LCD MODULE SPECIFICATION
FOR CUSTOMER'S APPROVAL

CUSTOMER : Standard

MODULE TYPE : HY-12864K-202

APPROVED BY: (FOR CUSTOMER USE ONLY)

Approved By	Checked By	Prepared By	MT File No	Date Issued

CONTENTS

SPECIFICATION FOR

LIQUID CRYSTAL DISPLAY MODULE

MODEL NO. : HY-12864K-203

View Direction	☑6 O'clock			☐12 O'clock	
LCD Type	☐ FSTN Positive			☐ FSTN Negative	
	☐STN Gray	☑STN Yellow Green		☐ STN Blue	
Rear Polarizer	☐Reflective	☑ Transflective		☐ Transmissive	
Back light Type	☑ LED	☐ Internal Power	☐ EL	☑5V input	
		☐External Power	☐ CCFL	☐ 24V input	
Back light Color	☐ White	☐ Amber	☐ Blue ☐ Green	☑Yellow	☐ Other
Temperature Range	☐ Normal	☐ Wide		☑ Super Wide	
EL Driver IC	☐ Build-in	☐Not Build-in			
DC-DC Converter	☑ With	☐Without			

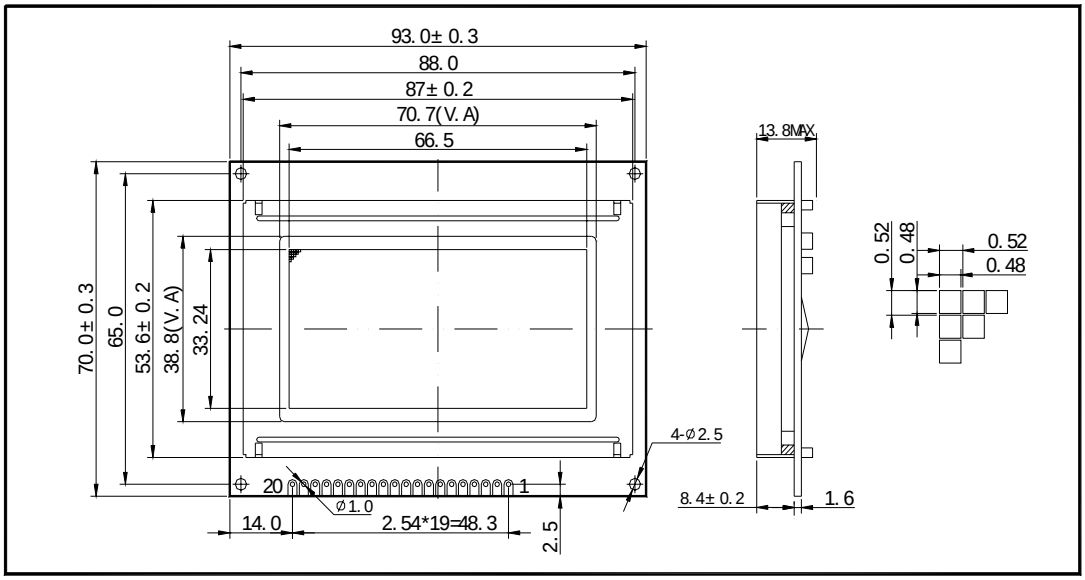
TO BE VERY CAREFUL !

The LCD driver ICs are made by CMOS process, which are very easy to be damaged by static charge, make sure the user is grounded when handling the LCM.

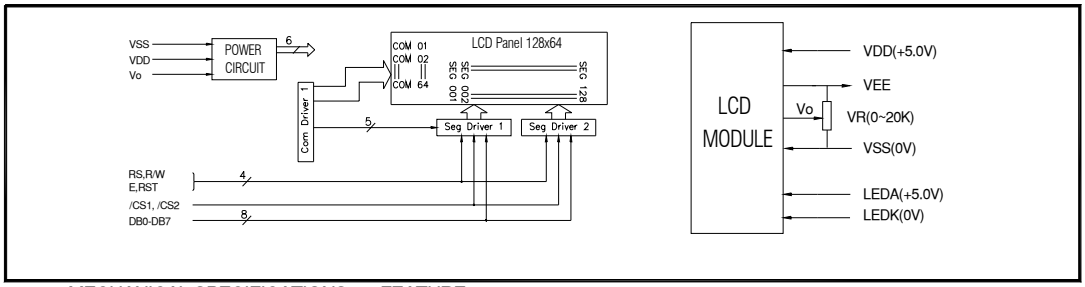
Lcd Module Drawing

QiuTian,ShiJia **HY-12864K-202** 128x64DOTS 1/64DUTY,1/9BIAS

1.0 DIMENSIONAL DRAWING



2.0 BLOCK DIAGRAM & POWER SUPPLY



3.0 MECHANICAL SPECIFICATIONS & FEATURE

Item	Nominal Dimensions(mm)	FEATURE	
		LCD Type	STN
Module Size (W*H*T)	93.0x70.0x11.3	LCD Colour	Yellow-Green
View Area (W*H)	70.7x38.8	View Angle	6 O'clock
DOTS X DOTS(W*H)	128x64	Display Type	Positive Type
Dot Pitch (W*H)	0.52x0.52	Rear polarizer	Transflective
Dot Size (W*H)	0.48x0.48	Operating Temperature	-20℃ ~ 70℃
--	--	Storage Temperature	-30℃ ~ 80℃
--	--	Blacklight Color	LED(Yellow)

4.0 ELECTRICAL CHARACTERISTICS

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Operating Voltage	Vdd	Ta=25℃	---	5.0	---	V
Operating Voltage for LCD	Vlcd	Ta=25℃	---	8.0	---	V
Supply Current	Idd	Ta=25℃, Vdd=5.0V	---	2.0	3.0	mA
Supply Current for Blacklight	Side light-emitting	Ta=25℃, Vf=4.2V	---	150	---	mA

5.0 INTERFACE PIN CONNECTIONS

Pin No	Symbol	Level	Description
1	VSS	I	GND
2	VDD	I	Power supply for Logic
3	Vo	I	Power supply for LCD
4	RS	H/L	Register selection (H:Data registor, L:Instruction registor)
5	R/W	H/L	Read/write selection (H:Read,L:Write)
6	E	H/H→L	Enable signal for chip
7-14	DB0-DB7	H/L	Data Bus line
15	/CS1	L	Chip Select Signal for Left Half of the Screen
16	/CS2	L	Chip Select Signal for RIGHT Half of the Screen
17	RST	I	Reset signal
18	VEE	O	Negative voltage output
19	LEDA	I	Power supply for BLACKLIGHT
20	LEDK	I	Power supply for BLACKLIGHT

GENERAL SPECIFICATION

Item	Content
Display Resolution	128(W)x64(H)
Dimensional Outline(mm)	93.0(W)x70.0(H)x11.8 max(D)
Display mode	STN Yellow-Green ,Transflective Type
Circuit	Common-Driver IC, Segment-driver IC with build-in SRAM
Interface	VSS,VDD,V0,RS,R/W,E,DB0-DB7,CS1,CS2,RET,VEE LEDA,LEDK

ABSOLUTE MAXIMUN RATING

(1) Electrical Absolute Ratings

Item	Symbol	Min.	Max.	Unit	Note
Power Supply for Logic	V_{DD}-V_{SS}	0	5.5	Volt	
Power Supply for LCD	V_{DD}-V_0	0	10.0	Volt	
Input Voltage	V_I	0	V_{DD}	Volt	
Current for LED backlight		-	180	mA	Vdd=5.0V

Note 1 : Operator should be grounded during handling LCM.

