

深圳力先电子有限公司

# 液晶显示模块使用手册

型号：LX12864B11 系列

版本：1.0

| 客户确认  |  |    |  |
|-------|--|----|--|
|       |  |    |  |
| 客户确认： |  | 盖章 |  |
| 客户建议： |  |    |  |

| 编制 |    |    |
|----|----|----|
| 拟制 | 确认 | 批准 |
|    |    |    |

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**RECORD OF REVISION**

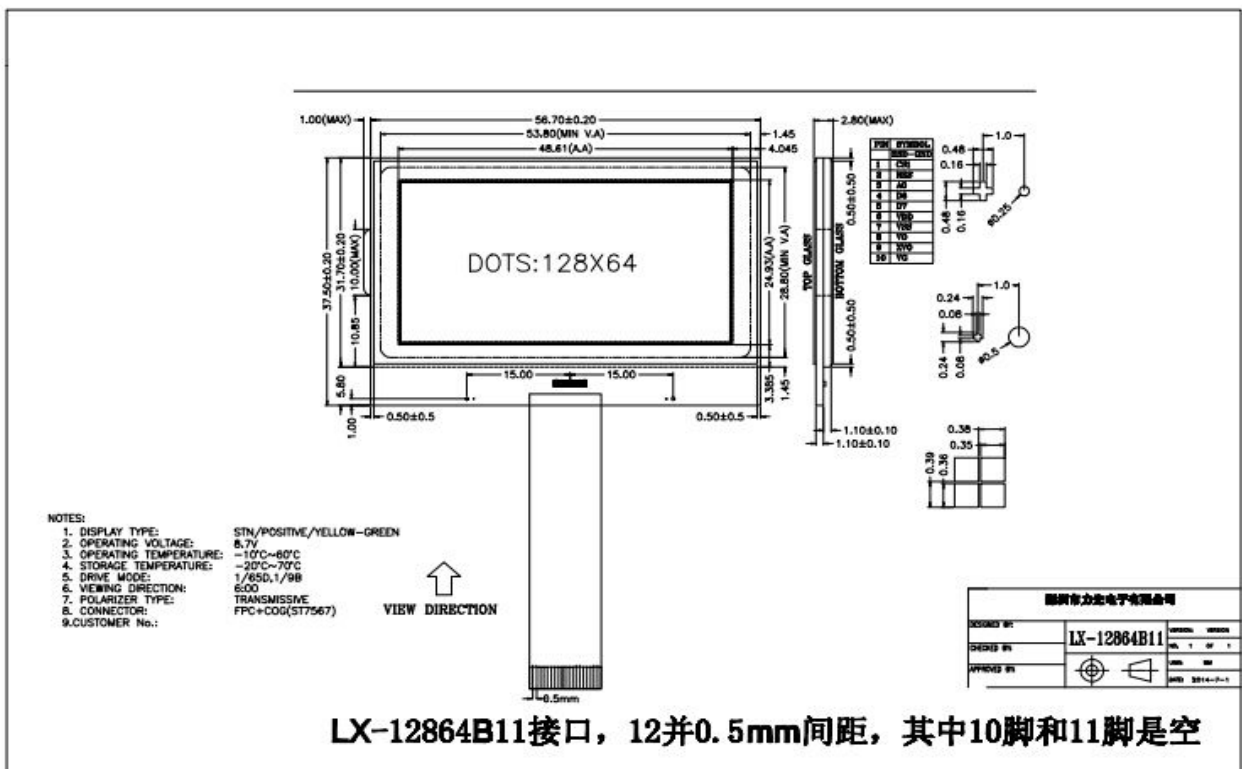
| <b>Version</b> | <b>Revision Date</b> | <b>Contents</b> | <b>Editor</b> |
|----------------|----------------------|-----------------|---------------|
| 1.0            | 2014-08-28           | New Release     | YOU           |
|                |                      |                 |               |
|                |                      |                 |               |
|                |                      |                 |               |
|                |                      |                 |               |
|                |                      |                 |               |
|                |                      |                 |               |

**1. PHYSICAL DATA**

| Item                | Contents        | Unit    |
|---------------------|-----------------|---------|
| LCD type            | STN/黄绿/正显       | ---     |
| LCD duty            | 1/64            | ---     |
| LCD bias            | 1/9             | ---     |
| Viewing direction   | 6               | o'clock |
| Module size (W×H×T) | 56.7×38.6×2.7   | mm      |
| Number of dots(W×H) | 128 × 64        | dots    |
| Dot Size(W×H))      | 0.35×0.36       | mm      |
| Dot Pitch(W×H))     | 0.38×0.39       | mm      |
| 工作温度                | -10 °C -- +60°C |         |
| 存储温度                | -20 °C -- +70°C |         |

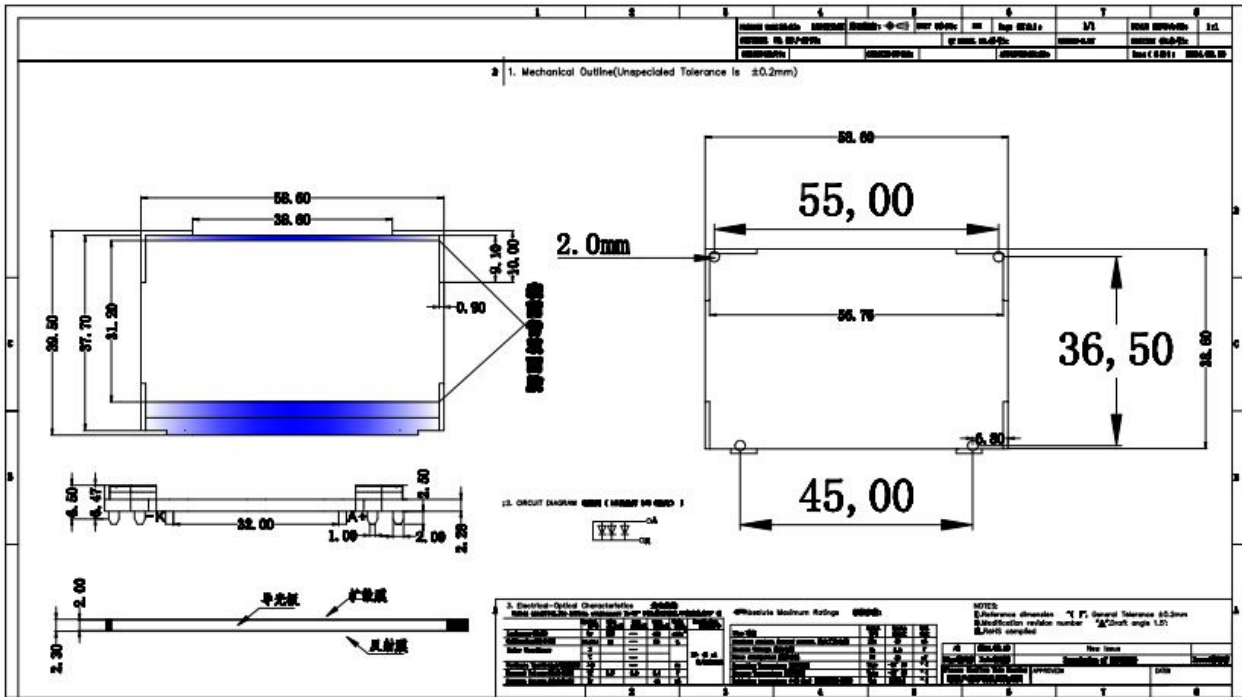
| Item | Contents    | Unit |
|------|-------------|------|
| 背光电压 | 2.9V-3.1V   |      |
| 背光电流 | 25ma--35ma- |      |

