basic instruction set
						1		0			

Initial setting(Register flag) (RE=1: extended instruction set)

Inst.	code										description
	RS	RW	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	
SCROLL OR RAM ADDR. SELECT	0	0	0	0	0	0	0	0	1	SR	Allow IRAMaddress or set CGRAM address
										0	
REVERSE	0	0	0	0	0	0	0	1	R1	R0	Begin with normal and toggle to reverse
									0	0	
EXTENDED FUNCTION SET	0	0	0	0	1	DL	X	1 RE	G	0	Graphic display OFF
									0		

7.5 CGRAM CODE ADDRESS

H/L	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		☺	☹	♥	♦	♣	♠	•	◐	◑	♂	♀	♫	♬	✂	
1	▶	◀	‡	!!	¶	§	-	‡	↑	↓	→	←	└	↔	▲	▼
2		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{		}	~	△

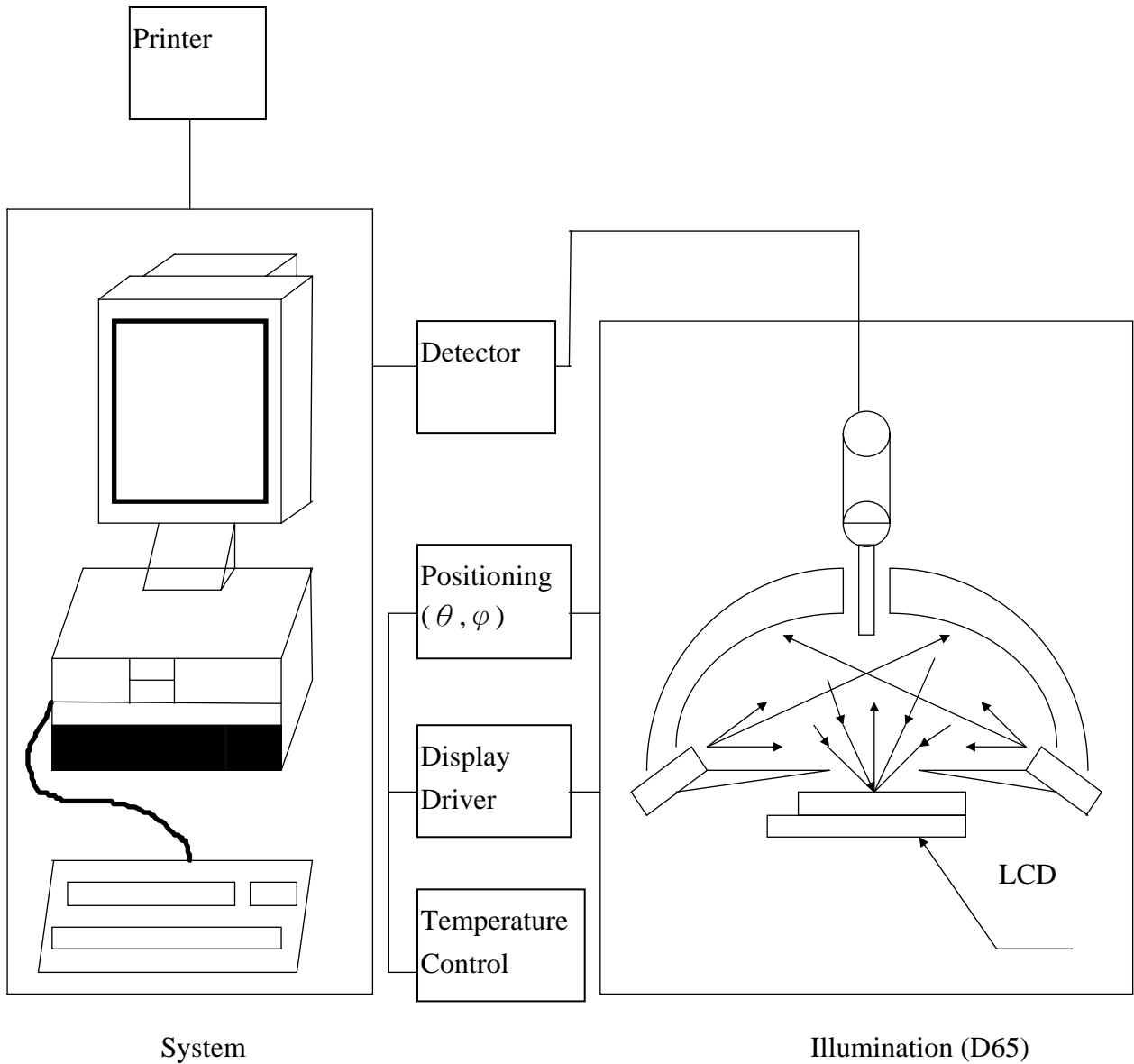
8. ELECTRO-OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Temp	Min	Typ.	Max	Units	Note
LCD driving voltage	V _{LCD}	$\theta = \phi = 0$	-10°C	---	6.7	---	V	NOTE1
			25°C	6.3	6.6	6.8		
			60°C	---	6.3	---		
Response Time	Rise Time (Tr)	$\theta = \phi = 0$	-10°C	---	---	--	msec	NOTE2
	Decay Time (Tf)			---	---	---		
	Rise Time (Tr)		25°C	---	225	340		
	Decay Time (Tf)			---	240	360		
	Rise Time (Tr)		60°C	---	---	--		
	Decay Time (Tf)			---	---	--		
Contrast Ratio	Cr	$\theta = \phi = 0$	25°C	5	10	---	---	NOTE4

