JLX19264G-329-PC

带字库 IC 的编程说明书

目 录

1．概述

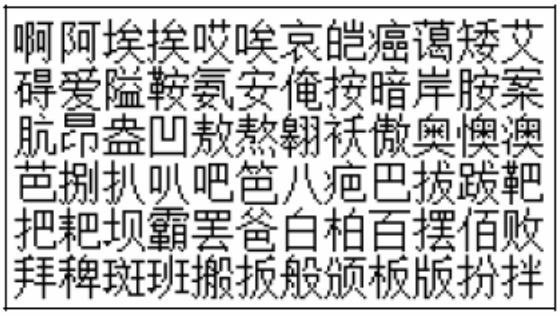
JLX19264G-329-PC 型液晶显示模块既可以当成普通的图像型液晶显示模块使用(即显示普通图像型的单色图片功能)，又含有 JLX-GB2312 字库 IC，可以从字库 IC 中读出内置的字库的点阵数据写入到 LCD 驱动 IC 中，以达到显示汉字的目的。

此字库 IC 存储内容如下表所述：

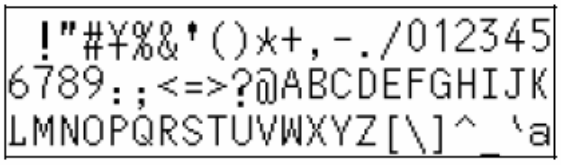
分类	字库内容	编码体系（字符集）	字符数
汉字及字符	15X16 点 GB2312 标准点阵字库	GB2312	6763+376
	8X16 点国标扩展字符 GB2312	GB2312	126
ASCII 字符	5X7 点 ASCII 字符	ASCII	96
	7X8 点 ASCII 字符	ASCII	96
	8X16 点 ASCII 字符	ASCII	96
	8X16 点 ASCII 粗体字符	ASCII	96
	16 点阵不等宽 ASCII 方头（Arial）字符	ASCII	96
	16 点阵不等宽 ASCII 白正（TimesNewRoman）字符	ASCII	96

2. 字型样张：

15X16 点 GB2312 汉字

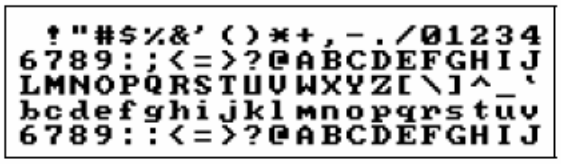


8x16 点国标扩展字符

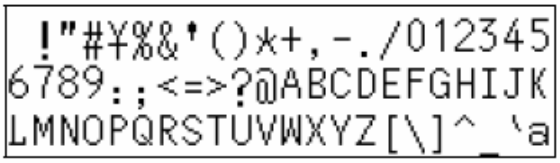


5x7 点 ASCII 字符

7x8 点 ASCII 字符

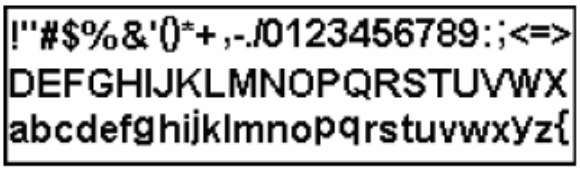


8x16 点 ASCII 字符

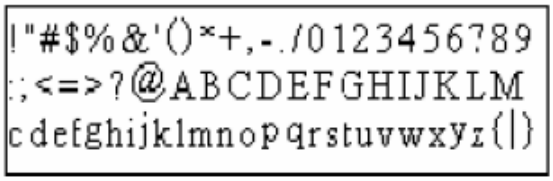


8x16 点 ASCII 粗体字符

16 点阵不等宽 ASCII 方头

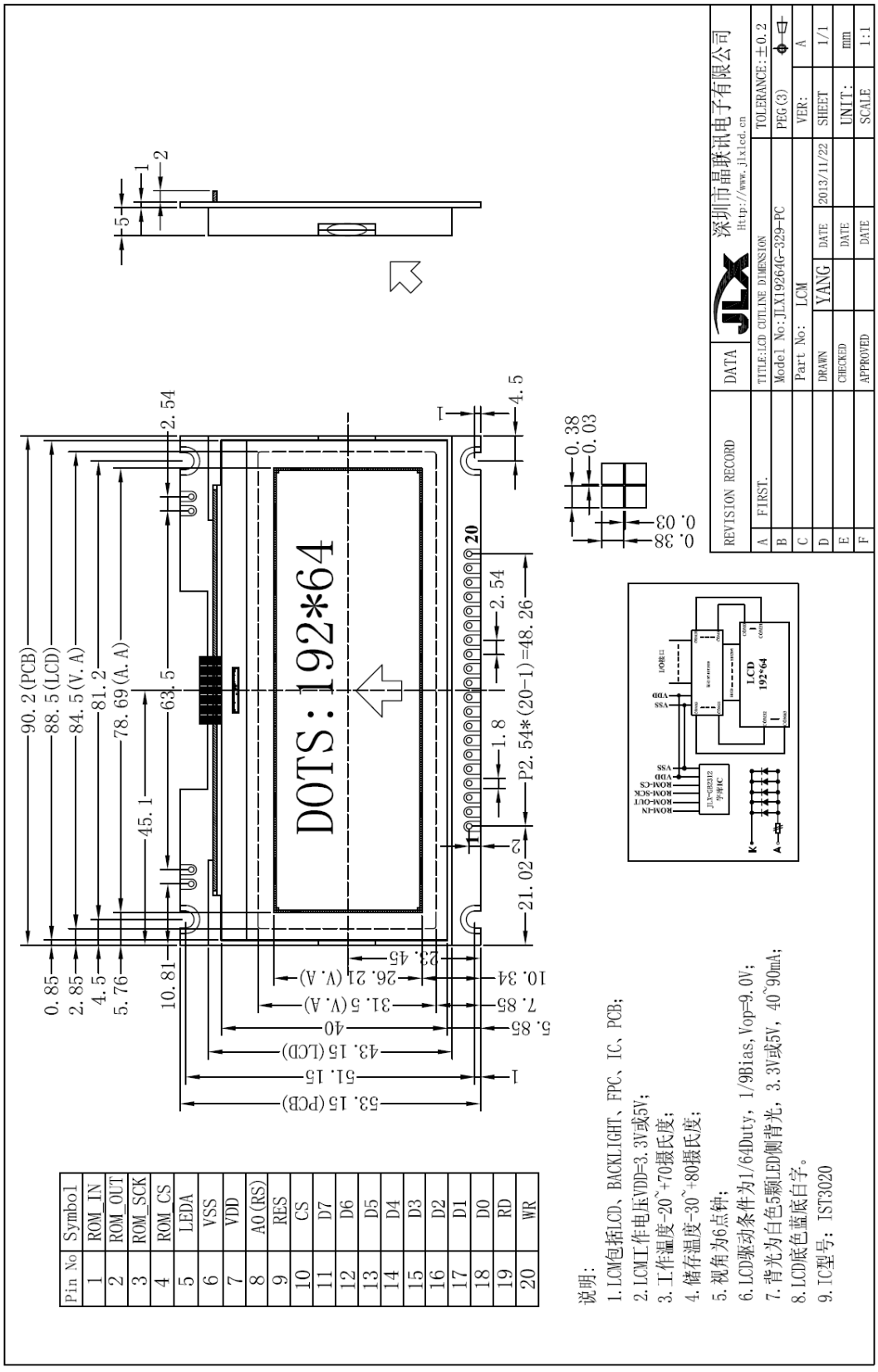


16 点阵不等宽 ASCII 白正



3. 外形尺寸及接口引脚功能

3.1 外形图：



Pin No	Symbol
1	ROM_IN
2	ROM_OUT
3	ROM_SCK
4	ROM_CS
5	LEDA
6	VSS
7	VDD
8	A0(RS)
9	RES
10	CS
11	D7
12	D6
13	D5
14	D4
15	D3
16	D2
17	D1
18	D0
19	RD
20	WR