**2.EXTERNAL DIMENSIONS**

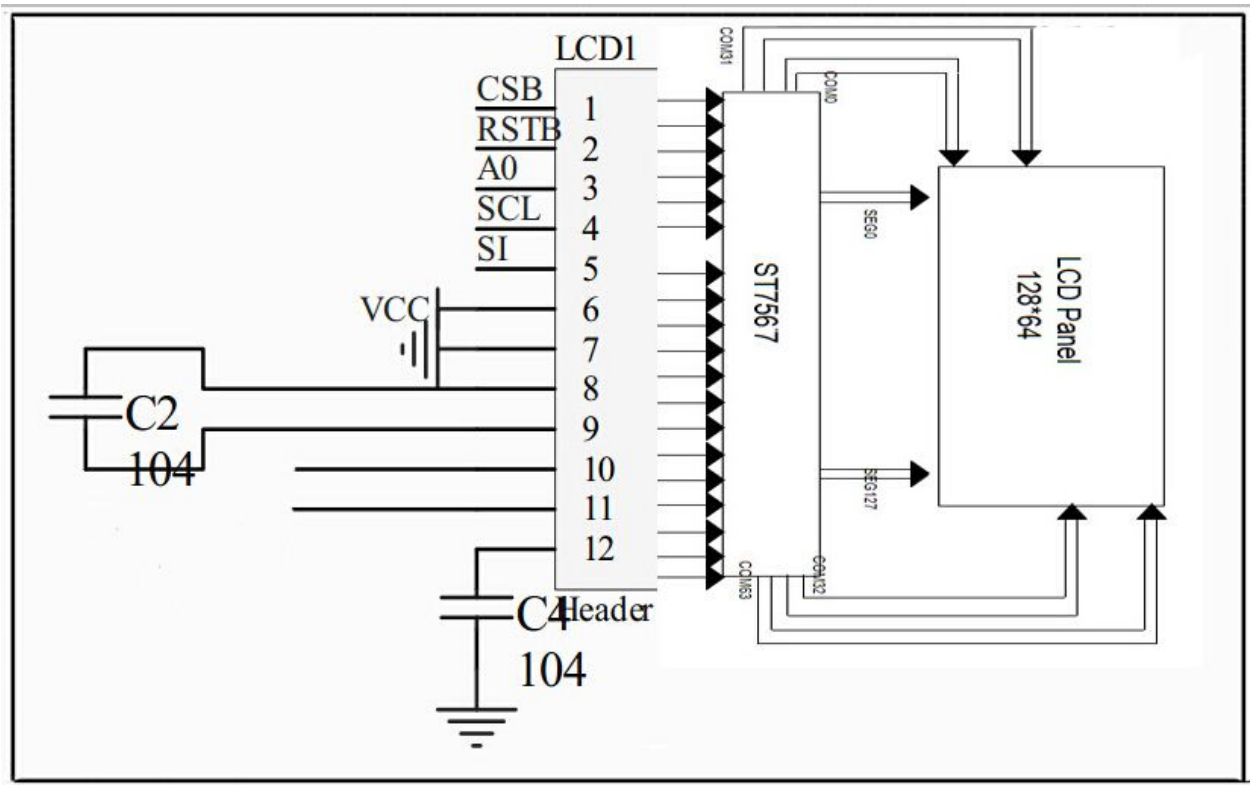


特别注明，按以上图看正面，右边为第一脚（CS）

背光结构图



3. BLOCK DIAGRAM  
外围电路



注：以上图外围电路原理串口

## 4. 以下引脚是并口和串口（SPI），LX-12864B11 以串口为准

| PIN NO. | Symbol    | Level | Description  |
|---------|-----------|-------|--|
| 1       | NC        |       | NC   |
| 2       | CS        | H/L   | Chip select.   |
| 3       | RES       | H/L   | Reset pin.   |
| 4       | A0        | H/L   | A0="H": data. A0="L": Instruction command.   |
| 5       | /WR       | ---   | When Bus Mode is 6800, R/W=R/W<br>When Bus Mode is 8080, R/W=/RW   |
| 6       | /RD       | H/L   | When Bus Mode is 6800, E=E<br>When Bus Mode is 8080, E =/RD  |
| 7       | DB0       | H/L   | This is an 8-bit bi-directional data bus that connects to an 8-bit or 16-bit standard MPU data bus.<br>When the serial interface (SPI-4) is selected (P/S = "L") :<br>D7 : serial data input (SI) ; D6 : the serial clock input (SCL).<br>D0 to D5 should be connected to VDD or floating. |
| 8       | DB1       |       |  |
| 9       | DB2       |       |  |
| 10      | DB3       |       |  |
| 11      | DB4       |       |  |
| 12      | DB5       |       |  |
| 13      | DB6 (SCL) |       |  |
| 14      | DB7 (SI)  |       |  |
| 15      | VDD       | ---   | Power supply.  |
| 16      | VSS       | ---   | Ground.  |
| 17      | VOUT      | ---   | Negative power for LCD.  |
| 18      | C3+       | ---   | DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2N terminal.   |
| 19      | C1+       | ---   | DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1N terminal.   |
| 20      | C1-       |       | DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1P terminal.   |
| 21      | C2+       |       | DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1N terminal. Reset signal.   |
| 22      | C2-       |       | DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2N terminal.   |
| 23~26   | V1~V4     | ---   | This is a multi-level power supply for the liquid crystal drive.   |
| 27      | V0        | ---   | Contrast adjustment input.   |
| 28      | C86       | H/L   | C86 = "H": 6800 Series MPU interface.<br>C86 = "L": 8080 Series MPU interface.   |
| 39      | P/S       | H/L   | P/S = "H": Parallel data input/output.<br>P/S = "L": Serial data input.  |
| 30      | NC        | ---   | NC   |

## 4. ABSOLUTE MAXIMUM RATINGS

### (1)Electrical Absolute Ratings

| Item                   | Symbol          | Min. | Max.     | Unit | Note   |
|------------------------|-----------------|------|----------|------|--------|
| Power Supply for Logic | $V_{DD}-V_{SS}$ | 0    | 3.47     | Volt | Note 1 |
| Power Supply for LCD   | $V_{LCD}$       | 0    | 13.0     | Volt |        |
| Input Voltage          | $V_I$           | 0    | $V_{DD}$ | Volt |        |

Note 1 : Operator should be grounded during handling LCM

### (2) Environmental Absolute Maximum Ratings

| Item                           | Normal Temperature |      |          |      | Wide Temperature |      |          |      |
|--------------------------------|--------------------|------|----------|------|------------------|------|----------|------|
|                                | Operating          |      | Storage  |      | Operating        |      | Storage  |      |
|                                | Min.               | Max, | Min.     | Max, | Min.             | Max, | Min.     | Max, |
| Ambient Temperature            | 0℃                 | +50℃ | -10℃     | +60℃ | -20℃             | +70℃ | -30℃     | +80℃ |
| Humidity(without condensation) | Note 2,4           |      | Note 3,5 |      | Note 4,5         |      | Note 4,6 |      |

Note 2  $T_a \leq 50^\circ\text{C}$  : 80% RH max

$T_a > 50^\circ\text{C}$  : Absolute humidity must be lower than the humidity of 85%RH at  $50^\circ\text{C}$

Note 3  $T_a$  at  $-20^\circ\text{C}$  will be <48hrs at  $70^\circ\text{C}$  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  $T_a \leq 70^\circ\text{C}$  : 75RH max

$T_a > 70^\circ\text{C}$  : absolute humidity must be lower than the humidity of 75%RH at  $70^\circ\text{C}$

Note 6  $T_a$  at  $-20^\circ\text{C}$  will be <48hrs, at  $80^\circ\text{C}$  will be <120hrs when humidity is higher than 75%.

## 5. ELECTRICAL CHARACTERISTICS

### DC Characteristics

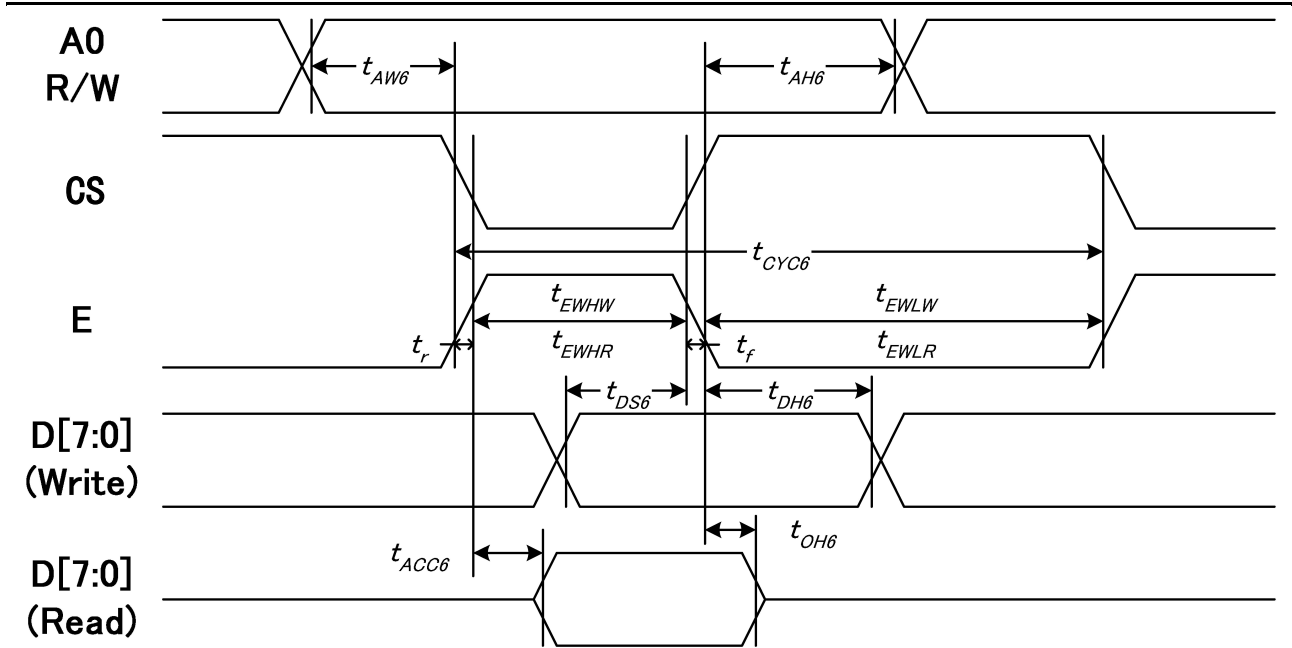
( $V_{DD}=3.3\text{V}; V_{SS}=0\text{V}; T_a=-20\sim 70^\circ\text{C}$ )