(2) Environmental Absolute Maximum Ratings

Item	Wide Temperature				Normal Temperature			
	Operating		Storage		Operating		Storage	
	Min.	Max,	Min.	Max,	Min.	Max,	Min.	Max,
Ambient Temperature	0℃	+50℃	-20℃	+70℃	-20℃	+70℃	-30℃	+80℃
Humidity(without condensation)	Note 2,4		Note 3,5		Note 4,5		Note 4,6	

Note 2 Ta≦50℃: 80% RH max
Ta>50℃: Absolute humidity must be lower than the humidity of 85%RH at 50℃

Note 3 Ta at -20℃ will be<48hrs at 70℃will be <120hrs when humidity is higher than 75%.

Note 4 Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

Note 5 Ta≦70℃: 75RH max
Ta>70℃: absolute humidity must be lower than the humidity of 75%RH at 70℃

Note 6 Ta at -20℃ will be <48hrs, at 80 ℃ will be <120hrs when humidity is higher than 75%.

ELECTRICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ	Max.	Unit	note
Power Supply for Logic	V_{DD}-V_{SS}	-	3.0	5.0	5.5	Volt	
Input Voltage	V_{IL}	L level	V_{SS}	0.2 V_{DD}	-	Volt	
	V_{IH}	H level	0.8 V_{DD}	V_{DD}	-	Volt	
LCM Recommend LCD Module Driving Voltage	V_{DD} -V_{ADJ}	T_a＝0℃	8.0	8.3	8.6	Volt	
		T_a＝25℃	7.7	8.0	8.3		
		T_a＝50℃	7.0	7.2	7.5		
Power Supply Current for LCM	I_{DD}(EL B/L OFF)	V_{DD} =5.0V T_a=25℃ V_{DD}-V_0 =8.0V	-	1.5	1.8	mA	-
	I_{LED} (EL B/L ON)			150	180		
Power Supply for EL Backlight	V_{EL+}-V_{EL-}	Ta=25℃	-	5.0	-	V	DC

OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ	Max.	Unit	note
Viewing angle range	θ_f (12 o'clock)	When Cr≧2	35	-	-	Degree	
	θ_b (6 o'clock)		30	-	-		
	θ_l (9 o'clock)		30	-	-		
	θ_r (3 o'clock)		30	35	-		
Rise Time	T_r	V_{DD}-V_0=8.7V Ta=25℃		112		mS	
Fall Time	T_f			250			
Contrast	Cr		-	5. 4	-		

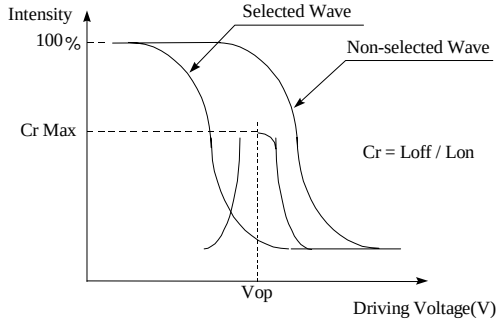
MECHANICAL SPECIFICATION

Product No.		HY-12864K-201
Module Size		93.0(W)×70.0(H)×11.3max(D)
Dot Size		0.48(H)mm×0.48(W)mm
Dot Pitch		0.52(H)mm×0.52(W)mm
Resolution		128(W)×64(H) Dots Matrix
Duty Ratio		1/64 Duty
LCD Display Mode	STN	☑Yellow Mode☐ Gray Mode ☐Blue Mode
	FSTN	☐ Black & White(Normally White/Positive Image) ☐ Black & White(Normally White/Negative Image)
	Rear Polarizer:	☐Reflective ☑Transflective ☐ Transmissive ☐ Transflective(High Transmissive)
Viewing Direction		☐12 O'clock ☑6 O'clock ☐3 O'clock ☐9 O'clock
Back light		☐W/O ☐CCFL ☐EL ☑LED
Controller		S6B0108 or compatible
DC/DC Converter		Built-in
EL Driver		With EL driver

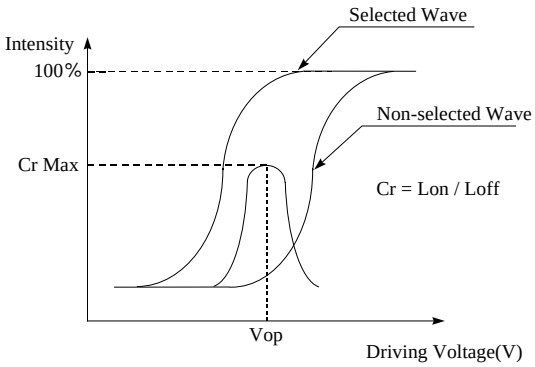
INTERFACE PIN ASSIGNMENT

Pin No.	Pin Out	Description
1	VSS	GND
2	VDD	Logic supply voltage (5.0V)
3	V0	Power supply for LCD
4	RS	Data/Instruction RS=high：Indicates that data of DB0~DB7 is display data. RS=low：Indicates that data of DB0~DB7 is instruction
5	R/W	Read/Write R/W=high：Data of DB0~DB7 can be read by CPU. R/W=low：Data of DB0~DB7 can be written into LCD driver IC at the falling edge of E when CS1 and CS2 is high.
6	E	Enable When write(R/W=low)：Data of DB0~DB7 is latched at the fall of E When read(R/W=high)：Data is read while E is at high level.
7	DB0	Data Bus line.
8	DB1	
9	DB2	
10	DB3	
11	DB4	
12	DB5	
13	DB6	
14	DB7	
15	CS1	Chip-select for half-left screen. Active high
16	CS2	Chip-select for half-right screen. Active high.
17	RET	Reset Signal, low level of RET is for reset and keep RET=’h’
18	VEE	Output of supply negative voltage by the DC-DC converter on the module
19	LEDA	Power supply for backlight(+5.0V)
20	LEDK	Power supply for backlight(0V)

[Note 7] Definition of Operation Voltage (Vop)

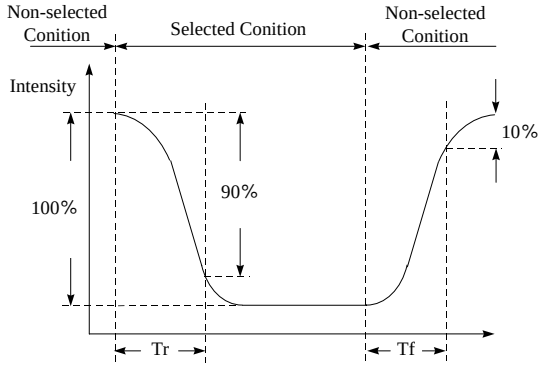


[positive type]

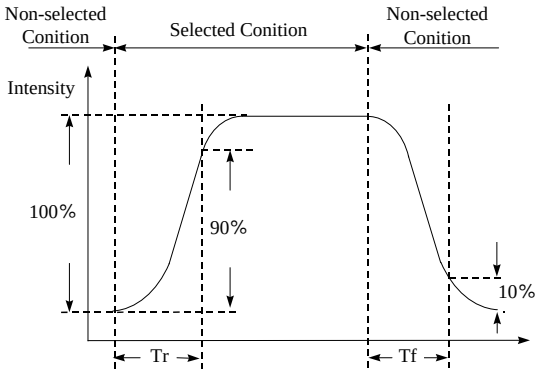


[Negative type]