图 1. 外形尺寸

3.2 模块的接口引脚功能

3.2.1 并行时接口引脚功能

引 线 号	符 号	名 称	功 能	
1	ROM-IN	字库 IC 接口 SI	串行数据输出	详见字库 IC:JLX-GB2312 说明书： ROM-IN 对应字库 IC 接口 SI，ROM-OUT 对应 SO， ROM-SCK 对应 SCLK， ROM-CS 对应 CS#
2	ROM-OUT	字库 IC 接口 SO	串行数据输入	
3	ROM-SCK	字库 IC 接口 SCLK	串行时钟输入	
4	ROM-CS	字库 IC 接口 CS#	片选输入	
5	LEDA	背光电源	背光电源正极，同 VDD 电压（5V 或 3.3V）	
6	VSS	接地	0V	
7	VDD	电路电源	5V,或 3.3V 可选	
8	RS	寄存器选择信号	H:数据寄存器 0:指令寄存器（IC 资料上所写为”A0”）	
9	RES	复位	低电平复位，复位完成后，回到高电平，液晶模块开始工作	
10	CS	片选	低电平片选	
11～18	D7-D0	I/O	数据总线 DB7-DB0	
19	E	使能信号	并行时：使能信号	
20	R/W	读/写	并行时：H:读数据 0:写数据	

表 1：模块并行接口引脚功能

3.2.2 串行时接口引脚功能

引 线 号	符 号	名 称	功 能	
1	ROM-IN	字库 IC 接口 SI	串行数据输出	详见字库 IC:JLX-GB2312 说明书： ROM-IN 对应字库 IC 接口 SI，ROM-OUT 对应 SO， ROM-SCK 对应 SCLK， ROM-CS 对应 CS#
2	ROM-OUT	字库 IC 接口 SO	串行数据输入	
3	ROM-SCK	字库 IC 接口 SCLK	串行时钟输入	
4	ROM-CS	字库 IC 接口 CS#	片选输入	
5	LEDA	背光电源	背光电源正极，同 VDD 电压（5V 或 3.3V）	
6	VSS	接地	0V	
7	VDD	电路电源	5V,或 3.3V 可选	
8	RS	寄存器选择信号	H:数据寄存器 0:指令寄存器（IC 资料上所写为”A0”）	
9	RES	复位	低电平复位，复位完成后，回到高电平，液晶模块开始工作	
10	CS	片选	低电平片选	
11	SDA	I/O	串行数据	
12	SCK	I/O	串行时钟	
13～20	空	空	空	

表 2：模块串行接口引脚功能

4. 工作电路框图：

见图 2，模块由 LCD 驱动 IC IST3020、字库 IC、背光组成。

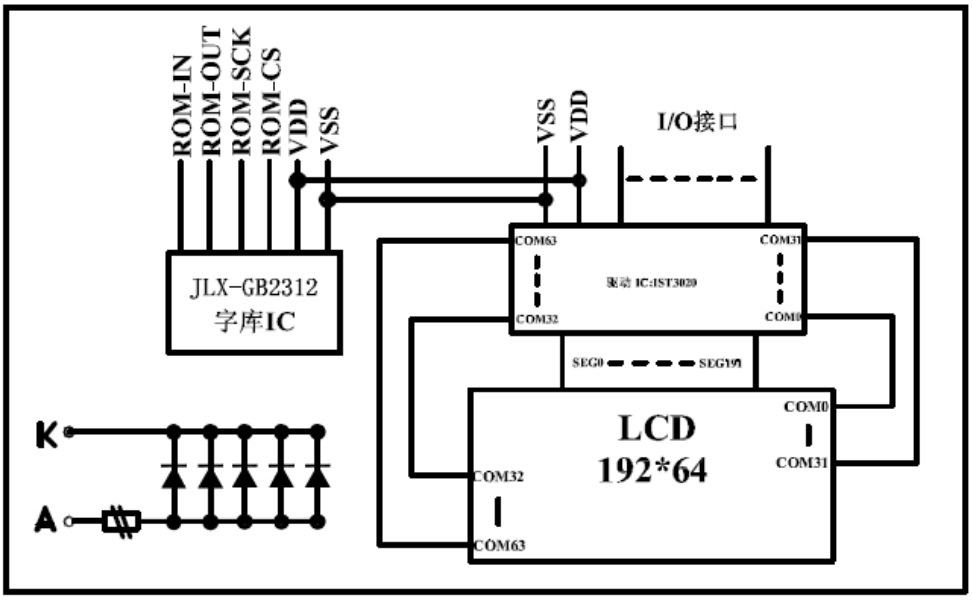


图 2:电路框图

5. 指令：

5.1 字库 IC（JLX-GB2312）指令表

Instruction	Description	Instruction Code(One-Byte)		Address Bytes	Dummy Bytes	Data Bytes
READ	Read Data Bytes	0000 0011	03 h	3	-	1 to ∞
FAST_READ	Read Data Bytes at Higher Speed	0000 1011	0B h	3	1	1 to ∞

所有对本芯片的操作只有 2 个，那就是 Read Data Bytes (READ "一般读取")和 Read Data Bytes at Higher Speed (FAST_READ "快速读取点阵数据")。

Read Data Bytes（一般读取）：

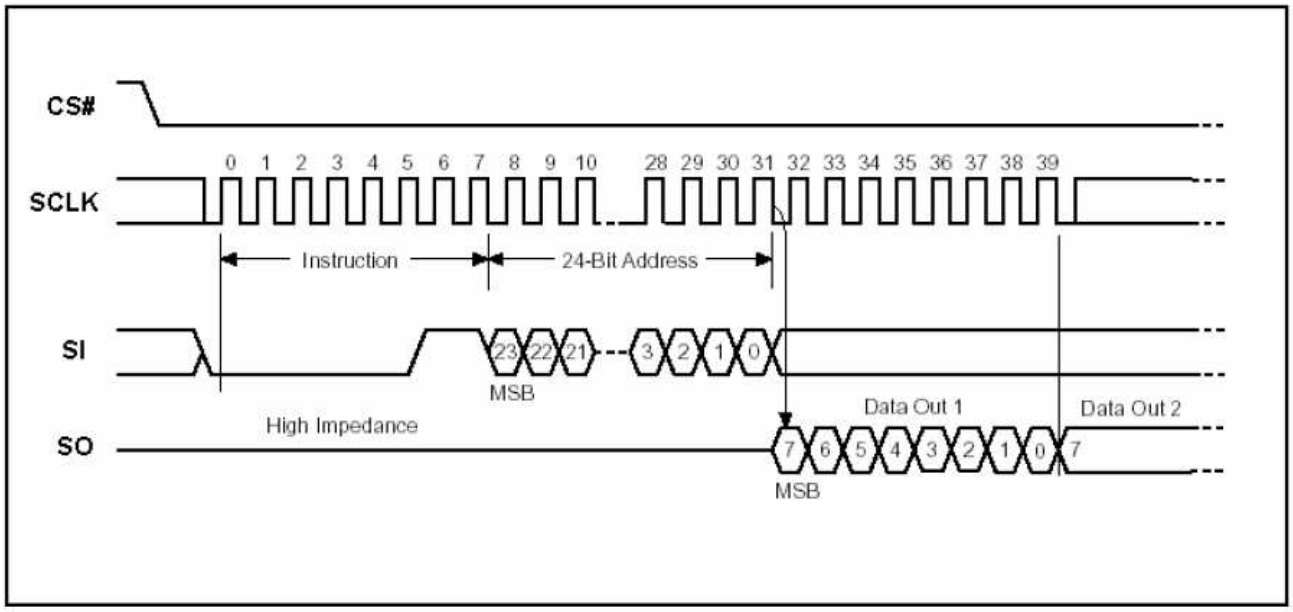
Read Data Bytes 需要用指令码来执行每一次操作。READ 指令的时序如下(图)：