| Item                     | Symbol          | Condition                | Min.        | Typ. | Max.        | Unit |
|--------------------------|-----------------|--------------------------|-------------|------|-------------|------|
| Power Supply for Logic   | $V_{DD}-V_{SS}$ | ---                      | 3.14        | 3.3  | 3.47        | Volt |
| Input Voltage            | $V_{IL}$        | ---                      | $V_{SS}$    | ---  | $0.2V_{DD}$ | Volt |
|                          | $V_{IH}$        | ---                      | $0.8V_{DD}$ | ---  | $V_{DD}$    | Volt |
| Output Voltage           | $V_{OH}$        | $I_{OL} = -0.5\text{mA}$ | $0.8V_{DD}$ | ---  | $V_{DD}$    | Volt |
|                          | $V_{OL}$        | $I_{OL} = +0.5\text{mA}$ | $V_{SS}$    | ---  | $0.2V_{DD}$ | Volt |
| LCM Recommend LCD Module | $V_{LCD}$       | $T_a = 0^\circ\text{C}$  | ---         | ---  | ---         | Volt |

|                              |                           |                      |      |      |     |    |
|------------------------------|---------------------------|----------------------|------|------|-----|----|
| Driving Voltage              |                           | T <sub>a</sub> =25°C | 9.15 | 9.35 | 9.6 |    |
|                              |                           | T <sub>a</sub> =50°C | ---  | ---  | --- |    |
| Power Supply Current for LCM | I <sub>DD</sub> (B/L OFF) | ---                  | ---  | ---  | TBD | mA |

**AC Characteristics****System Bus Timing for 6800 Series MPU**(VDD=3.3V, T<sub>a</sub>=25°C)

| Item                          | Signal | Symbol | Condition   | Min. | Max. | Unit |
|-------------------------------|--------|--------|-------------|------|------|------|
| Address setup time            | A0     | tAW6   |             | 0    | —    | ns   |
| Address hold time             |        | tAH6   |             | 0    | —    |      |
| System cycle time             | E      | tCYC6  |             | 240  | —    |      |
| Enable L pulse width (WRITE)  |        | tEWLW  |             | 80   | —    |      |
| Enable H pulse width (WRITE)  |        | tEWHW  |             | 80   | —    |      |
| Enable L pulse width (READ)   |        | tEWLR  |             | 80   | —    |      |
| Enable H pulse width (READ)   |        | tEWHR  |             | 80   | —    |      |
| Write data setup time         |        | D[7:0] | tDS6        |      | 30   |      |
| Write data hold time          | tDH6   |        |             | 10   | —    |      |
| Read data access time         | tACC6  |        | CL = 100 pF | —    | 70   |      |
| Read data output disable time | tOH6   |        | CL = 100 pF | 10   | 50   |      |

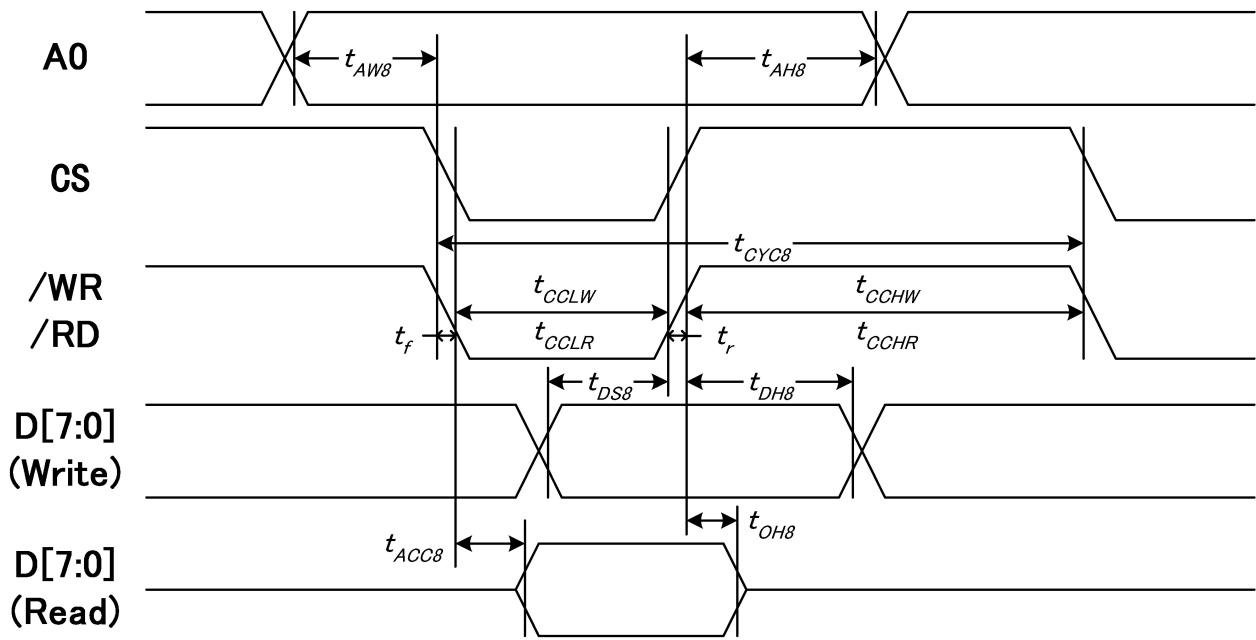


**System Bus Timing for 8080 Series MPU**

(VDD=3.3V, Ta=25°C)

| Item                      | Signal | Symbol | Condition  | Min. | Max. | Unit |
|---------------------------|--------|--------|------------|------|------|------|
| Address setup time        | A0     | tAW8   |            | 0    | —    | ns   |
| Address hold time         |        | tAH8   |            | 0    | —    |      |
| System cycle time         | /WR    | tCYC8  |            | 240  | —    |      |
| /WR L pulse width (WRITE) |        | tCCLW  |            | 80   | —    |      |
| /WR H pulse width (WRITE) |        | tCCHW  |            | 80   | —    |      |
| /RD L pulse width (READ)  |        | RD     | tCCLR      |      | 80   |      |
| /RD H pulse width (READ)  | tCCHR  |        |            | 80   | —    |      |
| WRITE Data setup time     | D[7:0] | tDS8   |            | 30   | —    |      |
| WRITE Data hold time      |        | tDH8   |            | 10   | —    |      |
| READ access time          |        | tACC8  | CL = 100pF | —    | 70   |      |
| READ Output disable time  |        | tOH8   | CL = 100pF | 5    | 50   |      |

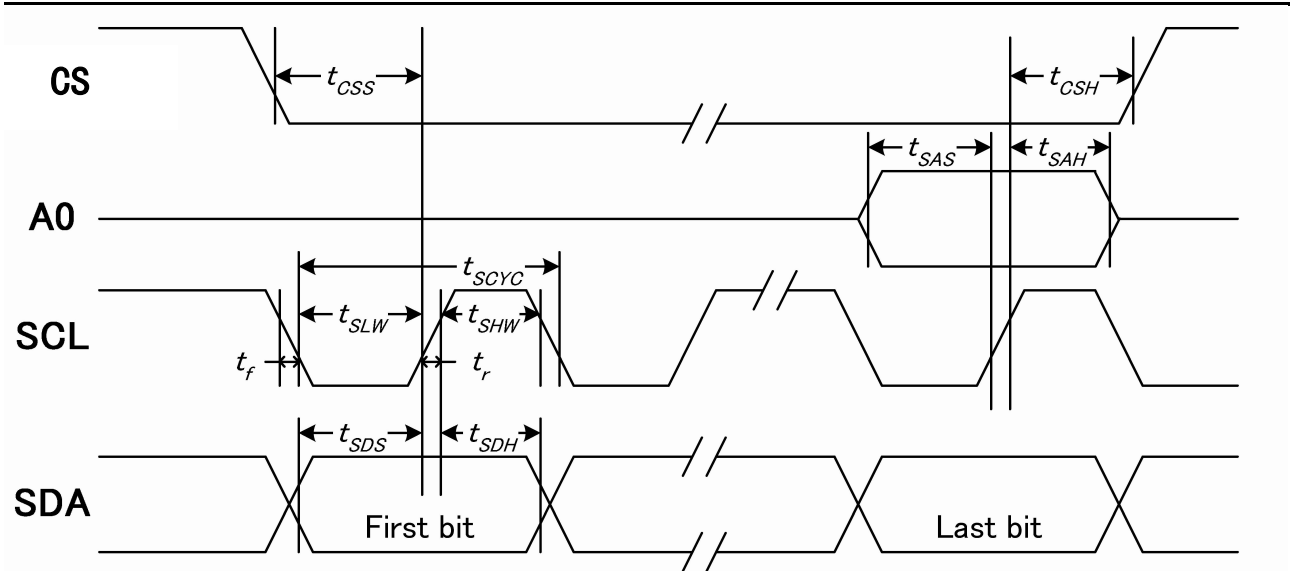




**System Bus Timing for 4-Line Serial Interface**

(VDD=3.3V, Ta=25°C)