[Note 8] Definition of Response Time (Tr, Tf)



[positive type]



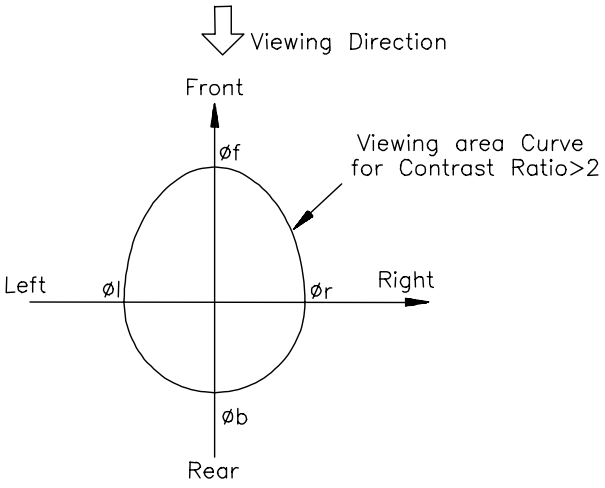
[Negative type]

Conditions:

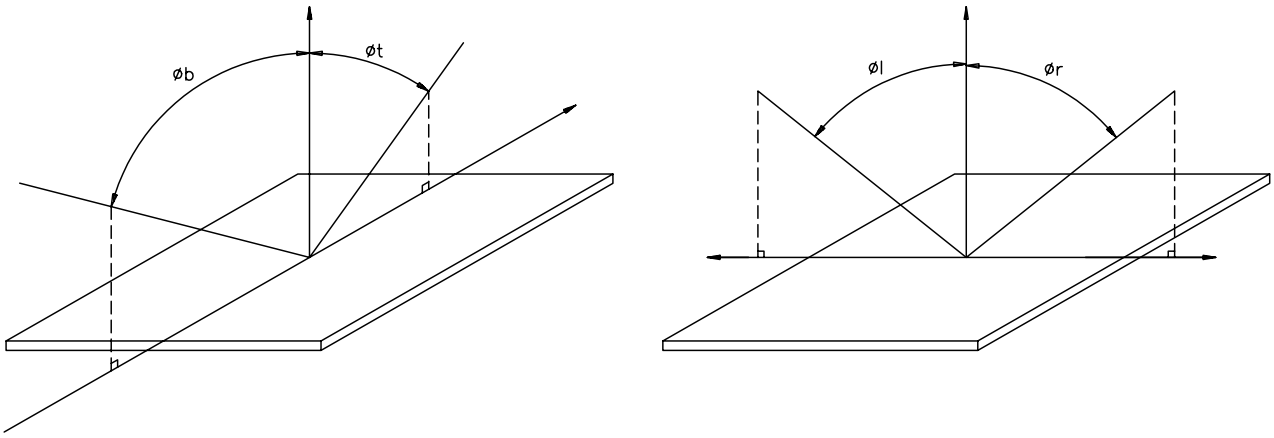
Operating Voltage : Vop **Viewing Angle(θ , φ): 0° , 0°**

Frame frequency : 64 Hz **Driving Wave form : 1/N duty, 1/a bias**

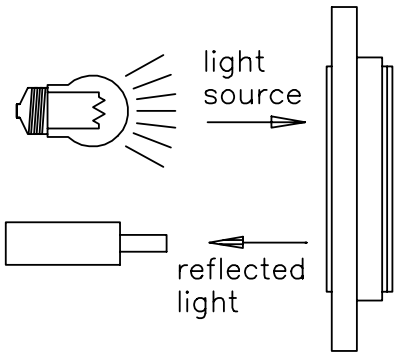
[Note 9] Definition of Viewing Direction