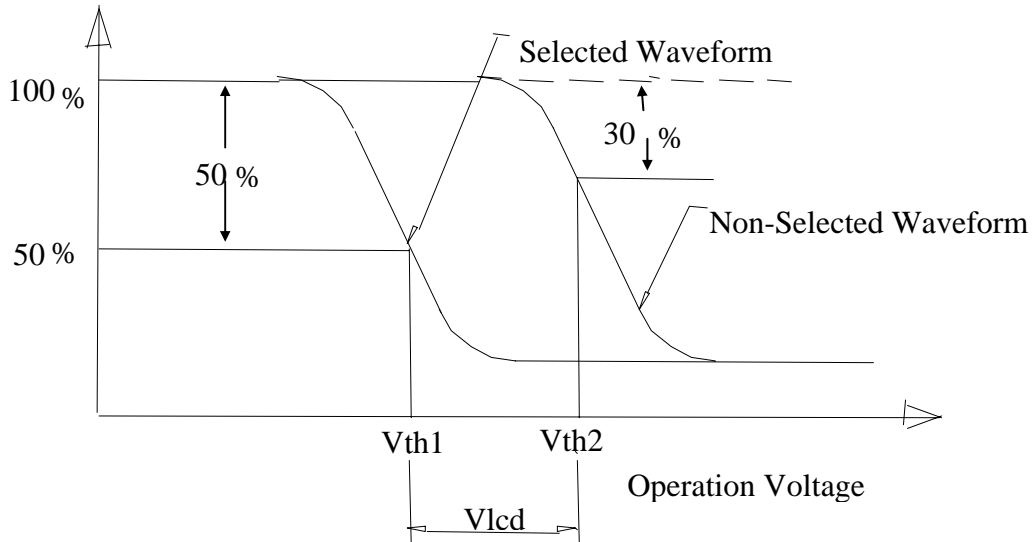
Viewing Angle Range	$\theta (\phi = 0^\circ)$ (6'')	$\phi = 90^\circ$ (3'')	$\phi = 180^\circ$ (12'')	$\phi = 270^\circ$ (9'')	備註
$\theta (25^\circ\text{C})$ CR≥2	35	25	15	25	Deg NOTE3