■首先把片选信号（CS#）变为低，紧跟着的是 1 个字节的命令字（03 h）和 3 个字节的地址和通过串行数据输入引脚（SI）移位输入，每一位在串行时钟（SCLK）上升沿被锁存。

■然后该地址的字节数据通过串行数据输出引脚（SO）移位输出，每一位在串行时钟（SCLK）下降沿被移出。

■读取字节数据后，则把片选信号（CS#）变为高，结束本次操作。
如果片选信号（CS#）继续保持为低，则下一个地址的字节数据继续通过串行数据输出引脚（SO）移位输出。

图：Read Data Bytes (READ) Instruction Sequence and Data-out sequence:



Read Data Bytes at Higher speed（快速读取）：

Read Data Bytes at Higher Speed 需要用指令码来执行操作。READ_FAST 指令的时序如下(图)：

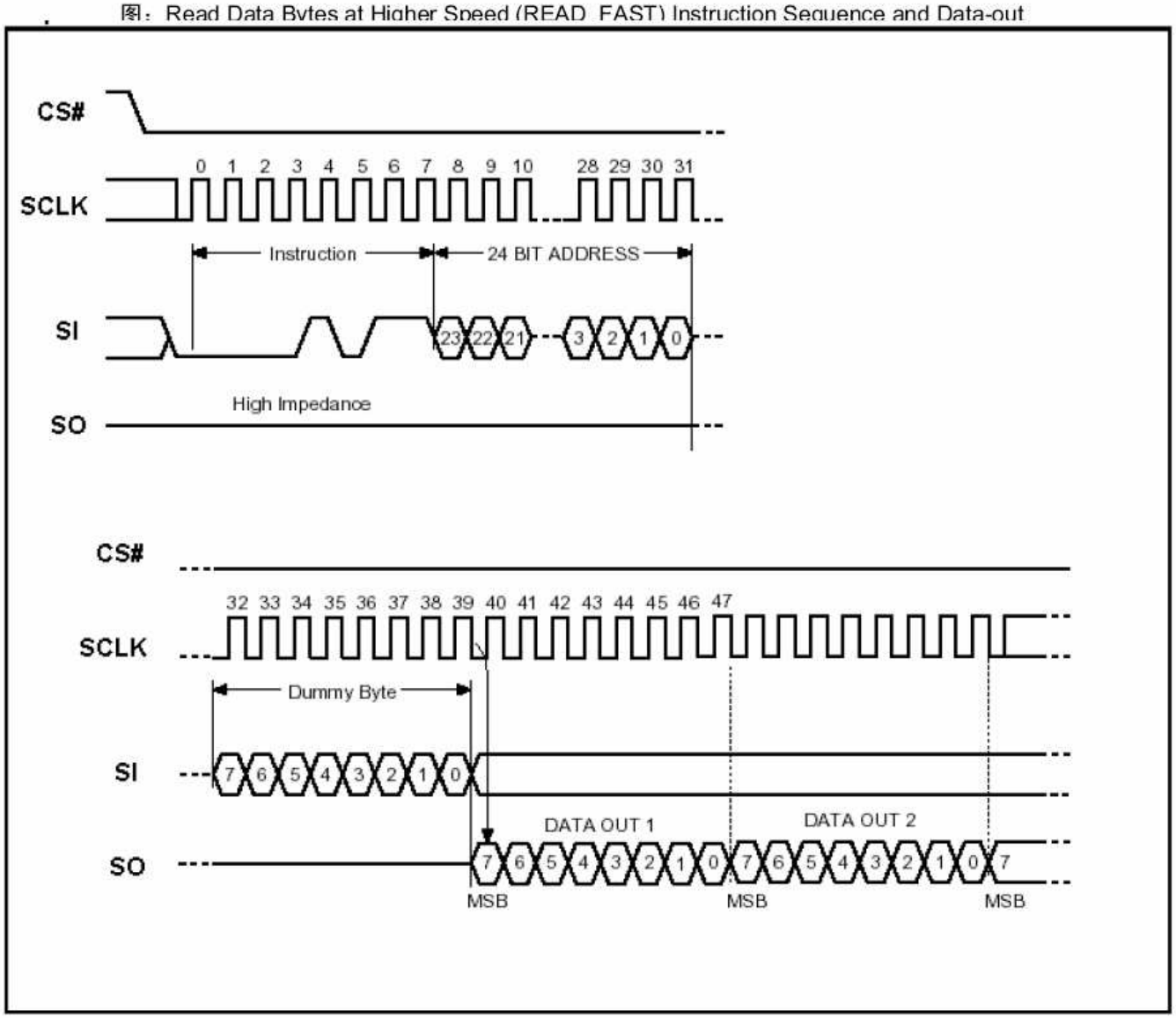
■首先把片选信号（CS#）变为低，紧跟着的是 1 个字节的命令字（0B h）和 3 个字节的地址以及一个字节 Dummy Byte 通过串行数据输入引脚（SI）移位输入，每一位在串行时钟（SCLK）上升沿被锁存。

■然后该地址的字节数据通过串行数据输出引脚（SO）移位输出，每一位在串行时钟（SCLK）下降沿被移出。

■如果片选信号（CS#）继续保持为低，则下一个地址的字节数据继续通过串行数据输出引脚（SO）移位输出。例：读取一个 15x16 点阵汉字需要 32Byte，则连续 32 个字节读取后结束一个汉字的点阵数据读取操作。

如果不需要继续读取数据，则把片选信号（CS#）变为高，结束本次操作。

图：Read Data Bytes at Higher Speed (READ_FAST) Instruction Sequence and Data-out



5.2 LCD 驱动 IC 指令表详见“JLX19264G-329-PC”的中文说明书

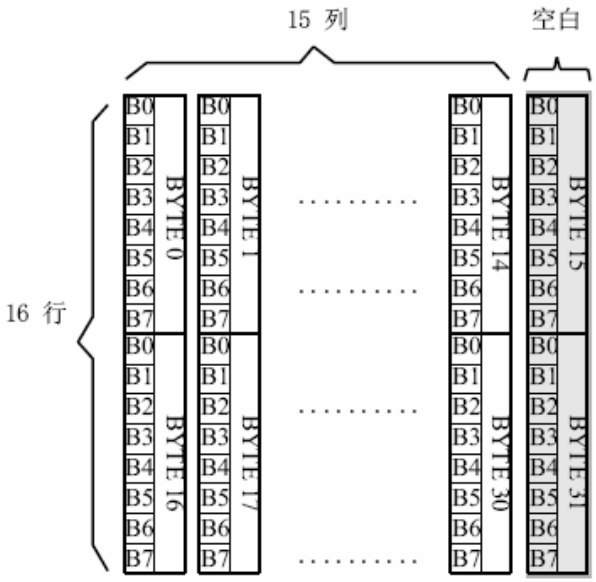
6 字库调用方法

6.1 汉字点阵排列格式

每个汉字在芯片中是以汉字点阵字模的形式存储的，每个点用一个二进制位表示，存 1 的点，当显示时可以在屏幕上显示亮点，存 0 的点，则在屏幕上不显示。点阵排列格式为竖置横排：即一个字节的高位表示下面的点，低位表示上面的点（如果用户按 16bit 总线宽度读取点阵数据，请注意高低字节的序），排满一行后再排下一行。这样把点阵信息用来直接在显示器上按上述规则显示，则将出现对应的汉字。