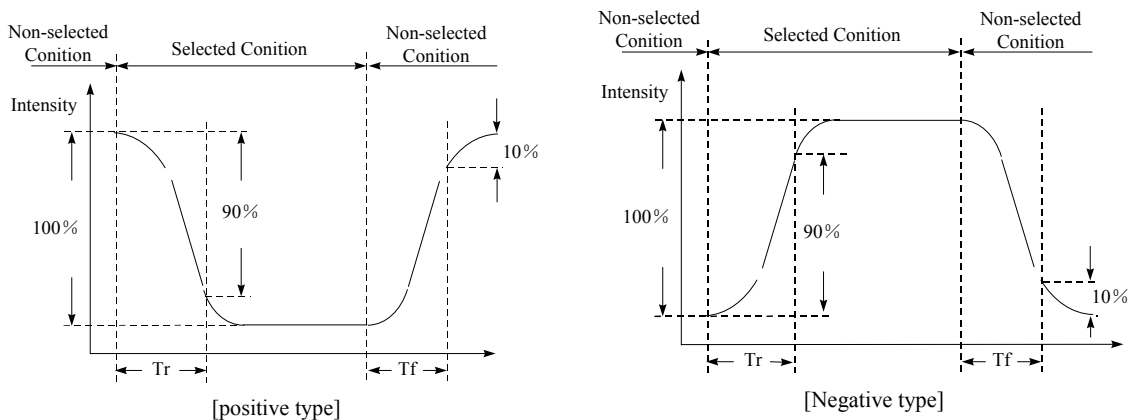
| Item                 | Signal | Symbol | Condition | Min. | Max. | Unit |
|----------------------|--------|--------|-----------|------|------|------|
| Serial clock period  | SCLK   | tSCYC  |           | 50   | ---  | ns   |
| SCLK "H" pulse width |        | tSHW   |           | 25   | ---  |      |
| SCLK "L" pulse width |        | tSLW   |           | 25   | ---  |      |
| Address setup time   | A0     | tSAS   |           | 20   | ---  |      |
| Address hold time    |        | tSAH   |           | 10   | ---  |      |
| Data setup time      | SDA    | tSDS   |           | 20   | ---  |      |
| Data hold time       |        | tSDH   |           | 10   | ---  |      |
| CS-SCLK time         | CS     | tCSS   |           | 20   | ---  |      |
| CS-SCLK time         |        | tCSH   |           | 40   | ---  |      |



### 6. ELECTRO-OPTICAL CHARACTERISTICS

| Item                | Symbol                  | Condition                             | Min. | Typ. | Max. | Unit   | note                       |
|---------------------|-------------------------|---------------------------------------|------|------|------|--------|----------------------------|
| Viewing angle range | $\theta_f$ (12 o'clock) | When $Cr \geq 2$                      | 35   | ---  | ---  | Degree | Note 2<br>Note 3<br>Note 4 |
|                     | $\theta_b$ (6 o'clock)  |                                       | 30   | ---  | ---  |        |                            |
|                     | $\theta_l$ (9 o'clock)  |                                       | 30   | ---  | ---  |        |                            |
|                     | $\theta_r$ (3 o'clock)  |                                       | 30   | 35   | ---  |        |                            |
| Rise Time           | $T_r$                   | $V_{DD}-V_0=8.7V$<br>$T_a=25^\circ C$ |      | 112  |      | mS     | Note 1                     |
| Fall Time           | $T_f$                   |                                       |      | 250  |      |        |                            |
| Contrast            | $Cr$                    |                                       | ---  | 5.4  | ---  |        |                            |

[Note 1] Definition of Response Time ( $T_r$ ,  $T_f$ )

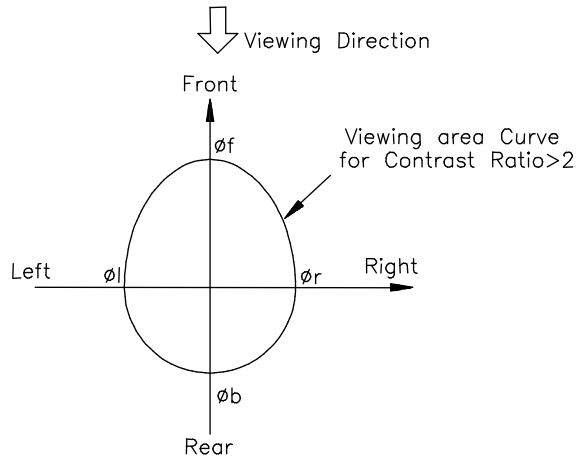


Conditions:

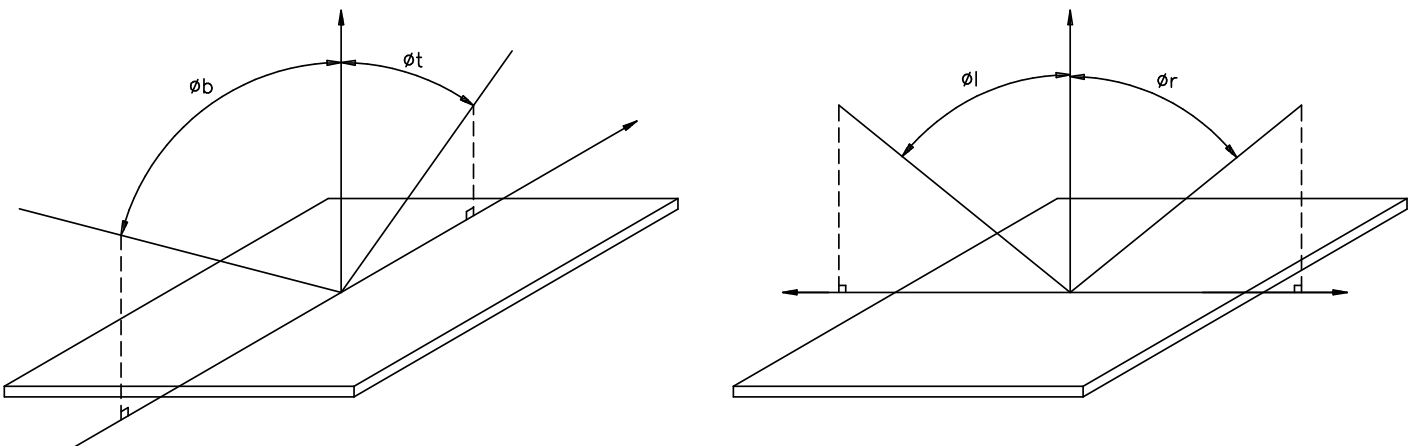
Operating Voltage :  $V_{op}$   
 Frame Frequency : 64 Hz

Viewing Angle( $\theta, \varphi$ ):  $0^\circ, 0^\circ$   
 Driving Wave form : 1/N duty, 1/a bias

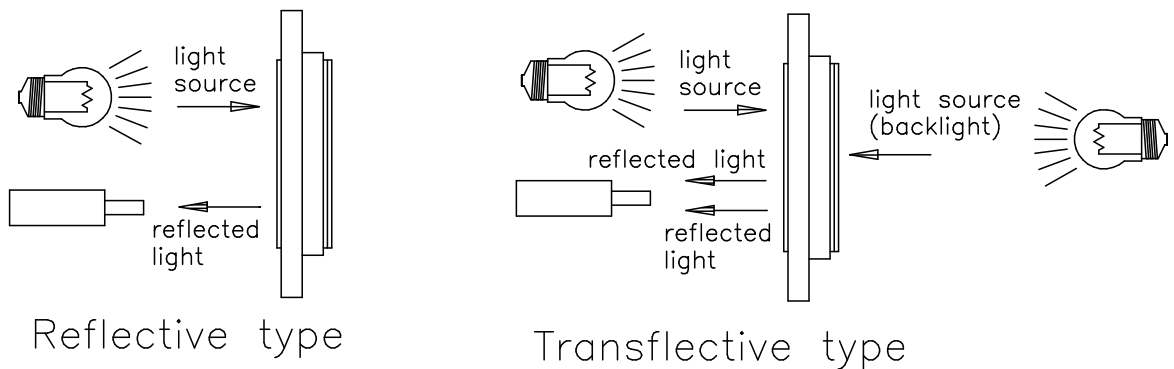
**[Note 2] Definition of Viewing Direction**