● For panel only

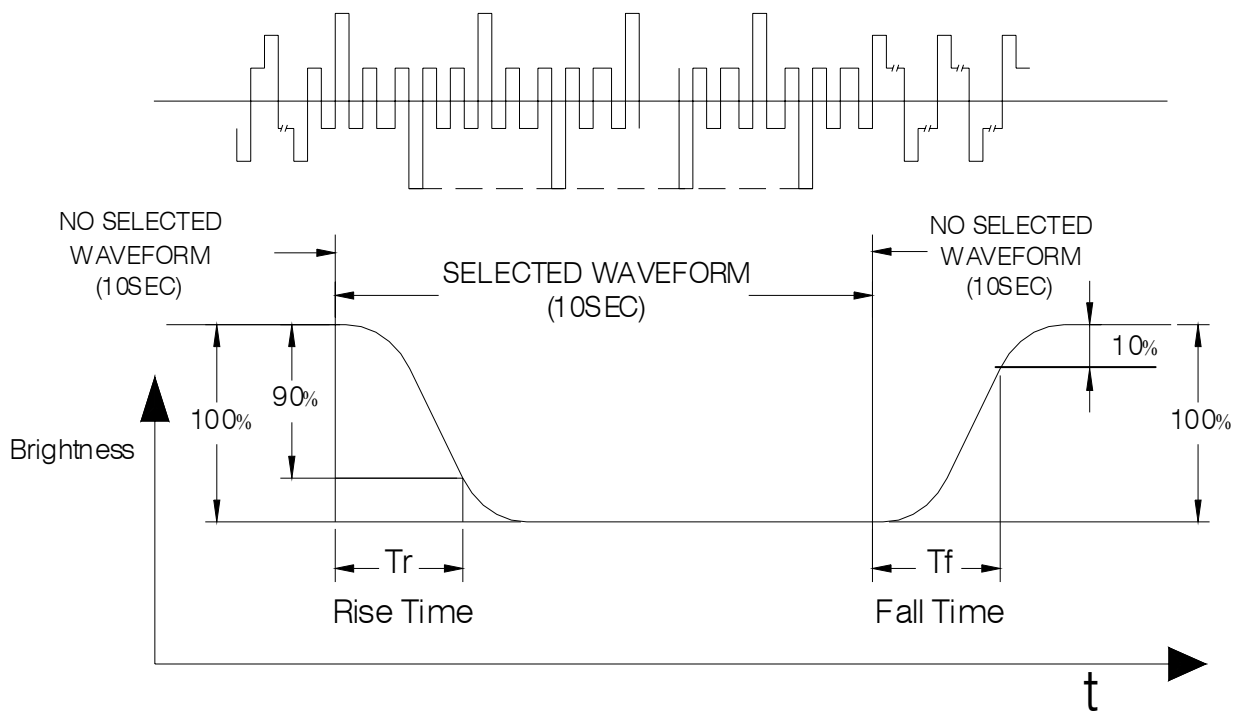
• **Electro-Optical Characteristics Measuring Equipment(DMS501)**