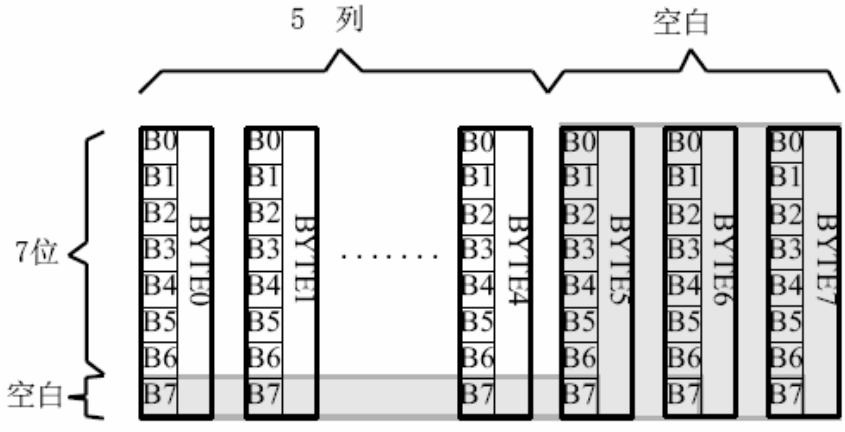
6.1.1 15X16 点汉字排列格式

15X16 点汉字的信息需要 32 个字节（BYTE 0 - BYTE 31）来表示。该 15X16 点汉字的点阵数据是竖置横排的，其具体排列结构如下图：



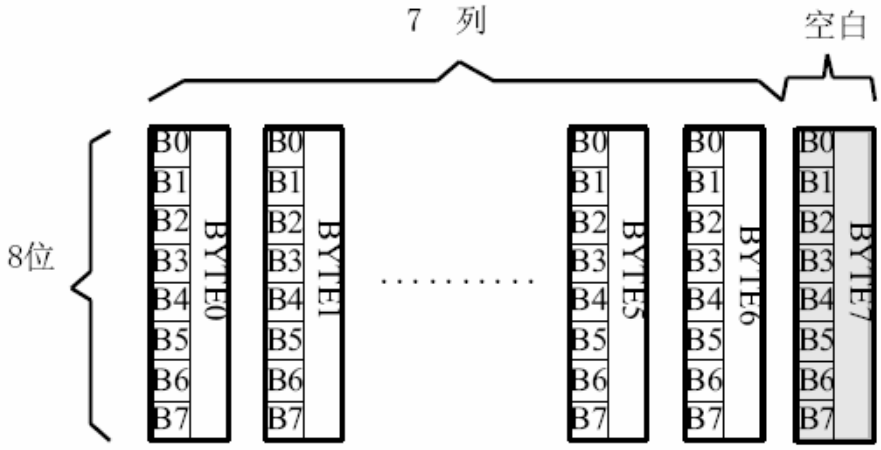
6.1.2 5X7 点 ASCII 字符排列格式

5X7 点 ASCII 的信息需要 8 个字节（BYTE 0 - BYTE7）来表示。该 ASCII 点阵数据是竖置横排的，其具体排列结构如下图：



6.1.3 7X8 点 ASCII 字符排列格式

7X8 点 ASCII 的信息需要 8 个字节（BYTE 0 - BYTE7）来表示。该 ASCII 点阵数据是竖置横排的，其具体排列结构如下图：



6.1.4 8X16 点字符排列格式

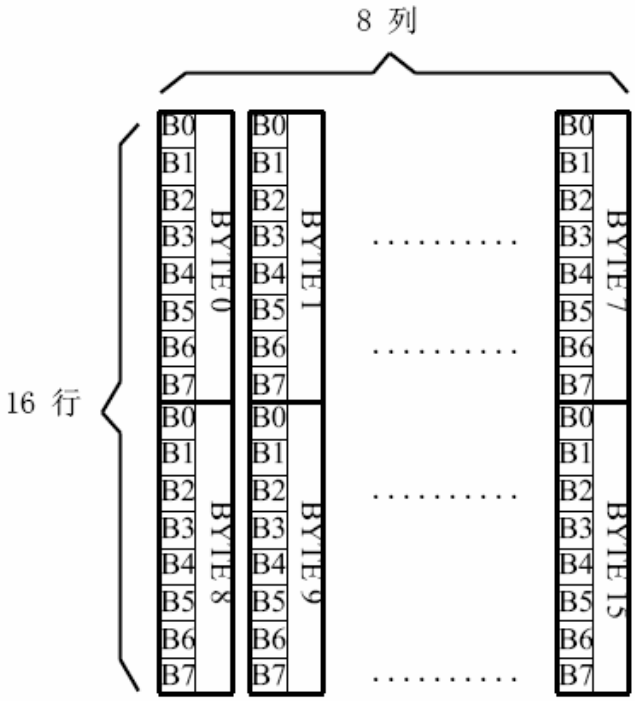
适用于此种排列格式的字体有：

8X16 点 ASCII 字符

8X16 点 ASCII 粗体字符

8X16 点国标扩展字符

8X16 点字符信息需要 16 个字节（BYTE 0 - BYTE15）来表示。该点阵数据是竖置横排的，其具体排列结构如下图：



6.1.5 16 点阵不等宽 ASCII 方头（Arial）、白正（Times New Roman）字符排列格式

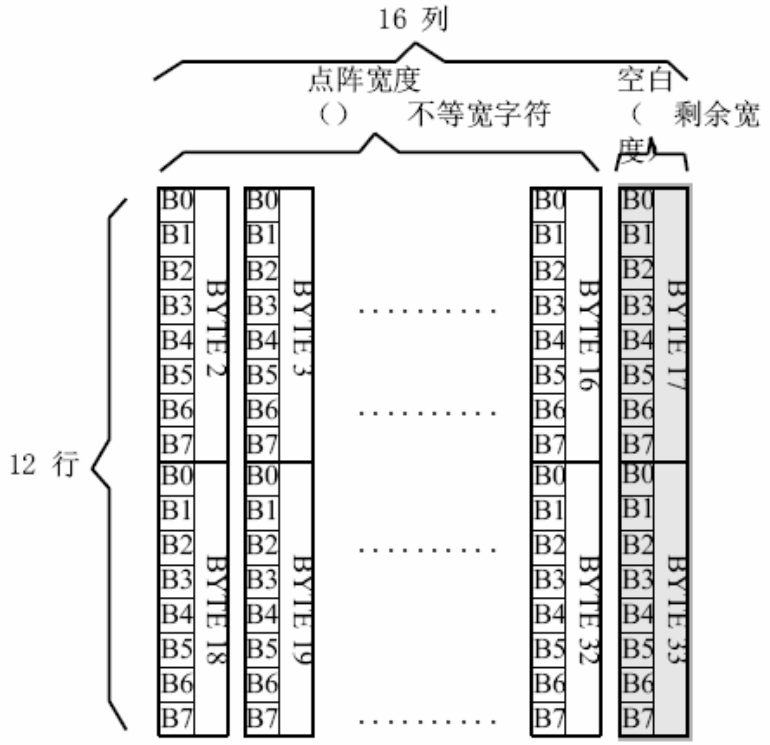
16 点阵不等宽字符的信息需要 34 个字节（BYTE 0 - BYTE33）来表示。

■ 存储格式

由于字符是不等宽的，因此在存储格式中 BYTE0~ BYTE1 存放点阵宽度数据，BYTE2-33 存放竖置横排点阵数据。具体格式见下图：

■ 存储结构

不等宽字符的点阵存储宽度是以 BYTE 为单位取整的，根据不同字符宽度会出现相应的空白区。根 BYTE0~ BYTE1 所存放点阵的实际宽度数据，可以对还原下一个字的显示或排版留作参考。



例如：ASCII 方头字符 B

0-33BYTE 的点阵数据是： 00 0C 00 F8 F8 18 18 18 18 18 F8 F0 00 00 00 00 00 00 00 7F 7F 63 63 63 63 63 67 3E 1C 00 00 00 00 00

其中：

BYTE0~ BYTE1: 00 0C 为 ASCII 方头字符 B 的点阵宽度数据，即：12 位宽度。字符后面有 4 位空白区，可以在排版下一个字时考虑到这一点，将下一个字的起始位置前移。