**[Note 3] Definition of viewing angle**



**[Note 4] Description of Measuring Equipment**



## 7. OPERATING PRINCIPLES & METHODS

| INSTRUCTION   | A0 | R/W | COMMAND BYTE     |    |     |     |     |     |     |      | DESCRIPTION  |
|---|----|-----|------------------|----|-----|-----|-----|-----|-----|------|--|
|   |    |     | D7               | D6 | D5  | D4  | D3  | D2  | D1  | D0   |  |
| (1) Display ON/OFF  | 0  | 0   | 1                | 0  | 1   | 0   | 1   | 1   | 1   | D    | D=1, display ON<br>D=0, display OFF  |
| (2) Set Start Line  | 0  | 0   | 0                | 1  | S5  | S4  | S3  | S2  | S1  | S0   | Set display start line   |
| (3) Set Page Address  | 0  | 0   | 1                | 0  | 1   | 1   | Y3  | Y2  | Y1  | Y0   | Set page address   |
| (4) Set Column Address  | 0  | 0   | 0                | 0  | 0   | 1   | X7  | X6  | X5  | X4   | Set column address (MSB)   |
|   | 0  | 0   | 0                | 0  | 0   | 0   | X3  | X2  | X1  | X0   | Set column address (LSB)   |
| (5) Read Status   | 0  | 1   | 0                | MX | D   | RST | 0   | 0   | 0   | 0    | Read IC Status   |
| (6) Write Data  | 1  | 0   | D7               | D6 | D5  | D4  | D3  | D2  | D1  | D0   | Write display data to RAM  |
| (7) Read Data   | 1  | 1   | D7               | D6 | D5  | D4  | D3  | D2  | D1  | D0   | Read display data from RAM   |
| (8) SEG Direction   | 0  | 0   | 1                | 0  | 1   | 0   | 0   | 0   | 0   | MX   | Set scan direction of SEG<br>MX=1, reverse direction<br>MX=0, normal direction   |
| (9) Inverse Display   | 0  | 0   | 1                | 0  | 1   | 0   | 0   | 1   | 1   | INV  | INV =1, inverse display<br>INV =0, normal display                                |
| (10) All Pixel ON   | 0  | 0   | 1                | 0  | 1   | 0   | 0   | 1   | 0   | AP   | AP=1, set all pixel ON<br>AP=0, normal display                                   |
| (11) Bias Select  | 0  | 0   | 1                | 0  | 1   | 0   | 0   | 0   | 1   | BS   | Select bias setting<br>0=1/9; 1=1/7  |
| (12) Read-modify-Write  | 0  | 0   | 1                | 1  | 1   | 0   | 0   | 0   | 0   | 0    | Column address increment:<br>Read:+0 , Write:+1                                  |
| (13) END  | 0  | 0   | 1                | 1  | 1   | 0   | 1   | 1   | 1   | 0    | Exit Read-modify-Write mode  |
| (14) RESET  | 0  | 0   | 1                | 1  | 1   | 0   | 0   | 0   | 1   | 0    | Internal reset   |
| (15) COM Direction  | 0  | 0   | 1                | 1  | 0   | 0   | MY  | -   | -   | -    | Set output direction of COM<br>MY=1, reverse direction<br>MY=0, normal direction |
| (16) Power Control  | 0  | 0   | 0                | 0  | 1   | 0   | 1   | VB  | VR  | VF   | Control built-in power circuit<br>ON/OFF   |
| (17) Regulation Ratio   | 0  | 0   | 0                | 0  | 1   | 0   | 0   | RR2 | RR1 | RR0  | Select regulation resistor ratio   |
| (18) Electronic volume mode set<br>Electronic volume register set | 0  | 0   | 1                | 0  | 0   | 0   | 0   | 0   | 0   | 1    | Set the V0 output voltage<br>electronic volume register                          |
|   | 0  | 0   | 0                | 0  | EV5 | EV4 | EV3 | EV2 | EV1 | EV0  |  |
| (19) Static indicator ON/OFF<br>Static indicator Register set     | 0  | 0   | 1                | 0  | 1   | 0   | 1   | 1   | 0   | 0/1  | 0: OFF, 1: ON  |
|   | 0  | 0   | 0                | 0  | 0   | 0   | 0   | 0   | 0   | Mode | Set the flashing mode  |
| (20) Page Blink<br>Page selection                                 | 0  | 0   | 1                | 1  | 0   | 1   | 0   | 1   | 0   | 1    | P7 - 0: 1 - blinking page<br>0 - no blinking, normal display                     |
|   | 0  | 0   | P7               | P6 | P5  | P4  | P3  | P2  | P1  | P0   |  |
| (21) Driving Mode Set<br>Mode selection                           | 0  | 0   | 1                | 1  | 0   | 1   | 0   | 0   | 1   | 0    | Set the driving mode register<br>Driving capability (D0):<br>(1)>(0)             |
|   | 0  | 0   | 0                | 0  | 0   | 0   | 0   | 0   | 0   | D0   |  |
| (22) Power Save   | 0  | 0   | Compound Command |    |     |     |     |     |     |      | Display OFF + All Pixel ON   |
| (23) NOP  | 0  | 0   | 1                | 1  | 1   | 0   | 0   | 0   | 1   | 1    | No operation   |
| (24) Test   | 0  | 0   | 1                | 1  | 1   | 1   | -   | -   | -   | -    | Do NOT use.<br>Reserved for testing.   |
|   | 0  | 0   | 1                | 1  | 0   | 1   | 0   | 1   | 0   | 0    |  |
| (25) Oscillator Frequency selection                               | 0  | 0   | 1                | 1  | 1   | 0   | 0   | 1   | 0   | 0/1  | 20KHz/33KHz (Default)<br>16.4KHz/ 27.06KHz                                       |

**8. RELIABILITY**

| <b>Environmental Test</b> |                                       |   |  |  |
|---------------------------|---------------------------------------|---|--|--|
| <b>No.</b>                | <b>Test Item</b>                      | <b>Content of Test</b>  | <b>Test Condition</b>                                      | <b>Applicable Standard</b>                   |
| 1                         | High temperature storage              | Endurance test applying the high storage temperature for a long time.   | 80 °C<br>200 hrs   | -----  |
| 2                         | Low temperature storage               | Endurance test applying the low storage temperature for a long time.  | -30 °C<br>200 hrs  | -----  |
| 3                         | High temperature operation            | Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.  | 70 °C<br>200 hrs   | -----  |
| 4                         | Low temperature operation             | Endurance test applying the electric stress under low temperature for a long time.  | -20 °C<br>200 hrs  | -----  |
| 5                         | High temperature / Humidity storage   | Endurance test applying the high temperature and high humidity storage for a long time.   | 70 °C , 90 %RH<br>96 hrs                                   | MIL-202E-103B<br>JIS-C5023                   |
| 6                         | High temperature / Humidity operation | Endurance test applying the electric stress (Voltage & Current) and temperature / humidity stress to the element for a long time.   | 50 °C , 90 %RH<br>96 hrs                                   | MIL-202E-103B<br>JIS-C5023                   |
| 7                         | Temperature cycle                     | Endurance test applying the low and high temperature cycle.<br>$\begin{array}{c} -10^{\circ}\text{C} \quad \rightleftharpoons \quad 25^{\circ}\text{C} \quad \rightleftharpoons \quad 60^{\circ}\text{C} \\ 30\text{min} \quad \rightleftharpoons \quad 5\text{min.} \quad \rightleftharpoons \quad 30\text{min} \\ \longleftarrow \hspace{10em} \longrightarrow \\ \text{1 cycle} \end{array}$ | -10°C / 60°C<br>10 cycles                                  | -----  |
| <b>Mechanical Test</b>    |                                       |   |  |  |
| 8                         | Vibration test                        | Endurance test applying the vibration during transportation and using.  | 10~22Hz → 1.5mmp-p<br>22~500Hz → 1.5G<br>Total 0.5hrs      | MIL-202E-201A<br>JIS-C5025<br>JIS-C7022-A-10 |
| 9                         | Shock test                            | Constructional and mechanical endurance test applying the shock during transportation.  | 50G half sign<br>wave 11 msdc<br>3 times of each direction | MIL-202E-213B                                |
| 10                        | Atmospheric pressure test             | Endurance test applying the atmospheric pressure during transportation by air.  | 115 mbar<br>40 hrs   | MIL-202E-105C                                |
| <b>Others</b>             |                                       |   |  |  |
| 11                        | Static electricity test               | Endurance test applying the electric stress to the terminal.  | VS=800V , RS=1.5 kΩ<br>CS=100 pF<br>10 time                | MIL-883B-3015.1                              |

Inspection after test: Inspection after 2~4 hours storage at room temperature ,the sample shall be free from defects:

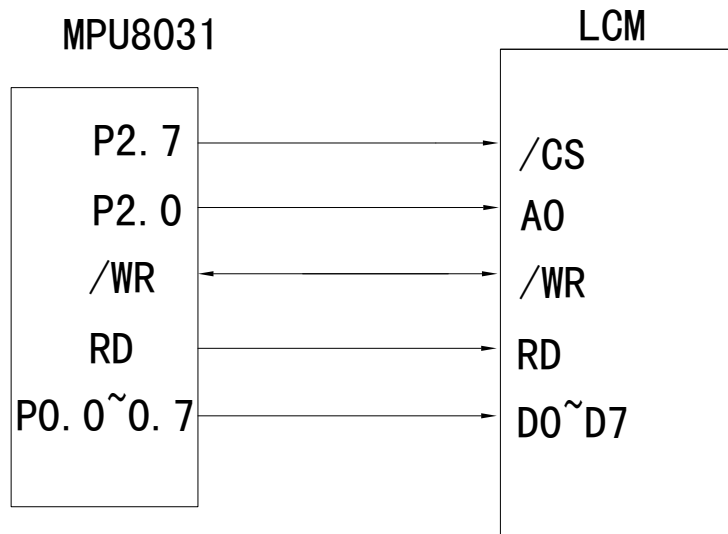
1. Air bubble in the LCD.
2. Sealleak
3. Non-display.
4. Missing segments.
5. Glass crack.
6. Current Idd is twice higher than initial value.