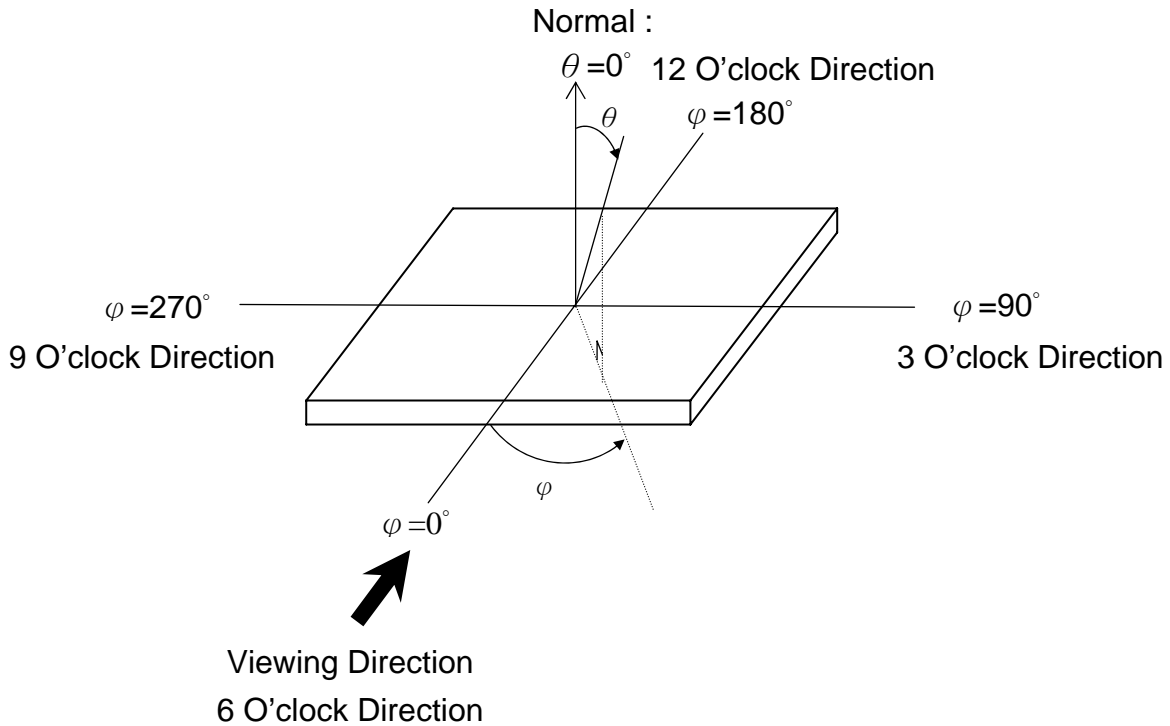
• **Note 1. Definition of Driving Voltage(Vlcd) :**



• **Note 2. Definition of Optical Response Time :**

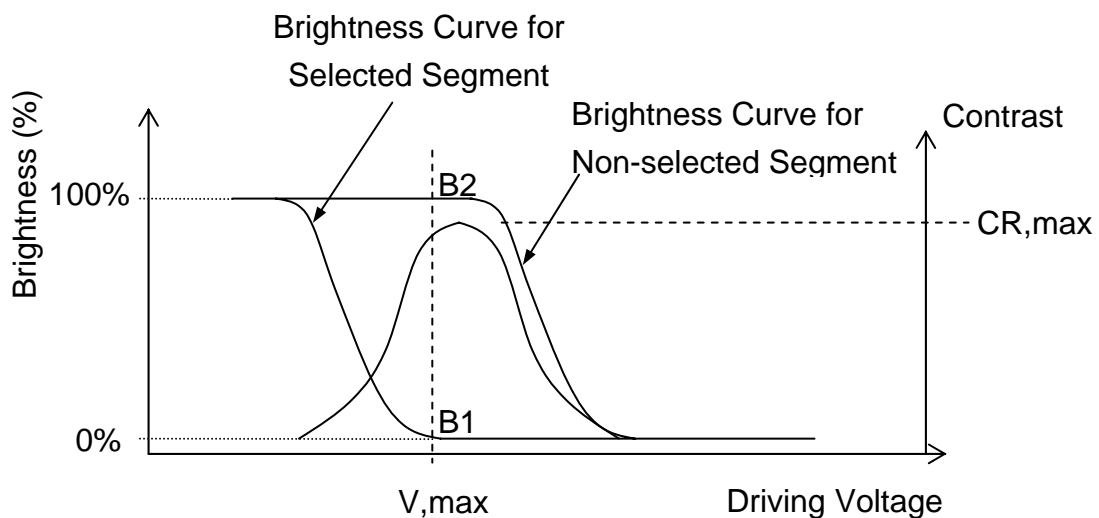


• **Note 3. Definition of Viewing Angle θ and ϕ :**



• **Note 4. Definition of Contrast ratio(CR) :**

$$CR = \frac{\text{Brightness of Non-selected Segment (B2)}}{\text{Brightness of Selected Segment (B1)}}$$