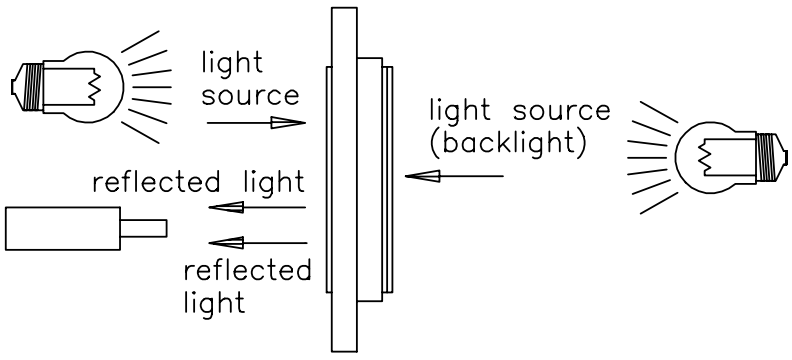
[Note 10] Definition of viewing angle



[Note 11] Description of Measuring Equipment

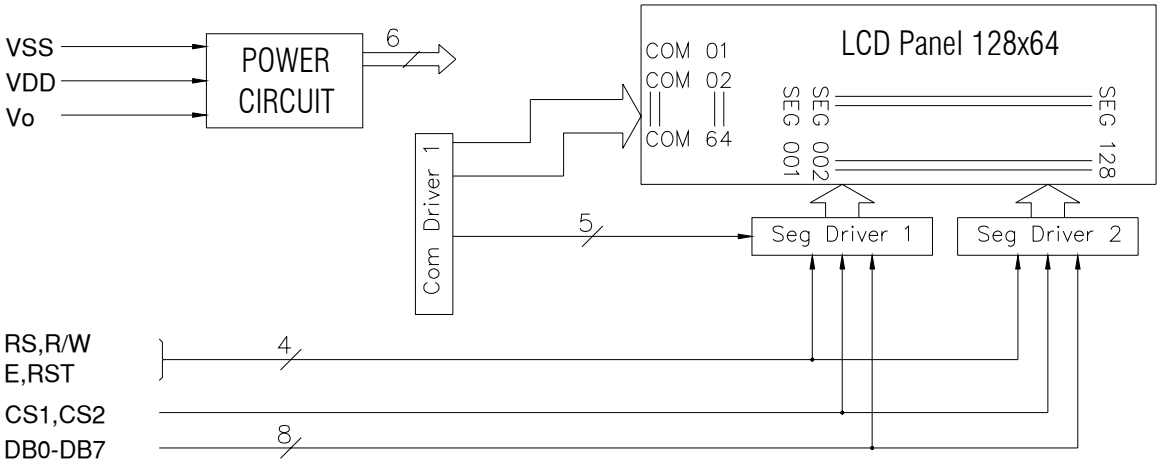


Reflective type

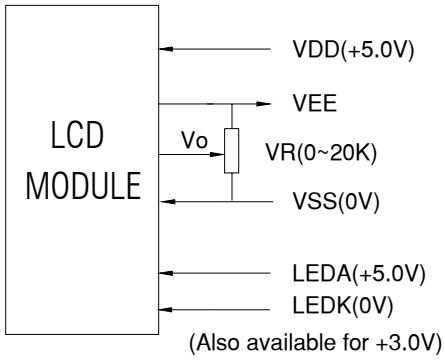


Transflective type

BLOCK DIAGRAM



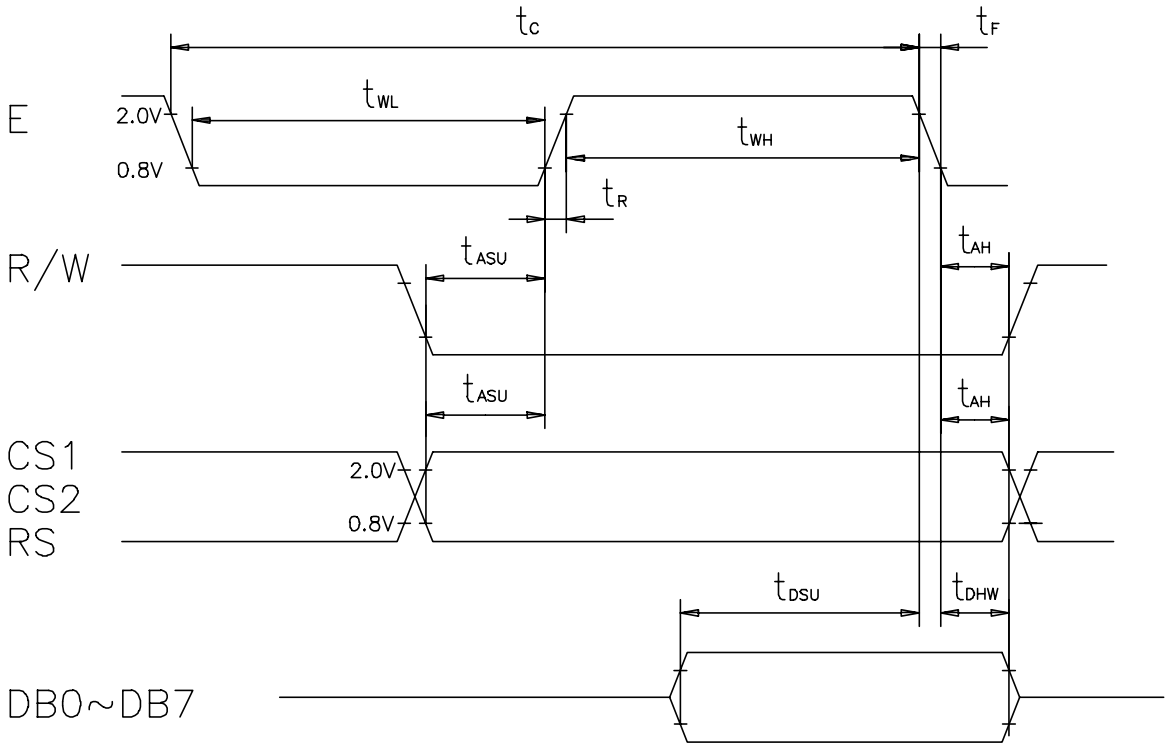
POWER SUPPLY



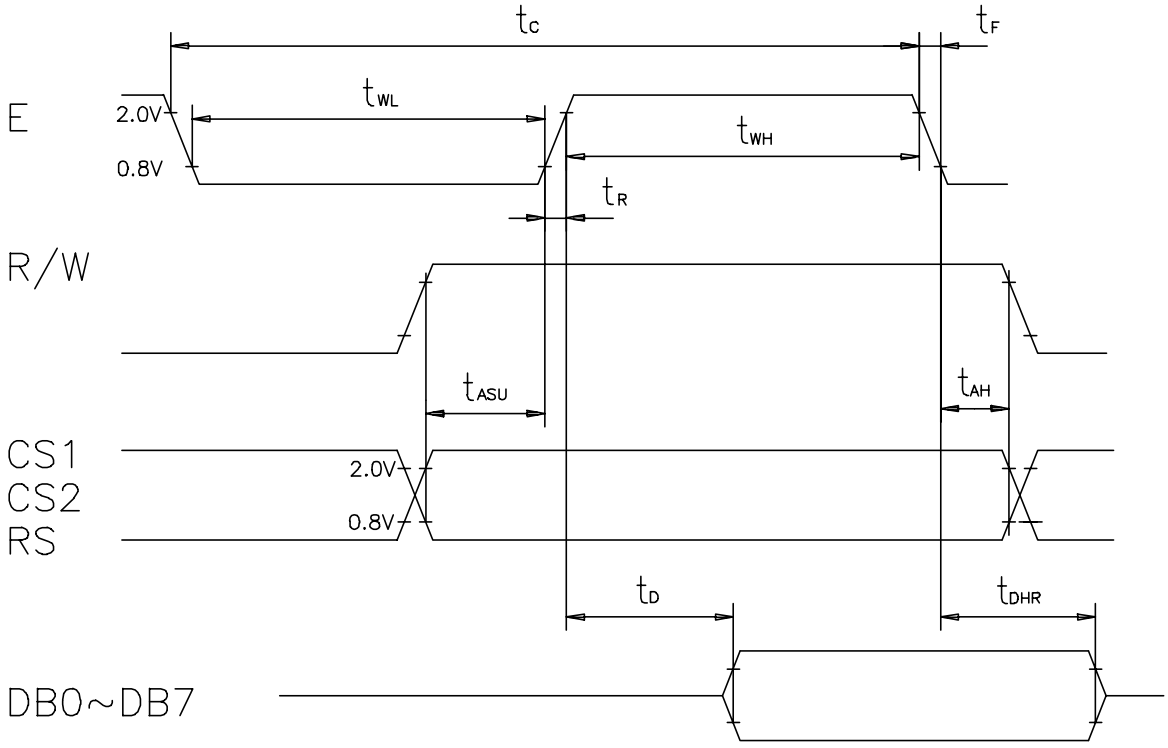
TIMING CHARACTERISTICS

MPU interface timing: (V_{SS} =0V, V_{DD}=4.5V~5.5V, T_a=0 to 50℃)

Item	Symbol	Min.	Typ.	Max.	Unit
E Cycle Time	t_C	1000	—	—	ns
E High Level Width	t_{WH}	450	—	—	ns
E Low Level Width	t_{WL}	450	—	—	ns
E Rise Time	t_R	—	—	25	ns
E Fall Time	t_F	—	—	25	ns
Address Setup Time	t_{ASU}	140	—	—	ns
Address Hold Time	t_{AH}	10	—	—	ns
Data Setup Time	t_{DSU}	200	—	—	ns
Data Delay Time	t_D	—	—	320	ns
Data Hold Time(Write)	t_{DHW}	10	—	—	ns
Data Hold Time(Read)	t_{DHR}	20	—	—	ns



MPU Write Timing



MPU Read Timing

DISPLAY COMMANDS

The display commands shown below control the internal state of the LCD driver ICs. Commands are sent from CPU to LCD module for the display control.

Command	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Function
Display ON/OFF	0	0	0	0	1	1	1	1	1	1/0	To control the display ON or OFF. The internal status and display RAM data are not affected. 0:OFF, 1:ON
Set address (Y address)	0	0	0	1	Y address (0~63)						To set the Y address in the Y address counter.
Set page (X address)	0	0	1	0	1	1	1	Page(0~7)			To set the X address at the X address register.
Display Start Line	0	0	1	1	Display Start Line(0~63)						To indicate the display data RAM displayed at the top of the screen.
Status Read	0	1	Busy	0	ON/ OFF	Reset	0	0	0	0	To read status of the LCD controller IC: Busy 0:Ready, 1: In operation ON/OFF: 0:Display ON, 1:Display OFF Reset: 0:Normal, 1:Reset
Write display data	1	0	Write Data								To write data into display data RAM. Y address is increased by 1 after this command.
Read Display data	1	1	Read Data								To read data from display data RAM to the data bus.