## 9. QUALITY GUARANTEE

| No | Item                                      | Criteria  |
|----|---|---|
| 1  | inclusions (black spot, white spot, dust) | <p>(1)round type<br/> diameter mm(a*)      no of defect*</p> <p><math>a \leq 0.20</math>                      neglect<br/> <math>0.20 &lt; a \leq 0.35</math>                5max<br/> <math>0.35 &lt; a</math>                          none</p> <p>(2)linear type<br/> <b>length mm(l)</b>                <b>width mm(W)</b>                <b>no. of defect</b></p> <p>na                                      <math>W \leq 0.03</math>                      neglect<br/> <math>1 \leq 3</math>                                <math>0.03 &lt; W \leq 0.08</math>                6<br/> <math>3 &lt; l</math>                                 <math>0.08 &lt; W</math>                        none</p> |
| 2  | scratch                                   | <p>1.scratch on protective film is permitted.<br/> 2.scratch on polarizer shall be as follow:<br/> (1)round type<br/> diameter mm(a*)      no of defect</p> <p><math>a \leq 0.15</math>                      neglect<br/> <math>0.15 &lt; a \leq 0.20</math>                2 max<br/> <math>0.20 &lt; a</math>                          none</p> <p>(2)linear type<br/> be judged by 1.-(2) linear type</p>  |
| 3  | dent                                      | diameter < 1.5mm  |
| 4  | bubble                                    | not exceeding 0.5mm average diameter is acceptable between glass and polarizing film  |
| 5  | pin hole                                  | $(a+b)/2 \leq 0.15\text{mm}$<br>maximum number: ignored<br>$0.15 < (a+b)/2 \leq 0.20\text{mm}$<br>maximum number:10   |
| 6  | dot width                                 | design width $\pm 15\%$   |
| 7  | dot defect                                | $(a+b)/2 \leq 0.20\text{mm}$<br>maximum number: ignored<br>$0.20 < (a+b)/2 \leq 0.30\text{mm}$<br>maximum number:5<br>x=width   |
| 8  | contrast irregularity(spot)               | diameter spec                no of defect<br>$a \leq 0.50\text{mm}$ neglect<br>$0.50 < a \leq 0.75$ 5<br>$0.75 < a \leq 1.00$ 3<br>$1.00 < a$ none  |
| 9  | color tone and uniformity                 | obvious uneven color is not permitted   |

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

(1) Interface circuit:



串口测试程序（其它技术参数请参考 IC:ST7567）

```

//*****
//连线表: CPU=W78E54B *
//CS=P3.0 SID=P3.1 SCK=P3.2 RS=P3.3 Fosc=12Mhz RST=P3.5 *
//*****
#include <reg52.h>
#include <intrins.h>

#define LcmXPixel 128 //横向宽度
#define LcmYPixel 64 //纵向高度
#define MIN(A,B) ((A)<(B)?(A):(B))
#define Uchar unsigned char
#define Uint unsigned int

sbit CS = P3^0; //片选
sbit SID = P3^1; //数据
sbit SCK = P3^2; //Clock 信号
sbit RS = P3^3; //数据指令选择
sbit Key = P3^4; //测试架锁定按键(测试架专用)
sbit RES = P3^5; //测试架复位是板载 RC 复位,可以不需要 IO 口操作

Uchar code ASCIIchardot[];
Uchar code bmp1[];
Uchar code bmp2[];
Uchar code bmp3[];
Uchar code ComTable[]={3,2,1,0,7,6,5,4};

//串口模式下只能写不能读,也不能查忙,因此用户要控制好速度不要太快
void WriteCommand( Uchar CommandByte )
{
    Uchar i;
    CS=0;
    RS=0; //Command
    for(i=0;i<8;i++)
    {
        SCK=1;
        SID=( (CommandByte)>>(7-i)) &0x01;
        SCK=0;
        _nop_();
        SCK=1;
    }
}

void WriteData( Uchar DataByte )
{
    Uchar i;
    CS=0;
    RS=1; //Data
    for(i=0;i<8;i++)
    {
        SCK=1;
        SID=( (DataByte)>>(7-i)) &0x01;
        SCK=0;
        _nop_();
        SCK=1;
    }
}

void DelayMS(unsigned int MS)
{
    unsigned char us, usn;

```

```

while (MS!=0)
{
    usn = 2;    //for 12M
    while(usn!=0)
    {
        us=0xf6;
        while (us!=0) {us--};
        usn--;
    }
    MS--;
}

void DelayKey(unsigned int Second , unsigned int MS100)
{
    unsigned int i;
    for(i=0;i<Second*100+MS100*10;i++)
    {
        if(Key==0)
        {
            DelayMS(20);
            while(Key==0) {DelayMS(20);}
            break;
        }
        else DelayMS(10);
    }
}

void LcmClear( Uchar FillData )
{
    Uint i, j;
    for(i=0;i<8;i++)
    {
        WriteCommand(0xB0|ComTable[i]);    //Set Page Address
        WriteCommand(0x10);    //Set Column Address = 0
        WriteCommand(0x01);    //Colum from S1 -> S128 auto add
        for(j=0;j<128;j++)
        {
            WriteData( FillData );
        }
    }
}

void LcmInit( void )
{
    WriteCommand(0xAE);    //Display OFF
    WriteCommand(0xA2);    //1/64 Duty 1/9 Bias
    WriteCommand(0xA0);    //ADC select S0->S131(玻璃设计用 S1-S128)
    WriteCommand(0xC0);    //com1 -> com64
    WriteCommand(0x24);    //对某些模块没用,用的外部 Rb/Ra
    WriteCommand(0x81);    //Sets V0
    WriteCommand(48);    //内部电位器调节对比度
    WriteCommand(0x2F);    //voltage follower ON regulator ON booster ON
    WriteCommand(0xA6);    //Normal Display (not reverse display)
    WriteCommand(0xA4);    //Entire Display Disable
    WriteCommand(0x40);    //Set Display Start Line = com0
    WriteCommand(0xB0);    //Set Page Address = 0
    WriteCommand(0x10);    //Set Column Address 4 higher bits = 0
    WriteCommand(0x01);    //Set Column Address 4 lower bits = 1 , from IC SEG1 -> SEG128
    LcmClear(0);
    WriteCommand(0xAF);    //Display ON
}

//显示 ASCII 字符的函数
void LcmPutChar(Uchar col,Uchar page,Uchar Order)
{
    Uchar i;
    Uint x;
    x = (Order-0x20)*0x10;    //ASICC 字符从 0x20 开始, 每个 16 byte
    WriteCommand(ComTable[page&0x07]|0xB0);    //Set Page Address
    WriteCommand( ((col+1)>>4) | 0x10);    //Set Column Address High Byte
    WriteCommand( (col+1)&0x0F );    //Low Byte Colum from S128 -> S1 auto add

    for(i=0;i<8;i++)
    {
        WriteData( ASCIIchardot[x] );
        x++;
    }
    page++;    //下半字符 page+1

    WriteCommand(ComTable[page&0x07]|0xB0);    //Set Page Address
    WriteCommand( ((col+1)>>4) | 0x10);    //Set Column Address High Byte
    WriteCommand( (col+1)&0x0F );    //Low Byte Colum from S128 -> S1 auto add

    for(i=0;i<8;i++)
    {
        WriteData( ASCIIchardot[x] );
        x++;
    }
    page--;    //写完一个字符 page 还原
}

//显示字符串的函数
void LcmPutStr(Uchar col,Uchar page,Uchar *puts)
{
    while(*puts != '\0')    //判断字符串时候显示完毕
    {
        if(col>(LcmXPixel-8))    //判断行末空间是否足够放一个字符, 自动换行
        {