9. RELIABILITY

9.1. MTBF

The LCD module shall be designed to meet a minimum MTBF value of 30000 hours with normal. (25°C in the room without sunlight)

9.2. TESTS

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Operating	70°C 120Hrs	<ul style="list-style-type: none"> ◦ No Defect Of Operational Function In Room Temperature Are Allowable. ◦ IDD of LCM in Pre-and post-test should follow specification
2	Low Temperature Operating	-20°C 120Hrs	
3	High Temperature/ Humidity Non-Operating	60°C ,90%RH ,120 Hrs	
4	High Temperature Non-Operating	80°C 120Hrs	
5	Low Temperature Non-Operating	-30°C 120Hrs	
6	Temperature Cycling Non-Operating	-20°C (30Min)↔ 60°C (30Min) 10 CYCLES	

Notes: Judgments should be made after exposure in room temperature for two hours.

10. PRECAUTIONS FOR USING LCD MODULES

10.1. HANDLING PRECAUTIONS

- (1) The display panel is made of glass. Do not subject it to a mechanical shock or impact by dropping it.
- (2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.
- (3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- (4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- (5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten a cloth with one of the following solvents:
 - Isopropyl alcohol
 - Ethyl alcohol
- (6) Solvents other than those above mentioned may damage the polarizer.
Especially, do not use the following:
 - Water
 - Ketone
 - Aromatic solvents
- (7) Extra care to minimize corrosion of the electrode. Water droplets, moisture condensation or a current flow in a high-humidity environment accelerates corrosion of the electrode.
- (8) Install the LCD Module by using the mounting holes. When mounting the LCD Module, make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
- (9) Do not attempt to disassemble or process the LCD Module.
- (10) NC terminal should be open. Do not connect anything.
- (11) If the logic circuit power is off, do not apply the input signals.
- (12) To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - Be sure to ground the body when handling the LCD Module.
 - Tools required for assembling, such as soldering irons, must be properly grounded.
 - To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.

-The LCD Module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

10.2. STORAGE CONDITIONS

When storing, avoid the LCD module to be exposed to direct sunlight of fluorescent lamps. For stability, to keep it away from high temperature and high humidity environment (The best condition is : $23\pm 5^{\circ}\text{C}$, $45\pm 20\% \text{RH}$). ESD protection is necessary for long-term storage also.

10.3. OTHERS

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD Module have been operating for a long time showing the same display patterns the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be recovered by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD Module resulting from destruction caused by static electricity etc. exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.
- Terminal electrode sections.

11. Using LCD modules

11.1 LIQUID CRYSTAL DISPLAY MODULES

LCD is composed of glass and polarizer. Pay attention to the following items when handling.

- (1) Please keep the temperature within specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.
- (2) Do not touch, push or rub the exposed polarizers with anything harder than a HB pencil lead (glass, tweezers, etc).
- (3) N-hexane is recommended for cleaning the adhesives used to attach front/rear polarizers and reflectors made of organic substances, which will be damaged by chemicals such as acetone, toluene, ethanol and isopropyl alcohol.
- (4) When the display surface becomes dusty, wipe gently with absorbent cotton or other soft material like chamois soaked in petroleum ether. Do not scrub hard to avoid damaging the display surface.
- (5) Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading.
- (6) Avoid contacting oil and fats.
- (7) Condensation on the surface and contact with terminals due to cold will damage, stain or polarizers. After products are tested at low temperature they must be warmed up in a container before coming in contact with room temperature air.
- (8) Do not put or attach anything on the display area to avoid leaving marks on.
- (9) Do not touch the display with bare hands. This will stain the display area and degrade insulation between terminals (some cosmetics are determinate to the polarizers).
- (10) As glass is fragile, it tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring.

11.2 INSTALLING LCD MODULE

Attend to the following items when installing the LCM.