MEMORY MAPPING

Relationship between RAM data and display

		RAM Y address(Y0 ~Y127)													Data
1st page(X=0)	Line 0→	0	1	1	1	0	0	……	0	0	1	0	0	0	←DB0(LSB)
	Line 1→	1	0	0	0	1	0	……	0	0	1	1	0	0	←DB1
	Line 2→	1	0	0	0	1	0	……	0	0	1	0	1	0	←DB2
	Line 3→	1	0	0	0	1	0	……	0	0	1	0	1	0	←DB3
	⋮	1	1	1	1	1	0	……	0	0	1	0	0	0	←DB4
		1	0	0	0	1	0	……	1	1	1	0	0	0	←DB5
		1	0	0	0	1	0	……	1	1	1	0	0	0	←DB6
	Line 7→	0	0	0	0	0	0	……	0	0	0	0	0	0	←DB7(MSB)
2nd page(X=1)	Line 8→	1	1	1	1	0	0	……	0	1	1	1	0	0	←DB0(LSB)
	Line 9→	1	0	0	0	1	0	……	0	1	0	0	1	0	←DB1
	Line 10→	1	0	0	0	1	0	……	0	1	0	0	1	0	←DB2
	⋮	1	1	1	1	0	0	……	1	1	1	0	1	0	←DB3
		1	0	0	0	1	0	……	0	1	0	0	1	0	←DB4
		1	0	0	0	1	0	……	0	1	0	0	1	0	←DB5
		1	1	1	1	0	0	……	0	1	1	1	0	0	←DB6
	Line 15→	0	0	0	0	0	0	……	0	0	0	0	0	0	←DB7(MSB)
	⋮							……							
8th page(X=7)	Line 56→	1	0	0	0	1	0	……	0	0	0	0	0	0	←DB0(LSB)
	⋮	1	0	0	0	1	0	……	0	0	0	0	0	0	←DB1
		1	0	0	0	1	0	……	0	1	0	0	1	0	←DB2
		1	1	1	1	1	0	……	1	0	1	0	1	0	←DB3
		1	0	0	0	1	0	……	1	0	0	1	0	0	←DB4
		1	0	0	0	1	0	……	1	0	0	1	0	0	←DB5
	Line 62→	1	0	0	0	1	0	……	0	1	1	0	1	0	←DB6
	Line 63→	0	0	0	0	0	0	……							←DB7(MSB)

1

ADDRESS CONFIGURATION OF DISPLAY DATA RAM

	Y address		
	0 1 2 3 ……126 127		
X=0→	DB0 To DB7	Page0	Line0 To Line7
X=1→	DB0 To DB7	Page1	Line8 To Line15
X=2→	DB0 To DB7	Page2	Line16 To Line23
X=3→	DB0 To DB7	Page3	Lint24 To Line31
X=4→	DB0 To DB7	Page4	Line32 To Line39
X=5→	DB0 To DB7	Page5	Line40 To Line47
X=6→	DB0 To DB7	Page6	Line48 To Line55
X=7→	DB0 To DB7	Page7	Line56 To Line63

Address configuration of Display Data RAM

RELIABILITY TEST

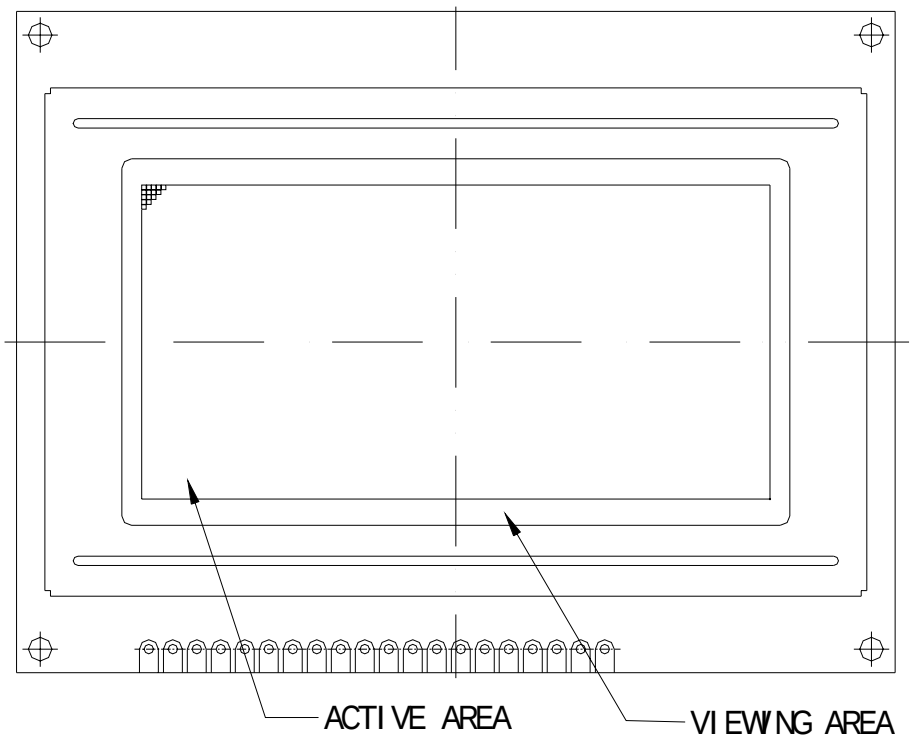
No	Item	Conditions		Note
1	High Temp. Operation	50℃	120HR	
2	High Temp. Storage	60℃	120HR	
3	Low Temp. Operation	0℃	120HR	
4	Low Temp. Storage	-20℃	120HR	
5	High Temp./Humid Storage	60℃ 90%RH	120HR	
6	Thermal Shock	-20℃ ,30min 60℃ ,30min	10 cycle	

APPEARANCE CHECK

CONDIITON OF APPEARANCE CHECK:

(1)Specimen shall be checked by eyes in distance of 30cm under 40w-fluorescence lamp.

(2)Checking direction shall be in 45 degree from perpendicular line op specimen surface.



HANDLING PRECAUTIONS

(1)Treat polarizer very carefully since it is easy to be damaged.

(2)When cleaning the display surface, use soft cloth (e.g. gauss) with a solvent (recommended below) and wipe lightly.

- ◆ Ethyl alcohol
- ◆ Isopropyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvents:

- ◆ Water
- ◆ Ketone
- ◆ Aromatics

(3)Direct current causes electro-chemical reaction with remarkable degradation of the display quality. Give careful consideration to prevent direct current at ON/OFF timing and during operation.

(4)Avoid strong shock and drop from the height.

(5)To prevent LCD panels from degradation, do not operate or store them exposed directly to sunshine or high temperature/humidity.

(6)Give careful consideration to avoid electrical static discharge with causes uneven contrast.

(7)Even a small condensation on the contact pads (terminals) causes electro-chemical reaction that makes missing row and column. Give careful attention to avoid condensation. When assembling with zebra connector, clean the surface of the pads with alcohol and keep the air very clean.