BYTE2-33: 00 F8 F8 18 18 18 18 18 F8 F0 00 00 00 00 00 00 00 7F 7F 63 63 63 63 63 67 3E 1C 00 00 00 00 00 为 ASCII 方头字符 B 的点阵数据。

6.2 汉字点阵字库地址表

	字库内容	编码体系	码位范围	字符数	起始地址	结束地址	参考算法
1	15X16 点 GB2312 标准点阵字库	GB2312	A1A1-F7FE	6763+376	00000	3B7BF	6.3.1.1
2	7X8 点 ASCII 字符	ASCII	20~7F 96		66C0	69BF	6.3.2.2
3	8X16 点国标扩展字符	GB2312	AAA1-ABC0	126	3B7D0	3BFBF	6.3.1.2
4	8X16 点 ASCII 字符	ASCII	20~7F	96	3B7C0	3BFBF	6.3.2.3
5	5X7 点 ASCII 字符 ASCII		20~7F	96	3BFC0	3C2BF	6.3.2.1
6	16 点阵不等宽 ASCII 方头（Arial）字符	ASCII	20~7F	96	3C2C0	3CF7F	6.3.2.4
7	8X16 点 ASCII 粗体字符 ASCII		20~7F	96	3CF80	3D57F	6.3.2.5
8	16 点阵不等宽 ASCII 白正（TimesNewRoman）字符	ASCII	20~7F	96	3D580	3E23F	6.3.2.6

6.3 字符在芯片中的地址计算方法

用户只要知道字符的内码，就可以计算出该字符点阵在芯片中的地址，然后就可从该地址连续读出点阵信息用于显示。

6.3.1 汉字字符的地址计算

6.3.1.1 15X16 点 GB2312 标准点阵字库

参数说明：

GBCode表示汉字内码。
MSB 表示汉字内码GBCode 的高8bits。
LSB 表示汉字内码GBCode 的低8bits。
Address 表示汉字或ASCII字符点阵在芯片中的字节地址。
BaseAdd：说明点阵数据在字库芯片中的起始地址。

计算方法：

```
BaseAdd=0;
if(MSB ==0xA9 && LSB >=0xA1)
    Address =   (282 + (LSB - 0xA1 ))*32+BaseAdd;
else if(MSB >=0xA1 && MSB <= 0xA3 && LSB >=0xA1)
    Address =( (MSB - 0xA1) * 94 + (LSB - 0xA1))*32+ BaseAdd;
else if(MSB >=0xB0 && MSB <= 0xF7 && LSB >=0xA1)
    Address = ((MSB - 0xB0) * 94 + (LSB - 0xA1)+ 846)*32+ BaseAdd;
```

6.3.1.2 8X16 点国标扩展字符

说明：

BaseAdd：说明本套字库在字库芯片中的起始字节地址。
FontCode：表示字符内码（16bits）
ByteAddress：表示字符点阵在芯片中的字节地址。
计算方法：

```
BaseAdd=0x3b7d0
if (FontCode>= 0xAAA1) and (FontCode<=0xAAFE ) then
    ByteAddress = (FontCode-0xAAA1 ) * 16+BaseAdd
Else if(FontCode>= 0xABA1) and (FontCode<=0xABC0 ) then
    ByteAddress = (FontCode-0xABA1 + 95) * 16+BaseAdd
```

6.3.2 ASCII 字符的地址计算

6.3.2.1 5X7 点 ASCII 字符

参数说明：

ASCIICode：表示 ASCII 码（8bits）
BaseAdd：说明该套字库在芯片中的起始地址。
Address：ASCII 字符点阵在芯片中的字节地址。
计算方法：

```
BaseAdd=0x3bfc0
```

if (ASCIICode >= 0x20) and (ASCIICode <= 0x7E) then

Address = (ASCIICode -0x20) * 8+BaseAdd

6.3.2.2 7X8 点 ASCII 字符

参数说明：

ASCIICode：表示 ASCII 码（8bits）

BaseAdd：说明该套字库在芯片中的起始地址。

Address：ASCII 字符点阵在芯片中的字节地址。

计算方法：

BaseAdd=0x66c0

if (ASCIICode >= 0x20) and (ASCIICode <= 0x7E) then

Address = (ASCIICode -0x20) * 8+BaseAdd

6.3.2.3 8X16 点 ASCII 字符

说明：

ASCIICode：表示 ASCII 码（8bits）

BaseAdd：说明该套字库在芯片中的起始地址。

Address：ASCII 字符点阵在芯片中的字节地址。

计算方法：

BaseAdd=0x3b7c0

if (ASCIICode >= 0x20) and (ASCIICode <= 0x7E) then

Address = (ASCIICode -0x20) * 16+BaseAdd

6.3.2.4 16 点阵不等宽 ASCII 方头（Arial）字符

说明：

ASCIICode：表示 ASCII 码（8bits）
BaseAdd：说明该套字库在芯片中的起始地址。
Address：ASCII 字符点阵在芯片中的字节地址。
计算方法：

```
BaseAdd=0x3c2c0
if (ASCIICode >= 0x20) and (ASCIICode <= 0x7E) then
    Address = (ASCIICode -0x20 ) * 34 + BaseAdd
```

6.3.2.5 8X16 点 ASCII 粗体字符

说明：

ASCIICode：表示 ASCII 码（8bits）
BaseAdd：说明该套字库在芯片中的起始地址。
Address：ASCII 字符点阵在芯片中的字节地址。
计算方法：

```
BaseAdd=0x3cf80
if (ASCIICode >= 0x20) and (ASCIICode <= 0x7E) then
    Address = (ASCIICode -0x20 ) * 16+BaseAdd
```

6.3.2.6 16 点阵不等宽 ASCII 白正（Times New Roman）字符

说明：

ASCIICode：表示 ASCII 码（8bits）
BaseAdd：说明该套字库在芯片中的起始地址。
Address：ASCII 字符点阵在芯片中的字节地址。
计算方法：

```
BaseAdd=0x3d580
if (ASCIICode >= 0x20) and (ASCIICode <= 0x7E) then
    Address = (ASCIICode -0x20 ) * 34 + BaseAdd
```

6.4 附录

6.4.1 GB2312 1 区（376 字符）

GB2312 标准点阵字符 1 区对应码位的 A1A1~A9EF 共计 376 个字符；

GB2312 1 区

A1	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
A			、	。	·	ˉ	ˇ	¨	〃	々	—	～	‖	…	‘	’
B	“	”	〔	〕	〈	〉	《	》	「	」	『	』	〖	〗	【	】
C	±	×	÷	∶	∧	∨	∑	∏	∪	∩	∈	∷	√	⊥	∥	∠
D	⌒	⊙	∫	∮	≡	≌	≈	∽	∝	≠	≮	≯	≤	≥	∞	∵
E	∴	♂	♀	°	′	″	℃	$	¤	￠	￡	‰	§	№	☆	★
F	○	●	◎	◇	◆	□	■	△	▲	※	→	←	↑	↓	〓	