- (1) Cover the surface with a transparent protective plate to protect the polarizer and LC cell.
- (2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be ± 0.1 mm.

11.3 ELECTRO-STATIC DISCHARGE CONTROL

Since this module uses a CMOS LSI, the same careful attention should be paid for electrostatic discharge as for an ordinary CMOS IC.

- (1) Make certain that you are grounded when handling LCM.
- (2) Before removing LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential.
- (3) When soldering the terminal of LCM, make certain the AC power source for the soldering iron does not leak.
- (4) When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.
- (5) As far as possible, make the electric potential of your work clothes and that of the workbenches to the ground potential.
- (6) To reduce the generation of electro-static discharge, be careful that the air in the work is not too dried. A relative humidity of 50%-60% is recommended.

11.4 PRECAUTIONS FOR OPERATION

- (1) Viewing angle varies with the change of liquid crystal driving voltage (V_o). Adjust V_o to show the best contrast.
- (2) Driving the LCD in the voltage above the limit will shorten its lifetime.
- (3) Response time is greatly delayed at temperature below the operating temperature range. However, this does not mean the LCD will be out of the order. It will recover when it returns to the specified temperature range.
- (4) If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then on.
- (5) Condensation on terminals can cause an electrochemical reaction disrupting the terminal circuit. Therefore, this product must be used and stored within the specified condition of $23\pm 5^{\circ}\text{C}$, $45\pm 20\% \text{RH}$.
- (6) When turning the power on, input each signal after the positive/negative voltage becomes stable.

11.5 SAFETY

- (1) It is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.
- (2) If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

12. REVISION HISTORY

Version	Revise record	Date
1.0	Original version	09-01-06
2.0	Change module temperature from noamral to wide temperature	09-12-05
2.01	Perfect the VER2.0spec, Commany internal modify.	13-08-01

SAMPLE APPROVED REPORT (样品确认单)

SAMPLE MODEL NO. (样品型号)	JHB25664A
SAMPLE SERIES NUMBER NO. (样品序号)	
SAMPLE QUANTITY (样品数量)	
COLOR/TYPE (底色/类型)	STN(Y-G)
VIEWING DIRECTION (视角)	6:00
DRIVING METHOD (驱动参数)	1/33Duty, 1/6Bias
LOGIC VOLTAGE (工作电压)	5.0V
LCD VOP (LCD 驱动电压)	6.6V
OPERATING TEMP. (操作温度)	-20 ~ 70℃
STORAGE TEMP. (储存温度) °C	-30 ~ 80℃
POLARIZER MODE(偏光片模式)	TRANSFLECTIVE
CONTROLLER/DRIVER IC(控制/驱动 IC)	ST7920/ST7921
BACKLIGHT COLOR/TYPE (背光源类型/颜色)	LED/Y-G
DRAWING REV/NO./QUANTITY (图纸版本/数量)	
SPECIFICATION (规格书 份数)	
REMARKS: (备注)	
WRIT BY: _____ DATE: _____ APROV BY: _____ DATE: _____	
CUSTOMER'S APPROVAL (客户确认):	
1) FUNCTION (功能):	<input type="checkbox"/> OK <input type="checkbox"/> N.G.
2) DRIVER CONDITION (驱动条件):	<input type="checkbox"/> OK <input type="checkbox"/> N.G.
3) DISPLAY MODE (显示模式):	<input type="checkbox"/> OK <input type="checkbox"/> N.G.
4) VIEWING ANGLE (视角):	<input type="checkbox"/> OK <input type="checkbox"/> N.G.
5) BACKLIGHT (背光源):	<input type="checkbox"/> OK <input type="checkbox"/> N.G.
6) DISPLAYING PATTERN (显示效果):	<input type="checkbox"/> OK <input type="checkbox"/> N.G.
CUSTOMER'S CONCLUSIONS (客户意见): _____	

CUSTOMER'S SIGNATURE (客户签名): _____ DATE (日期): _____	