LCD PRODUCT QUALITY STANDARD

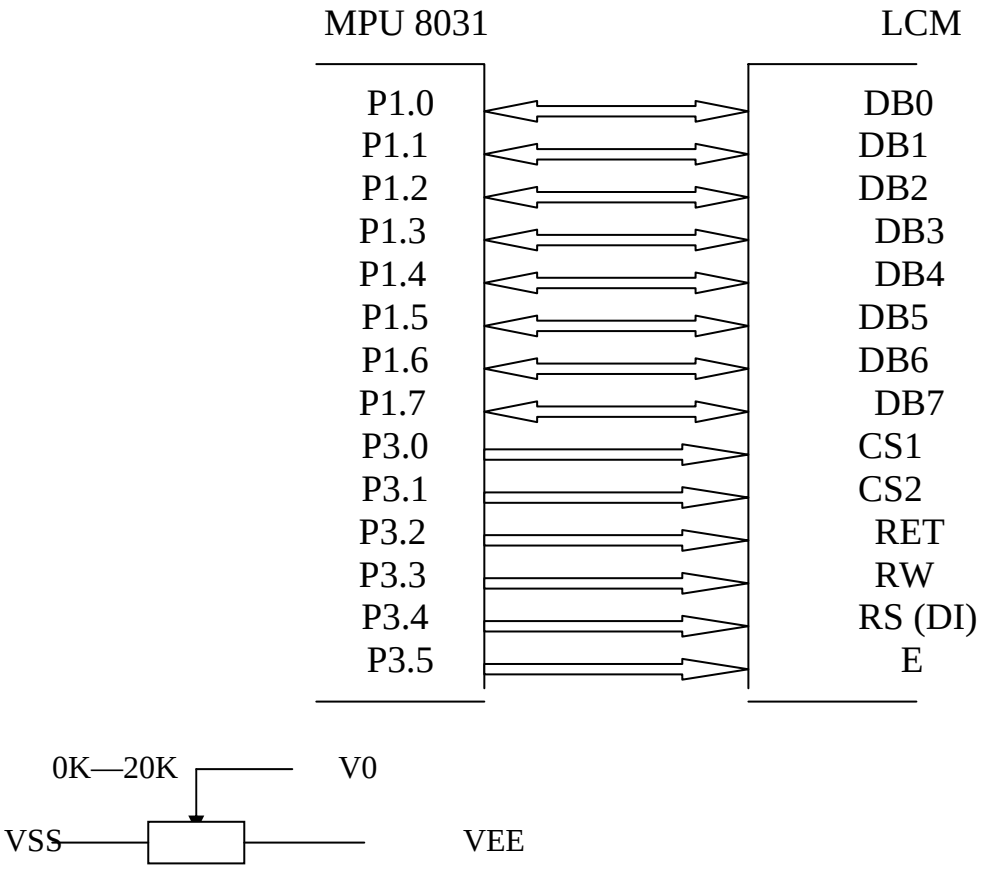
DISPLAY APPEARANCE

No	Item	Criteria
1	Inclusions (black spot, white spot, dust)	(1)Round type Diameter mm(a*) — no of defect* $a \leqq 0.20$ — neglect $0.20 < a \leqq 0.35$ — 5max $0.35 < a$ — none (2)Linear type Length mm(l) — width mm(W) — no. of defect na — $W \leqq 0.03$ — neglect $l \leqq 3$ — $0.03 < W \leqq 0.08$ — 6 $3 < l$ — $0.08 < W$ — none
2	Scratch	1.Scratch on protective film is permitted. 2.Scratch on polarizer shall be as follow: (1)Round type Diameter mm(a*) — no of defect $a \leqq 0.15$ — neglect $0.15 < a \leqq 0.20$ — 2 max $0.20 < a$ — none (2)Linear type

		Be judged bye 1.-(2) linear type
3	Dent	diameter ＜ 1.5mm
4	Bubble	Not exceeding 0.5mm average diameter is acceptable between glass and polarizing film
5	Pin hole	(a+b)/2 ≦ 0.15mm Maximum number: ignored 0.15＜(a+b)/2≦0.20mm Maximum number:10
6	Dot defect	(a+b)/2≦0.20mm Maximum number: ignored 0.20＜(a+b)/2≦0.30mm Maximum number:5 X=width
7	Contrast Irregularity(spot)	Diameter spec　　no of defect a≦0.50mm　　neglect 0.50＜a≦0.75　　5 0.75＜a≦1.00　　3 1.00＜a　　none
8	Dot width	Design width ±15%
9	Color tone and uniformity	Obvious uneven color is not permitted

Interface circuit and driving programme on LCM of dots matrix series .

一. Interface circuit:



二. Driving programme of testing for the module

```
#include<reg51.h>

sbit cs1=P3^0;
sbit cs2=P3^1;
sbit rst=P3^2;
sbit rw=P3^3;
sbit di=P3^4;
sbit e=P3^5;
unsigned char x,y;

void delay(int num)
{
      while(num--) ;
}

void lw(unsigned char x,unsigned char y,unsigned char dd)
{
            if (x<64)
            {
                  cs1=cs2=0;
                  di=rw=0;cs1=1;cs2=0;P1=0xb8|y;e=1;delay(2);e=0;delay(2);
                  di=rw=0;cs1=1;cs2=0;P1=0x40|x;e=1;delay(2);e=0;delay(2);
                  di=1;rw=0;cs1=1;cs2=0;P1=dd;e=1;delay(2);e=0;delay(2);
                  /*cs1=cs2=0;*/
            }
            else
            {
                  cs1=cs2=0;x=x-64;
                  di=rw=0;cs1=0;cs2=1;P1=0xb8|y;e=1;delay(2);e=0;delay(2);
                  di=rw=0;cs1=0;cs2=1;P1=0x40|x;e=1;delay(2);e=0;delay(2);
                  di=1;rw=0;cs1=0;cs2=1;
                                    ;P1=dd;e=1;delay(2);e=0;delay(2);
                  cs1=cs2=1;
            }
            P1=0xff;
}

void lcd_init(void) {
      unsigned char x,y;
      rst=0;
      rst=1;
      e=di=rw=0;
      cs1=cs2=1;
      cs1=0;cs2=1;
      di=rw=0;P1=0x3f;e=1;delay(2);e=0;delay(2);
      cs1=0;cs2=1;
      di=rw=0;P1=0xc0;e=1;delay(2);e=0;delay(2);
      cs1=cs2=0;

      cs1=1;cs2=0;
      di=rw=0;P1=0x3f;e=1;delay(2);e=0;delay(2);
```

```
    cs1=1;cs2=0;
    di=rw=0;P1=0xc0;e=1;delay(2);e=0;delay(2);
    cs1=cs2=0;

      for (y=0;y<8;y++) {
        for (x=0;x<128;x++) lw(x,y,0);
    }
}

unsigned char code dat[8][128]={
0xFF,0xFF,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,
0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,
0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,
0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,
0x03,0x03,0x03,0x03,0x23,0xE3,0x43,0x43,0x63,0x23,0x23,0x23,0x63,0x43,0x43,0x43,
0x43,0x83,0x83,0x83,0x83,0x83,0x83,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,
0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,
0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0x03,0xFF,0xFF,
0xFF,0xFF,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x20,0x30,0xF0,0xF8,0xF8,
0x88,0x88,0x80,0x80,0x00,0xFC,0xFC,0x00,0x00,0xC0,0xC0,0x80,0x00,0x00,0x00,0x00,
0x00,0xF0,0xF0,0x20,0x20,0x20,0x20,0xE0,0xE0,0x20,0x20,0x20,0x20,0x20,0xF0,0xF0,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,0x00,0x00,0x00,0x01,0x03,0x0D,0x0A,0x08,0x10,0x20,0x20,0xE0,0x00,0x00,
0x80,0x00,0x00,0x00,0x00,0x00,0x00,0x01,0x03,0x06,0xF8,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x80,0x80,0x80,0x80,0x80,0x80,0x80,0x00,0x00,
0x00,0x80,0x80,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xFF,0xFF,
0xFF,0xFF,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x01,0x81,0xE1,0x79,0xFF,0xFF,0xFF,
0x71,0x75,0x07,0x07,0xF8,0xFF,0x3F,0xFE,0xC3,0x01,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0xFF,0xFF,0x08,0x08,0x08,0x08,0xFF,0xFF,0x08,0x08,0x08,0x08,0x08,0xFF,0xFF,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xFF,0xE5,0x75,
0x4A,0x20,0x20,0x20,0x20,0x20,0x10,0x10,0x10,0x12,0x1D,0x10,0x10,0x10,0x20,0x20,
0x20,0x30,0x08,0x08,0x0C,0x06,0x01,0x01,0x00,0x8C,0x8C,0x8C,0x46,0x42,0x23,0x19,
0x0D,0x0F,0x07,0x07,0x02,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xFF,0xFF,
0xFF,0xFF,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x01,0x01,0x00,0x00,0x0F,0x0F,0x0F,
0x00,0x08,0x0E,0x07,0x03,0x00,0x00,0x01,0x03,0x0F,0x0C,0x08,0x08,0x00,0x00,0x00,
0x00,0x0F,0x0F,0x04,0x04,0x04,0x04,0x07,0x07,0x04,0x04,0x04,0x04,0x04,0x0F,0x0F,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x80,0x60,0xD0,0xD0,0xB0,0xA8,0x68,0x68,
0x68,0x68,0x68,0x68,0xE8,0x68,0x28,0x10,0x08,0x04,0x02,0x02,0x01,0x00,0x00,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x38,0x26,0x41,0x40,0x80,0x80,0x00,0x00,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xFF,0xFF,
0xFF,0xFF,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x10,0x10,0x11,0x17,0xDE,0xFC,
0x70,0x10,0x00,0xFE,0xFE,0x04,0xF4,0xF4,0x04,0x04,0xFE,0xFE,0x00,0x00,0x00,0x00,
0x00,0xC0,0xF0,0xFE,0x5E,0x06,0x10,0x10,0x10,0x10,0xFF,0xFF,0xFF,0x10,0x10,0x18,
0x98,0x90,0x00,0x00,0x00,0x00,0x18,0x16,0x21,0x40,0x40,0x90,0x10,0x28,0x18,0x98,
0x98,0xB6,0x2F,0x5B,0x56,0x2C,0x6C,0x14,0x1C,0x04,0x08,0x08,0x08,0x08,0x10,0x10,
0x10,0x10,0x10,0x10,0x10,0x10,0x08,0x08,0x08,0x04,0x0C,0x18,0x18,0x74,0xAC,0xA8,
0xA0,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xE3,0x1C,0x00,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xFF,0xFF,
0xFF,0xFF,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x10,0x18,0x0C,0x07,0xFF,0xFF,
0x0E,0x0C,0x08,0x07,0x87,0xF0,0x7F,0xFF,0xF8,0x08,0x07,0x87,0x80,0x00,0x00,0x02,
```

```
0x03,0x01,0xFF,0xFF,0xC1,0x01,0x01,0x21,0x21,0x21,0xFF,0xFF,0xFD,0x21,0x31,0x11,
0x11,0x01,0x01,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x01,0x09,0x09,0x08,
0x08,0x08,0x08,0x08,0xF8,0x00,0x80,0x40,0x60,0x00,0x00,0x28,0x30,0xE0,0x30,0x28,
0x90,0x10,0xF0,0x40,0x90,0x10,0xF0,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x83,0x7C,0xB0,0x48,0x00,0x00,0x00,0x00,0xC0,0x30,0x08,0x06,0x01,0x00,0x00,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xFF,0xFF,
0xFF,0xFF,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x07,0x07,
0x04,0x04,0x06,0x03,0x01,0x00,0x00,0x03,0x03,0x02,0x02,0x03,0x03,0x02,0x00,0x00,
0x00,0x00,0x07,0x07,0x07,0x04,0x04,0x04,0x04,0x04,0x07,0x03,0x07,0x04,0x04,0x04,
0x07,0x03,0x02,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,0x00,0x00,0x1F,0x61,0x82,0x84,0x8C,0x60,0x00,0x89,0x49,0x3F,0x09,0x29,
0x90,0x89,0x7F,0x10,0x88,0x85,0x7F,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xE0,0x1C,
0x83,0x41,0x20,0x10,0x08,0x04,0x02,0x01,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xFF,0xFF,
0xFF,0xFF,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,
0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,
0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,
0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,
0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,
0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC3,0xC2,0xC1,