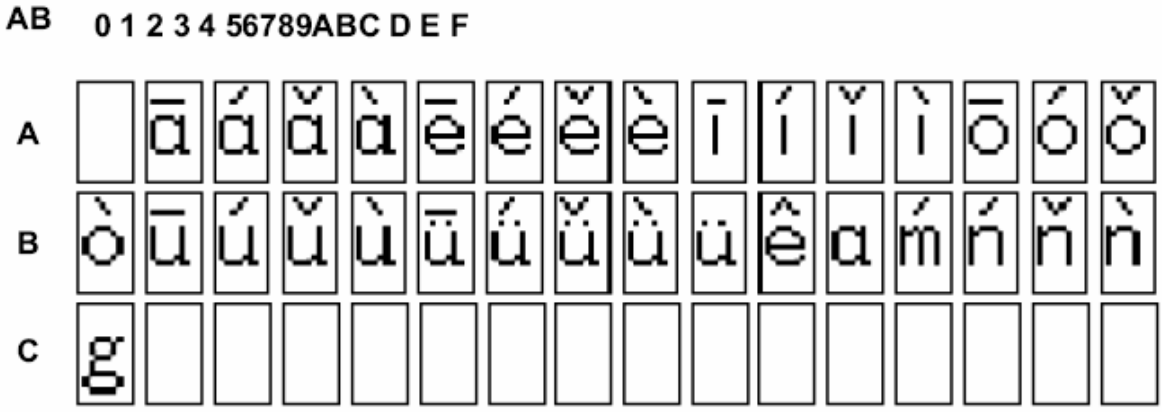
A2	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
A																
B		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
C	16.	17.	18.	19.	20.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
D	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	①	②	③	④	⑤	⑥	⑦
E	⑧	⑨	⑩	€		㈠	㈡	㈢	㈣	㈤	㈥	㈦	㈧	㈨	㈩	
F		Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅴ	Ⅵ	Ⅶ	Ⅷ	Ⅸ	Ⅹ	Ⅺ	Ⅻ			

A3	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
A		！	＂	＃	￥	％	＆	＇	（	）	＊	＋	，	－	．	／
B	０	１	２	３	４	５	６	７	８	９	：	；	＜	＝	＞	？
C	＠	Ａ	Ｂ	Ｃ	Ｄ	Ｅ	Ｆ	Ｇ	Ｈ	Ｉ	Ｊ	Ｋ	Ｌ	Ｍ	Ｎ	Ｏ
D	Ｐ	Ｑ	Ｒ	Ｓ	Ｔ	Ｕ	Ｖ	Ｗ	Ｘ	Ｙ	Ｚ	［	＼	］	＾	＿
E	‘	ａ	ｂ	ｃ	ｄ	ｅ	ｆ	ｇ	ｈ	ｉ	ｊ	ｋ	ｌ	ｍ	ｎ	ｏ
F	ｐ	ｑ	ｒ	ｓ	ｔ	ｕ	ｖ	ｗ	ｘ	ｙ	ｚ	｛	｜	｝	￣	

A9	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
A					─	━	│	┃	┄	┅	┆	┇	┈	┉	┊	┋
B	┌	┍	┎	┏	┐	┑	┒	┓	└	┕	┖	┗	┘	┙	┚	┛
C	├	┝	┞	┟	┠	┡	┢	┣	┤	┥	┦	┧	┨	┩	┪	┫
D	┬	┭	┮	┯	┰	┱	┲	┳	┴	┵	┶	┷	┸	┹	┺	┻
E	┼	┽	┾	┿	╀	╁	╂	╃	╄	╅	╆	╇	╈	╉	╊	╋
F																