```



```

        page=page+2;
        col=0;
    }
    if (page>(LcmYPixel/8-2)) //到了屏幕最下角,自动返回左上角
    {
        page=0;
        col=0;
    }
    LcmPutChar(col, page, *puts);
    puts++;
    col=col+8; //下一个字符 8 列之后
}

//显示 3 位数的数值(0-255)
void LcmPutNum(Uchar col,Uchar page,Uchar Num)
{
    Uchar a,b,c;
    a=Num/100;
    b=(Num%100)/10;
    c=Num%10;
    if(a==0) ; //也不写空格,直接跳过去//PutChar(col, page, 0x20);
    else LcmPutChar(col, page, a+0x30);

    if(a==0 && b==0) ; //也不写空格,直接跳过去//LcmPutChar(col, page, 0x20);
    else LcmPutChar(col+8, page, b+0x30);

    LcmPutChar(col+16, page, c+0x30);
}

void LcmPutBmp( Uchar *puts )
{
    Uchar i,j;
    Uint X=0;
    for(i=0;i<(LcmYPixel/8);i++)
    {
        WriteCommand(0xB0|ComTable[i]); //Set Page Address
        WriteCommand(0x10); //Set Column Address = 0
        WriteCommand(0x01); //Column from S1 -> S128 auto add
        for(j=0;j<LcmXPixel;j++)
        {
            WriteData( puts[X] );
            X++;
        }
    }
}

void main( void )
{
    Uchar i;
    Uchar contrast=48; //对比度=48(根据我们常用的外部电阻参数来的)
    DelayMS(10);
    RES = 0;
    DelayMS(200);
    RES = 1;
    DelayMS(50);
    LcmInit();
    while(1)
    {
        LcmPutBmp(bmp1);
        DelayKey(1,0);

        for(i=(contrast-5);i<(contrast+5);i++)
        {
            WriteCommand(0x81); //Sets V0
            WriteCommand(0x3F&i); //内部电位器调节对比度
            LcmPutNum(10,2,i);
            DelayKey(0,1);
        }

        WriteCommand(0x81); //Sets V0
        WriteCommand(contrast); //恢复对比度
        LcmPutNum(10,2,contrast);

        LcmClear(0xff);
        DelayKey(1,0);

        LcmClear(0);
        LcmPutStr(0,0,"CA12864I2 Program");
        LcmPutStr(0,2,"SunSon ELEC-TECH");
        LcmPutStr(0,4,"TEL:755-29970110");
        LcmPutStr(0,6,"By LJ 2009.04.08");
        DelayKey(1,0);
    }
}

/* ASICC 字库代码 8x16 点阵 */
unsigned char code ASCIIchardot[16*96] = {
/*-- 文字: --*/
/*-- Fixedsys12; 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
/*-- 文字: ! --*/
/*-- Fixedsys12; 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00,0x00,0x0E,0x1F,0x0E,0x00,0x00,0x00,0x00,0x00,0x00,0xB0,0xB0,0x00,0x00,0x00,
/*-- 文字: " --*/
/*-- Fixedsys12; 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00,0x1C,0x1C,0x00,0x00,0x1C,0x1C,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,

```

```

/*-- 文字: # --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x04, 0x1F, 0x1F, 0x04, 0x1F, 0x1F, 0x04, 0x00, 0x40, 0xF0, 0xF0, 0x40, 0xF0, 0xF0, 0x40,

/*-- 文字: $ --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x0C, 0x1E, 0x73, 0x71, 0x18, 0x08, 0x00, 0x00, 0x20, 0x30, 0x1C, 0x9C, 0xF0, 0x60, 0x00,

/*-- 文字: % --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x18, 0x3C, 0x24, 0x3D, 0x1B, 0x06, 0x0C, 0x00, 0x00, 0x60, 0xC0, 0xB0, 0x78, 0x48, 0x78, 0x30,

/*-- 文字: & --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x0D, 0x1F, 0x12, 0x1E, 0x0C, 0x00, 0x00, 0x00, 0x0E, 0xF0, 0x10, 0x90, 0xE0, 0xF0, 0x90,

/*-- 文字: ' --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x00, 0x1C, 0x1C, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: ( --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x03, 0x0F, 0x1C, 0x10, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0xF8, 0x1C, 0x04, 0x00, 0x00,

/*-- 文字: ) --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x10, 0x1C, 0x0F, 0x03, 0x00, 0x00, 0x00, 0x00, 0x04, 0x1C, 0xF8, 0xE0, 0x00, 0x00,

/*-- 文字: * --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x01, 0x05, 0x07, 0x03, 0x07, 0x05, 0x01, 0x00, 0x00, 0x40, 0xC0, 0x80, 0xC0, 0x40, 0x00,

/*-- 文字: + --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x01, 0x01, 0x07, 0x07, 0x01, 0x01, 0x00, 0x00, 0x00, 0xC0, 0xC0, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: , --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x34, 0x3C, 0x38, 0x00, 0x00,

/*-- 文字: - --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: . --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x30, 0x30, 0x30, 0x00, 0x00,

/*-- 文字: / --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x00, 0x01, 0x07, 0x1E, 0x18, 0x00, 0x00, 0x18, 0x78, 0xE0, 0x80, 0x00, 0x00, 0x00,

/*-- 文字: 0 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x0F, 0x1F, 0x10, 0x16, 0x1F, 0x0F, 0x00, 0x00, 0xE0, 0xF0, 0xD0, 0x10, 0xF0, 0xE0,

/*-- 文字: 1 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x04, 0x04, 0x0C, 0x1F, 0x1F, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x00,

/*-- 文字: 2 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x0C, 0x1C, 0x10, 0x11, 0x1F, 0x0E, 0x00, 0x00, 0x30, 0x70, 0xD0, 0x90, 0x10, 0x10, 0x00,

/*-- 文字: 3 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x0C, 0x1C, 0x11, 0x11, 0x1F, 0x0E, 0x00, 0x00, 0x60, 0x70, 0x10, 0x10, 0xF0, 0xE0, 0x00,

/*-- 文字: 4 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x1F, 0x1F, 0x00, 0x07, 0x07, 0x00, 0x00, 0xC0, 0xC0, 0x40, 0x40, 0xF0, 0xF0, 0x40,

/*-- 文字: 5 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x1F, 0x1F, 0x11, 0x11, 0x10, 0x00, 0x00, 0x00, 0x10, 0x10, 0x10, 0x30, 0xE0, 0xC0, 0x00,

/*-- 文字: 6 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x03, 0x07, 0x1E, 0x1A, 0x13, 0x01, 0x00, 0x00, 0xE0, 0xF0, 0x10, 0x10, 0xF0, 0xE0, 0x00,

/*-- 文字: 7 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x10, 0x10, 0x11, 0x17, 0x1E, 0x18, 0x00, 0x00, 0x00, 0x70, 0xF0, 0x80, 0x00, 0x00, 0x00,

/*-- 文字: 8 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x0E, 0x1F, 0x13, 0x11, 0x1F, 0x0E, 0x00, 0x00, 0xE0, 0xF0, 0x10, 0x90, 0xF0, 0xE0, 0x00,

/*-- 文字: 9 --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x0F, 0x1F, 0x10, 0x10, 0x1F, 0x0F, 0x00, 0x00, 0x00, 0x90, 0xB0, 0xF0, 0xC0, 0x80, 0x00,

/*-- 文字: : --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x00, 0x06, 0x06, 0x06, 0x00, 0x00, 0x00, 0x00, 0x00, 0x30, 0x30, 0x30, 0x00, 0x00,

/*-- 文字: ; --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x00, 0x06, 0x06, 0x06, 0x00, 0x00, 0x00, 0x00, 0x00, 0x34, 0x3C, 0x38, 0x00, 0x00,

/*-- 文字: < --*/