0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,
0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xC0,0xFF,0xFF

};

unsigned char
a[16]={0xff,0x00,0x00,0xff,0xaa,0xaa,0x55,0x55,0xaa,0x55,0x55,0xaa,0xff,0xff,0x00,0x00};
unsigned char code
zy[32]={0X00,0X00,0X10,0X30,0XD0,0X00,0XD0,0X30,0X10,0X00,0X00,0X00,0X00,0X00,0X
00,0X00,
0X00,0X00,0X00,0X00,0X10,0X1F,0X10,0X00,0X00,0X00,0X00,0X00,0X00,0X00,0X00,0X00};
unsigned char code
zu[32]={0X00,0X00,0X10,0XF0,0X10,0X00,0X10,0XF0,0X10,0X00,0X00,0X00,0X00,0X00,0X0
0,0X00,
0X00,0X00,0X00,0X0F,0X10,0X10,0X10,0X0F,0X00,0X00,0X00,0X00,0X00,0X00,0X00,0X00}
;
unsigned char code
zs[32]={0X00,0X00,0X00,0X60,0X90,0X10,0X10,0X30,0X00,0X00,0X00,0X00,0X00,0X00,0X0
0,0X00,
0X00,0X00,0X00,0X18,0X10,0X11,0X11,0X0E,0X00,0X00,0X00,0X00,0X00,0X00,0X00,0X00}
;
unsigned char code
zn[32]={0X00,0X00,0X10,0XF0,0X70,0X80,0X10,0XF0,0X10,0X00,0X00,0X00,0X00,0X00,0X0
0,0X00,
0X00,0X00,0X10,0X1F,0X10,0X03,0X0C,0X1F,0X00,0X00,0X00,0X00,0X00,0X00,0X00,0X00}
;
unsigned char code
zg[32]={0X00,0X00,0XC0,0X20,0X10,0X10,0X10,0X70,0X00,0X00,0X00,0X00,0X00,0X00,0X0
0,0X00,
0X00,0X00,0X07,0X08,0X10,0X10,0X12,0X0E,0X02,0X00,0X00,0X00,0X00,0X00,0X00,0X00}
;
```

```
unsigned char code
yu[32]={0x00,0x00,0x88,0x88,0x4A,0xAC,0xB8,0xAA,0xBC,0xA8,0xB8,0xAC,0x4A,0x88,0x88,
0x00,
0x00,0x00,0x00,0x00,0x3A,0x2A,0x2A,0x2A,0x2A,0x2A,0x2A,0x3A,0x00,0x00,0x00};
unsigned char code
xin[32]={0x00,0x00,0x80,0x60,0xF8,0x06,0x08,0xA8,0xA8,0xAA,0xAC,0xA8,0xA8,0xA8,0x08,
0x00,
0x00,0x00,0x00,0x00,0x3F,0x00,0x00,0x3E,0x12,0x12,0x12,0x12,0x12,0x3E,0x00,0x00};
unsigned char code
dian[32]={0x00,0x00,0xF0,0x90,0x90,0x90,0x90,0xFE,0x90,0x90,0x90,0x90,0xF0,0x00,0x00,0x0
0,
0x00,0x00,0x0F,0x04,0x04,0x04,0x04,0x1F,0x24,0x24,0x24,0x24,0x27,0x20,0x18,0x00};
unsigned char code
zi[32]={0x00,0x00,0x80,0x82,0x82,0x82,0x82,0x82,0xE2,0x92,0x8A,0x86,0x82,0x80,0x80,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x10,0x20,0x1F,0x00,0x00,0x00,0x00,0x00,0x00,0x00};
unsigned char code
you[32]={0x00,0x00,0x04,0x84,0x44,0xF4,0x9C,0x96,0x94,0x94,0x94,0x94,0xF4,0x04,0x04,0x0
0,
0x00,0x00,0x01,0x00,0x00,0x3F,0x04,0x04,0x04,0x14,0x24,0x24,0x1F,0x00,0x00,0x00};
unsigned char code
xian[32]={0x00,0x00,0xFE,0x02,0x22,0x5A,0x86,0x00,0xFE,0x92,0x92,0x92,0x92,0xFE,0x00,0x
00,
0x00,0x00,0x3F,0x04,0x08,0x04,0x03,0x00,0x3F,0x12,0x04,0x0A,0x11,0x30,0x10,0x00};
unsigned char code
gong[32]={0x00,0x00,0x80,0x80,0x40,0x30,0x0C,0x00,0xC0,0x06,0x18,0x20,0xC0,0x80,0x80,0x
00,
0x00,0x00,0x00,0x10,0x18,0x14,0x12,0x11,0x10,0x10,0x14,0x18,0x30,0x00,0x00,0x00};
unsigned char code
si[32]={0x00,0x00,0x10,0x92,0x92,0x92,0x92,0x92,0x92,0x92,0x12,0x02,0x02,0xFE,0x00,0x00,
0x00,0x00,0x00,0x1F,0x08,0x08,0x08,0x08,0x08,0x1F,0x00,0x10,0x20,0x1F,0x00,0x00};
unsigned char code
d[32]={0x00,0x00,0x00,0xC0,0x40,0x40,0x40,0x7E,0x48,0x48,0x48,0x48,0xC8,0x08,0x00,0x00,
0x00,0x00,0x20,0x1B,0x02,0x02,0x0A,0x32,0x02,0x0A,0x32,0x02,0x0B,0x10,0x20,0x00};
unsigned char code
zhen[32]={0x00,0x00,0xFE,0x22,0x5A,0x86,0x08,0xC8,0xB8,0x8E,0xE8,0x88,0x88,0x88,0x08,0
x00,
0x00,0x00,0x3F,0x02,0x04,0x03,0x04,0x04,0x04,0x04,0x3F,0x04,0x04,0x04,0x04,0x00};
unsigned char code
ye[32]={0x00,0x00,0x12,0x24,0x8C,0x00,0x84,0xC4,0x34,0xC4,0xB6,0x24,0x24,0xE4,0x04,0x0
0,
0x00,0x00,0x02,0x3F,0x00,0x01,0x00,0x3F,0x21,0x12,0x0C,0x05,0x0B,0x30,0x20,0x00};
unsigned char code
jin[32]={0x00,0x00,0x00,0x80,0x80,0xBE,0xAA,0xAA,0x2A,0xAA,0xAA,0xBE,0x80,0x80,0x00,
0x00,
0x00,0x00,0x00,0x3F,0x24,0x24,0x24,0x3F,0x00,0x3F,0x24,0x24,0x24,0x3F,0x00,0x00};
unsigned char code
xi[32]={0x00,0x00,0x00,0x00,0xFE,0x92,0x92,0x92,0x92,0x92,0x92,0x92,0xFE,0x00,0x00,0x00,
0x00,0x00,0x21,0x22,0x26,0x20,0x3F,0x20,0x20,0x20,0x3F,0x20,0x24,0x22,0x23,0x00};
unsigned char code
s[32]={0x00,0x00,0x20,0x22,0x22,0x22,0x22,0x22,0xE2,0x22,0x22,0x22,0x22,0x22,0x20,0x00,
0x00,0x00,0x08,0x04,0x02,0x03,0x10,0x20,0x1F,0x00,0x00,0x01,0x02,0x04,0x0C,0x00};
unsigned char code
```

```
mo[32]={0x00,0x00,0x10,0xD0,0xFE,0x50,0x94,0xF4,0x5E,0x54,0x54,0x54,0x5E,0xF4,0x04,0x0
0,
0x00,0x00,0x03,0x00,0x3F,0x00,0x24,0x25,0x15,0x0D,0x07,0x0D,0x15,0x25,0x24,0x00};
unsigned char code
kuai[32]={0x00,0x00,0x20,0x20,0xFE,0x20,0x20,0x10,0x10,0xFE,0x10,0x10,0x10,0xF0,0x00,0x0
0,
0x00,0x00,0x08,0x08,0x0F,0x24,0x25,0x11,0x0D,0x03,0x05,0x09,0x11,0x21,0x21,0x00};
void write_chinese(x,y,array)
unsigned char x,y;
unsigned char array[];
{
      unsigned char j,dd;
      for(j=0;j<32;j++)
      {
            dd=array[j];
            if(j<16) lw(x+j,y,dd);
              else    lw(x+j-16,y+1,dd);
      }
}

void main()
{
      unsigned char i,dd;
loop:       lcd_init();
      write_chinese(0,2,yu);
      write_chinese(16,2,xin);
      write_chinese(32,2,dian);
      write_chinese(48,2,zi);
      write_chinese(64,2,you);
      write_chinese(80,2,xian);
      write_chinese(96,2,gong);
      write_chinese(112,2,si);

      write_chinese(0,4,d);
      write_chinese(16,4,zhen);
      write_chinese(32,4,ye);
      write_chinese(48,4,jin);
      write_chinese(64,4,xi);
      write_chinese(80,4,s);
      write_chinese(96,4,mo);
      write_chinese(112,4,kuai);

      write_chinese(0,0,zy);
      write_chinese(10,0,zu);
      write_chinese(20,0,zs);
      write_chinese(30,0,zu);
      write_chinese(40,0,zn);
      write_chinese(50,0,zg);
            delay(60000);
   for(i=0;i<8;i++)
          {
            for(y=0;y<8;y++)
```

```
                {
                  for(x=0;x<128;x++)
                      {
          if(i==4){goto w;}
             else if(i==5){goto w;}
                  else
                          if(x%2==0)
                       lw(x,y,a[2*i]);
                    else
                       lw(x,y,a[2*i+1]);

          }
          }
       delay(60000);
          delay(60000);
     }

   w:   for(y=0;y<8;y++)
          {
            for(x=0;x<128;x++)
                {
                  lw(x,y,dat[y][x]);
                }

            }
          delay(60000);
          delay(60000);
     goto loop;
}
```

REVISION HISTORY

Revision Content	Page	Date
Drawing format		
PDF file		