6.4.2 8×16点国标扩展字符

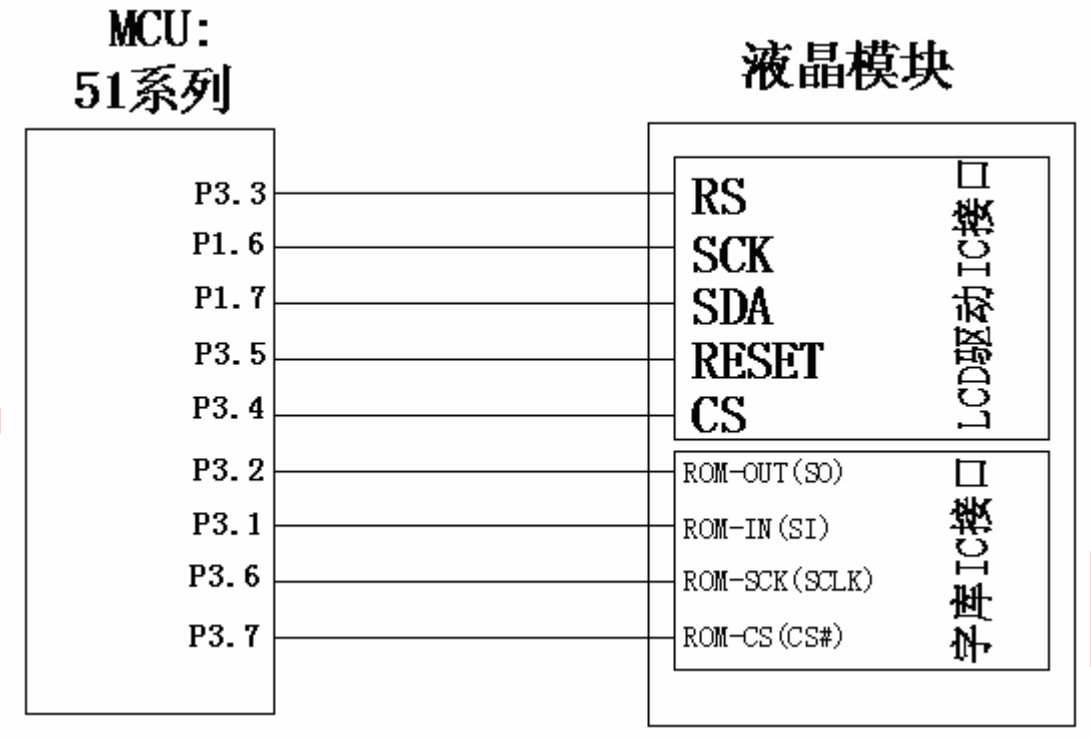
内码组成为 AAA1~ABC0 共计 126 个字符



7. 硬件设计及例程：

7.1 当 LCD 驱动 IC 采用串行接口方式时的硬件设计及例程：

7.1.1 硬件接口：下图为串行方式的硬件接口：



7.1.2 例程：以下为串行方式显示汉字及 ASCII 字符的例程：

```
/* Test program for JLX12864G-329-PC-P，串行接口，带中文字库 IC
   驱动 IC 是:IST3020(or competible),字库 IC:JLX-GB2312
   晶联讯电子：网址  http://www.jlxlcd.cn;
*/
#include <reg51.H>
#include <intrins.h>

sbit lcd_rs=P3^3;     /*接口定义:lcd_rs 就是 LCD 的 rs*/
sbit lcd_sclk=P1^6;   /*接口定义:lcd_sclk 就是 LCD 的 sclk*/
sbit lcd_sid=P1^7;    /*接口定义:lcd_sid 就是 LCD 的 sid*/
sbit lcd_reset=P3^5;  /*接口定义:lcd_reset 就是 LCD 的 reset*/
sbit lcd_cs1=P3^4;    /*接口定义:lcd_cs1 就是 LCD 的 cs1*/

sbit Rom_OUT=P3^2;    /*字库 IC 接口定义:Rom_OUT 就是字库 IC 的 SO*/
sbit Rom_IN=P3^1;     /*字库 IC 接口定义:Rom_IN 就是字库 IC 的 SI*/
sbit Rom_SCK=P3^7;    /*字库 IC 接口定义:Rom_SCK 就是字库 IC 的 SCK*/
sbit Rom_CS=P3^6;     /*字库 IC 接口定义 Rom_CS 就是字库 IC 的 CS#*/
```

```
#define uchar unsigned char
#define uint unsigned int
#define ulong unsigned long

uchar code bmp1[];
uchar code bmp2[];
void delay_us(int i);

uchar code jiong1[]={/*--  文字:  囧  --*/
/*--  宋体 12;  此字体下对应的点阵为：宽 x 高=16x16   --*/
0x00,0xFE,0x82,0x42,0xA2,0x9E,0x8A,0x82,0x86,0x8A,0xB2,0x62,0x02,0xFE,0x00,0x00,
0x00,0x7F,0x40,0x40,0x7F,0x40,0x40,0x40,0x40,0x40,0x7F,0x40,0x40,0x7F,0x00,0x00};

uchar code lei1[]={/*--  文字:  晶  --*/
/*--  宋体 12;  此字体下对应的点阵为：宽 x 高=16x16   --*/
0x80,0x80,0x80,0xBF,0xA5,0xA5,0xA5,0x3F,0xA5,0xA5,0xA5,0xBF,0x80,0x80,0x80,0x00,
0x7F,0x24,0x24,0x3F,0x24,0x24,0x7F,0x00,0x7F,0x24,0x24,0x3F,0x24,0x24,0x7F,0x00};


/*写指令到 LCD 模块*/
void transfer_command_lcd(int data1)
{
 char i;
 lcd_cs1=0;
 lcd_rs=0;
 for(i=0;i<8;i++)
   {
     lcd_sclk=0;
     delay_us(1);
     if(data1&0x80) lcd_sid=1;
     else lcd_sid=0;
     lcd_sclk=1;
     delay_us(1);
     data1=data1<<=1;
   }
   lcd_cs1=1;
}

/*写数据到 LCD 模块*/
void transfer_data_lcd(int data1)
{
 char i;
 lcd_cs1=0;
 lcd_rs=1;
 for(i=0;i<8;i++)
   {
```

```
      lcd_sclk=0;
      if(data1&0x80) lcd_sid=1;
      else lcd_sid=0;
      lcd_sclk=1;
      data1=data1<<=1;
    }
 lcd_cs1=1;
}


/*延时*/
void delay(int i)
{
 int j,k;
 for(j=0;j<i;j++)
 for(k=0;k<500;k++);
}

/*短延时*/
void delay_us(int i)
{
 int j,k;
 for(j=0;j<i;j++)
 for(k=0;k<2;k++);
}


/*等待一个按键，我的主板是用 P2.0 与 GND 之间接一个按键*/
void waitkey()
{
 repeat:
      if (P2&0x01) goto repeat;
 else delay(60);
 if (P2&0x01) goto repeat;
 else
 delay(400);
}


/*LCD 模块初始化*/
void initial_lcd()
{
 lcd_cs1=0;
 Rom_CS = 1;
    lcd_reset=0;                    /*低电平复位*/
    delay(20);
```

```
    lcd_reset=1;              /*复位完毕*/
    delay(20);
 transfer_command_lcd(0xAB); //开启内部晶振电路
 transfer_command_lcd(0xe2);  /*软复位*/
 delay(5);
 transfer_command_lcd(0x2c);  /*升压步聚 1*/
 delay(5);
 transfer_command_lcd(0x2e);  /*升压步聚 2*/
 delay(5);
 transfer_command_lcd(0x2f);  /*升压步聚 3*/
 delay(5);
 transfer_command_lcd(0xA2); //BIAS 设置
 transfer_command_lcd(0x24);  /*粗调对比度，可设置范围 0x20～0x27*/
 transfer_command_lcd(0x81);  /*微调对比度*/
 transfer_command_lcd(0x14);  /*0x1a,微调对比度的值，可设置范围 0x00～0x3f*/
 transfer_command_lcd(0xa2);  /*1/9 偏压比（bias）*/
 transfer_command_lcd(0xc0);  /*行扫描顺序：从上到下*/
 transfer_command_lcd(0xa1);  /*列扫描顺序：从左到右*/
 transfer_command_lcd(0x40);  /*起始行：第一行开始*/
 transfer_command_lcd(0xaf);  /*开显示*/
 lcd_cs1=1;
}

void lcd_address(uint page,uint column)
{

 column=column+31;
 transfer_command_lcd(0xb0+page-1);   /*设置页地址*/
 transfer_command_lcd(0x10+(column>>4&0x0f));   /*设置列地址的高 4 位*/
 transfer_command_lcd(column&0x0f);   /*设置列地址的低 4 位*/
}

/*全屏清屏*/
void clear_screen()
{
 unsigned char i,j;
 lcd_cs1=0;
 Rom_CS = 1;
 for(i=0;i<9;i++)
 {
      lcd_address(1+i,1);
      for(j=0;j<224;j++)
      {
           transfer_data_lcd(0x00);
      }
 }
```

```
    lcd_cs1=1;
}

/*显示 196x64 点阵图像*/
void display_192x64(uchar *dp)
{
 uint i,j;
 lcd_cs1=0;
 for(j=0;j<8;j++)
 {
    lcd_address(j+1,1);
    for (i=0;i<192;i++)
    {
        transfer_data_lcd(*dp);                    /*写数据到 LCD,每写完一个 8 位的数据后列地址自动加 1*/
        dp++;
    }
 }
 lcd_cs1=1;
}

/*显示 16x16 点阵图像、汉字、生僻字或 16x16 点阵的其他图标*/
void display_graphic_16x16(uint page,uint column,uchar *dp)
{
 uint i,j;
    lcd_cs1=0;
 Rom_CS = 1;
 for(j=0;j<2;j++)
 {
    lcd_address(page+j,column);
    for (i=0;i<16;i++)
    {
        transfer_data_lcd(*dp);                    /*写数据到 LCD,每写完一个 8 位的数据后列地址自动加 1*/
        dp++;
    }
 }
 lcd_cs1=1;
}

/*显示 8x16 点阵图像、ASCII, 或 8x16 点阵的自造字符、其他图标*/
void display_graphic_8x16(uint page,uchar column,uchar *dp)
{
 uint i,j;
 lcd_cs1=0;
 for(j=0;j<2;j++)
```

```
 {
      lcd_address(page+j,column);
      for (i=0;i<8;i++)
      {
           transfer_data_lcd(*dp);                    /*写数据到 LCD,每写完一个 8 位的数据后列地址自动加 1*/
           dp++;
      }
 }
 lcd_cs1=1;
}


/*显示 5*7 点阵图像、ASCII, 或 5x7 点阵的自造字符、其他图标*/
void display_graphic_5x7(uint page,uchar column,uchar *dp)
{
 uint col_cnt;
 uchar page_address;
 uchar column_address_L,column_address_H;
 column=column+32;
 page_address = 0xb0+page-1;
 lcd_cs1=0;
 column_address_L =(column&0x0f)-1;
 column_address_H =((column>>4)&0x0f)+0x10;

 transfer_command_lcd(page_address);       /*Set Page Address*/
 transfer_command_lcd(column_address_H);   /*Set MSB of column Address*/
 transfer_command_lcd(column_address_L);   /*Set LSB of column Address*/

 for (col_cnt=0;col_cnt<6;col_cnt++)
 {
      transfer_data_lcd(*dp);
      dp++;
 }
 lcd_cs1=1;
}

/****送指令到晶联讯字库 IC***/
void send_command_to_ROM( uchar datu )
{
 uchar i;
 for(i=0;i<8;i++ )
 {
      if(datu&0x80)
           Rom_IN = 1;
      else
           Rom_IN = 0;
```

```
            datu = datu<<1;
            Rom_SCK=0;
            Rom_SCK=1;
    }
}

/****从晶联讯字库 IC 中取汉字或字符数据（1 个字节）***/
static uchar get_data_from_ROM( )
{

 uchar i;
 uchar ret_data=0;
 Rom_SCK=1;
 for(i=0;i<8;i++)
 {
      Rom_OUT=1;
      Rom_SCK=0;
      ret_data=ret_data<<1;
      if( Rom_OUT )
           ret_data=ret_data+1;
      else
           ret_data=ret_data+0;
      Rom_SCK=1;