```

```

/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x01, 0x03, 0x06, 0x0C, 0x18, 0x10, 0x00, 0x00, 0x00, 0x80, 0xC0, 0x60, 0x30, 0x10, 0x00,

/*-- 文字: = --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x02, 0x02, 0x02, 0x02, 0x02, 0x00, 0x00, 0x80, 0x80, 0x80, 0x80, 0x80, 0x00,

/*-- 文字: > --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x10, 0x18, 0x0C, 0x06, 0x03, 0x01, 0x00, 0x00, 0x10, 0x30, 0x60, 0xC0, 0x80, 0x00, 0x00,

/*-- 文字: ? --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x0C, 0x1C, 0x11, 0x13, 0x1E, 0x0C, 0x00, 0x00, 0x00, 0xB0, 0xB0, 0x00, 0x00, 0x00,

/*-- 文字: @ --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x0F, 0x1F, 0x10, 0x11, 0x13, 0x12, 0x1F, 0x0F, 0xE0, 0xF0, 0x10, 0x90, 0xD0, 0x50, 0xD0, 0xD0,

/*-- 文字: A --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x07, 0x0F, 0x18, 0x18, 0x0F, 0x07, 0x00, 0x00, 0xF0, 0xF0, 0x80, 0x80, 0xF0, 0xF0, 0x00,

/*-- 文字: B --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x11, 0x11, 0x1F, 0x0E, 0x00, 0x00, 0xF0, 0xF0, 0x10, 0x10, 0xF0, 0xE0, 0x00,

/*-- 文字: C --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x0F, 0x1F, 0x10, 0x10, 0x1C, 0x0C, 0x00, 0x00, 0xE0, 0xF0, 0x10, 0x10, 0x70, 0x60, 0x00,

/*-- 文字: D --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x10, 0x18, 0x0F, 0x07, 0x00, 0x00, 0xF0, 0xF0, 0x10, 0x30, 0xE0, 0xC0, 0x00,

/*-- 文字: E --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x11, 0x11, 0x11, 0x10, 0x00, 0x00, 0xF0, 0xF0, 0x10, 0x10, 0x10, 0x10, 0x00,

/*-- 文字: F --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x11, 0x11, 0x11, 0x10, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: G --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x0F, 0x1F, 0x10, 0x10, 0x1C, 0x0C, 0x00, 0x00, 0xE0, 0xF0, 0x10, 0x90, 0xF0, 0xF0, 0x00,

/*-- 文字: H --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x01, 0x01, 0x1F, 0x1F, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x00, 0xF0, 0xF0, 0x00,

/*-- 文字: I --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x00, 0x10, 0x1F, 0x1F, 0x10, 0x00, 0x00, 0x00, 0x00, 0x10, 0xF0, 0x10, 0x00, 0x00,

/*-- 文字: J --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x00, 0x00, 0x00, 0x00, 0x1F, 0x1F, 0x00, 0x00, 0x60, 0x70, 0x10, 0x10, 0xF0, 0xE0, 0x00,

/*-- 文字: K --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x01, 0x07, 0x1E, 0x18, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0xC0, 0xF0, 0x30, 0x00,

/*-- 文字: L --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0xF0, 0xF0, 0x10, 0x10, 0x10, 0x10, 0x00,

/*-- 文字: M --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x04, 0x03, 0x04, 0x1F, 0x1F, 0x00, 0xF0, 0xF0, 0x00, 0x80, 0x00, 0xF0, 0xF0,

/*-- 文字: N --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x06, 0x03, 0x01, 0x1F, 0x1F, 0x00, 0xF0, 0xF0, 0x00, 0x00, 0x80, 0xF0, 0xF0,

/*-- 文字: O --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x0F, 0x1F, 0x10, 0x10, 0x1F, 0x0F, 0x00, 0x00, 0xE0, 0xF0, 0x10, 0x10, 0xF0, 0xE0, 0x00,

/*-- 文字: P --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x11, 0x11, 0x1F, 0x0E, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: Q --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x0F, 0x1F, 0x10, 0x10, 0x1F, 0x0F, 0x00, 0x00, 0xE0, 0xF0, 0x10, 0x18, 0xFC, 0xE4, 0x00,

/*-- 文字: R --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x1F, 0x1F, 0x11, 0x11, 0x1F, 0x0E, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x80, 0xF0, 0x70, 0x00,

/*-- 文字: S --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x0C, 0x1E, 0x13, 0x11, 0x18, 0x08, 0x00, 0x00, 0x20, 0x30, 0x10, 0x90, 0xF0, 0x60, 0x00,

/*-- 文字: T --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/
0x00, 0x10, 0x10, 0x1F, 0x1F, 0x10, 0x10, 0x00, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: U --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16  --*/

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0x00, 0x1F, 0x1F, 0x00, 0x00, 0x1F, 0x1F, 0x00, 0x00, 0xE0, 0xF0, 0x10, 0x10, 0xF0, 0xE0, 0x00,

/*-- 文字: V --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x1F, 0x1F, 0x00, 0x00, 0x1F, 0x1F, 0x00, 0x00, 0xC0, 0xE0, 0x30, 0x30, 0xE0, 0xC0, 0x00,

/*-- 文字: W --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x1F, 0x1F, 0x00, 0x03, 0x00, 0x1F, 0x1F, 0x00, 0x80, 0xF0, 0x70, 0x80, 0x70, 0xF0, 0x80,

/*-- 文字: X --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x18, 0x1C, 0x07, 0x03, 0x1C, 0x18, 0x00, 0x00, 0x70, 0xF0, 0x00, 0x80, 0xF0, 0x70, 0x00,

/*-- 文字: Y --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x1E, 0x1F, 0x01, 0x01, 0x1F, 0x1E, 0x00, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: Z --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x10, 0x10, 0x11, 0x13, 0x1E, 0x1C, 0x00, 0x00, 0x70, 0xF0, 0x90, 0x10, 0x10, 0x10, 0x00,

/*-- 文字: [ --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x1F, 0x1F, 0x10, 0x10, 0x00, 0x00, 0x00, 0x00, 0xFE, 0xFE, 0x02, 0x02, 0x00, 0x00,

/*-- 文字: \ --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x18, 0x1E, 0x07, 0x01, 0x00, 0x00, 0x00, 0x00, 0x00, 0x80, 0xE0, 0x78, 0x18, 0x00,

/*-- 文字: ] --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x10, 0x10, 0x1F, 0x1F, 0x00, 0x00, 0x00, 0x00, 0x02, 0x02, 0xFE, 0xFE, 0x00, 0x00,

/*-- 文字: ^ --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x10, 0x30, 0x60, 0x60, 0x30, 0x10, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: _ --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x02, 0x02, 0x02, 0x02, 0x02, 0x02, 0x02, 0x02, 0x02,

/*-- 文字: ` --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x40, 0x60, 0x70, 0x10, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: a --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x04, 0x04, 0x04, 0x07, 0x03, 0x00, 0x00, 0x60, 0xF0, 0x90, 0xF0, 0xF0, 0x00,

/*-- 文字: b --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x1F, 0x1F, 0x04, 0x04, 0x07, 0x03, 0x00, 0x00, 0xF0, 0xF0, 0x10, 0x10, 0xF0, 0xE0, 0x00,

/*-- 文字: c --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x03, 0x07, 0x04, 0x04, 0x06, 0x02, 0x00, 0x00, 0xE0, 0xF0, 0x10, 0x10, 0x30, 0x20, 0x00,

/*-- 文字: d --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x03, 0x07, 0x04, 0x04, 0x1F, 0x1F, 0x00, 0x00, 0xE0, 0xF0, 0x10, 0x10, 0xF0, 0xF0, 0x00,

/*-- 文字: e --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x03, 0x07, 0x04, 0x04, 0x07, 0x03, 0x00, 0x00, 0xE0, 0xF0, 0x90, 0x90, 0x90, 0x80, 0x00,

/*-- 文字: f --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x01, 0x0F, 0x1F, 0x11, 0x11, 0x11, 0x00, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x00, 0x00, 0x00, 0x00,

/*-- 文字: g --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x03, 0x07, 0x04, 0x04, 0x07, 0x00, 0x00, 0xE2, 0xF2, 0x12, 0x12, 0xFE, 0xFC, 0x00,

/*-- 文字: h --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x1F, 0x1F, 0x04, 0x04, 0x07, 0x03, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x00, 0xF0, 0xF0, 0x00,

/*-- 文字: i --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x04, 0x04, 0x37, 0x37, 0x00, 0x00, 0x00, 0x00, 0x10, 0x10, 0xF0, 0xF0, 0x10, 0x10, 0x00,

/*-- 文字: j --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x00, 0x04, 0x04, 0x37, 0x37, 0x00, 0x00, 0x00, 0x02, 0x02, 0xFE, 0xFC, 0x00, 0x00,

/*-- 文字: k --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x1F, 0x1F, 0x00, 0x01, 0x07, 0x06, 0x00, 0x00, 0xF0, 0xF0, 0x80, 0xC0, 0x70, 0x30, 0x00,

/*-- 文字: l --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x10, 0x10, 0x1F, 0x1F, 0x00, 0x00, 0x00, 0x00, 0x10, 0x10, 0xF0, 0xF0, 0x10, 0x10, 0x00,

/*-- 文字: m --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x07, 0x07, 0x04, 0x07, 0x04, 0x07, 0x03, 0x00, 0xF0, 0xF0, 0x00, 0xE0, 0x00, 0xF0, 0xF0,

/*-- 文字: n --*/
/*-- Fixedsys12: 此字体下对应的点阵为: 宽 x 高=8x16 --*/
0x00, 0x07, 0x07, 0x04, 0x04, 0x07, 0x03, 0x00, 0x00, 0xF0, 0xF0, 0x00, 0x00, 0xF0, 0xF0, 0x00,

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0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0x87, 0x80, 0x80, 0x80, 0x00, 0x7F, 0xE0, 0x00, 0x80, 0xC0, 0x30,
0x08, 0x03, 0x82, 0x66, 0x08, 0x51, 0xA2, 0x54, 0x88, 0x10, 0x20, 0x00, 0x01, 0x06, 0x08, 0x80,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1F, 0x00, 0x00,
0x7F, 0x02, 0x0C, 0xF1, 0x50, 0x10, 0x18, 0x16, 0x10, 0x11, 0x10, 0x00, 0x00, 0x00, 0x00, 0x00,
0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF,
0xFF, 0xFF, 0x7F, 0x3F, 0x1F, 0x0F, 0x07, 0x03, 0x03, 0x01, 0x01, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x60, 0xE0, 0xE0, 0xA0, 0x30, 0x20, 0x68, 0x78, 0x68, 0xF8, 0xF0, 0xE0, 0xC0, 0x00,
0x00, 0x00, 0x00, 0x01, 0x06, 0x18, 0xE0, 0x80, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF,
0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0x3F, 0x0F, 0x07, 0x01, 0xC0, 0x38, 0x08, 0x06, 0x03,
0x3C, 0xC0, 0x23, 0x10, 0x70, 0x00, 0x00, 0x00, 0x00, 0x0C, 0x10, 0x20, 0xFF, 0x80, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0xFE, 0x00, 0x00, 0xFE, 0x84, 0x84, 0xFC, 0x84, 0x84, 0xFE, 0x80, 0x00, 0x00, 0x00, 0x00, 0x00,
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};
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以上规格修改不另通告

深圳市力先电子有限公司