 }
 return(ret_data);
}

/*从相关地址（addrHigh：地址高字节,addrMid：地址中字节,addrLow：地址低字节）中连续读出 DataLen 个字节的数据到 pBuff 的地址*/
/*连续读取*/
void get_n_bytes_data_from_ROM(uchar addrHigh,uchar addrMid,uchar addrLow,uchar *pBuff,uchar DataLen )
{
 uchar i;
 Rom_CS = 0;
 lcd_cs1=1;
 Rom_SCK=0;
 send_command_to_ROM(0x03);
 send_command_to_ROM(addrHigh);
 send_command_to_ROM(addrMid);
 send_command_to_ROM(addrLow);
 for(i = 0; i < DataLen; i++ )
      *(pBuff+i) =get_data_from_ROM();
 Rom_CS = 1;
}
```

```
/*********************************************************************/

ulong  fontaddr=0;
void display_GB2312_string(uchar y,uchar x,uchar *text)
{
 uchar i= 0;
 uchar addrHigh,addrMid,addrLow ;
 uchar fontbuf[32];
 while((text[i]>0x00))
 {
     if(((text[i]>=0xb0) &&(text[i]<=0xf7))&&(text[i+1]>=0xa1))
     {
         /*国标简体（GB2312）汉字在晶联讯字库 IC 中的地址由以下公式来计算：*/
         /*Address = ((MSB - 0xB0) * 94 + (LSB - 0xA1)+ 846)*32+ BaseAdd;BaseAdd=0*/
         /*由于担心 8 位单片机有乘法溢出问题，所以分三部取地址*/
         fontaddr = (text[i]- 0xb0)*94;
         fontaddr += (text[i+1]-0xa1)+846;
         fontaddr = (ulong)(fontaddr*32);

         addrHigh = (fontaddr&0xff0000)>>16;  /*地址的高 8 位,共 24 位*/
         addrMid = (fontaddr&0xff00)>>8;      /*地址的中 8 位,共 24 位*/
         addrLow = fontaddr&0xff;             /*地址的低 8 位,共 24 位*/
         get_n_bytes_data_from_ROM(addrHigh,addrMid,addrLow,fontbuf,32 );/*取 32 个字节的数据，存到"fontbuf[32]"*/
         display_graphic_16x16(y,x,fontbuf);/*显示汉字到 LCD 上，y 为页地址，x 为列地址，fontbuf[]为数据*/
         i+=2;
         x+=16;
     }
     else if(((text[i]>=0xa1) &&(text[i]<=0xa3))&&(text[i+1]>=0xa1))
     {
         /*国标简体（GB2312）15x16 点的字符在晶联讯字库 IC 中的地址由以下公式来计算：*/
         /*Address = ((MSB - 0xa1) * 94 + (LSB - 0xA1))*32+ BaseAdd;BaseAdd=0*/
         /*由于担心 8 位单片机有乘法溢出问题，所以分三部取地址*/
         fontaddr = (text[i]- 0xa1)*94;
         fontaddr += (text[i+1]-0xa1);
         fontaddr = (ulong)(fontaddr*32);

         addrHigh = (fontaddr&0xff0000)>>16;  /*地址的高 8 位,共 24 位*/
         addrMid = (fontaddr&0xff00)>>8;      /*地址的中 8 位,共 24 位*/
         addrLow = fontaddr&0xff;             /*地址的低 8 位,共 24 位*/
         get_n_bytes_data_from_ROM(addrHigh,addrMid,addrLow,fontbuf,32 );/*取 32 个字节的数据，存到"fontbuf[32]"*/
         display_graphic_16x16(y,x,fontbuf);/*显示汉字到 LCD 上，y 为页地址，x 为列地址，fontbuf[]为数据*/
         i+=2;
         x+=16;
     }
```

```
    else if((text[i]>=0x20) &&(text[i]<=0x7e))
    {
        unsigned char fontbuf[16];
        fontaddr = (text[i]- 0x20);
        fontaddr = (unsigned long)(fontaddr*16);
        fontaddr = (unsigned long)(fontaddr+0x3cf80);
        addrHigh = (fontaddr&0xff0000)>>16;
        addrMid = (fontaddr&0xff00)>>8;
        addrLow = fontaddr&0xff;

        get_n_bytes_data_from_ROM(addrHigh,addrMid,addrLow,fontbuf,16 );/*取 16 个字节的数据，存到"fontbuf[32]"*/

        display_graphic_8x16(y,x,fontbuf);/*显示 8x16 的 ASCII 字到 LCD 上，y 为页地址，x 为列地址，fontbuf[]为数据*/
        i+=1;
        x+=8;
    }
    else
        i++;
 }

}

void display_string_5x7(uchar y,uchar x,uchar *text)
{
 unsigned char i= 0;
 unsigned char addrHigh,addrMid,addrLow ;
 while((text[i]>0x00))
 {

    if((text[i]>=0x20) &&(text[i]<=0x7e))
    {
        unsigned char fontbuf[8];
        fontaddr = (text[i]- 0x20);
        fontaddr = (unsigned long)(fontaddr*8);
        fontaddr = (unsigned long)(fontaddr+0x3bfc0);
        addrHigh = (fontaddr&0xff0000)>>16;
        addrMid = (fontaddr&0xff00)>>8;
        addrLow = fontaddr&0xff;

        get_n_bytes_data_from_ROM(addrHigh,addrMid,addrLow,fontbuf,8);/*取 8 个字节的数据，存到"fontbuf[32]"*/

        display_graphic_5x7(y,x,fontbuf);/*显示 5x7 的 ASCII 字到 LCD 上，y 为页地址，x 为列地址，fontbuf[]为数据*/
        i+=1;
        x+=6;
    }
    else
```

```
        i++;
    }

}
//==============main program==================
void main(void)
{
 while(1)
 {
        Rom_CS=1;
        lcd_cs1=0;
        initial_lcd();
        clear_screen();    //clear all dots
        display_192x64(bmp1);
        waitkey();
        clear_screen();    //clear all dots
        display_192x64(bmp2);
        waitkey();
        clear_screen();
        display_GB2312_string(1,1,"JLX19264G-329,带中文字库");  /*在第 1 页，第 1 列，显示一串 16x16 点阵汉字或 8x16 的 ASCII
                                                                字*/
        display_GB2312_string(3,1,"GB2312 简体字库及图型功能");
        display_GB2312_string(5,1,"16X16 简体汉字库,或 8X16 点");  /*显示一串 16x16 点阵汉字或 8x16 的 ASCII 字.以下雷同*/
        display_GB2312_string(7,1,"阵 ASCII,或 5X7 点阵 ASCII 码");
        waitkey();
        clear_screen();
        display_GB2312_string(1,1,"abcdefghijklmnopqrstuvwxyz");     /*在第 1 页，第 1 列，显示一串 16x16 点阵汉字或 8*16 的
                                                                ASCII 字*/
        display_string_5x7(3,1,"abcdefghijklmnopqrstuvwxyzABCDEF");/*在第 3 页，第 1 列，显示一串 5x7 点阵的 ASCII 字*/
        display_string_5x7(4,1,"ABCDEFGHIJKLMNOPQRSTUVWXYZ123456");/*显示一串 5x7 点阵的 ASCII 字*/
        display_string_5x7(5,1,"JLX electronics Co.,Ltd.established");/*显示一串 5x7 点阵的 ASCII 字*/
        display_string_5x7(6,1,"hed at year 2004.Focus LCM.  ");/*显示一串 5x7 点阵的 ASCII 字*/
        display_string_5x7(7,1,"TEL:0755-29784961-816");/*显示一串 5x7 点阵的 ASCII 字*/
        display_string_5x7(8,1,"FAX:0755-29784964    ");/*显示一串 5x7 点阵的 ASCII 字*/
        waitkey();
 }
}

uchar code bmp1[]={
/*--  调入了一幅图像：C:\Documents and Settings\Administrator\桌面\JLX19264G-329 回字框.bmp  --*/
/*--  宽度 x 高度=192x64  --*/
0xFF,0x01,0x01,0x01,0x01,0xFD,0x05,0x05,0x05,0x05,0xF5,0x15,0x15,0x15,0x15,0xD5,
0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,
0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,
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0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,0x55,
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0xAB, 0xA8, 0xA8, 0xA8, 0xA8, 0xAF, 0xA0, 0xA0, 0xA0, 0xA0, 0xBF, 0x80, 0x80, 0x80, 0x80, 0xFF,
```

```
};

uchar code bmp2[]={
/*--  调入了一幅图像：E:\work\图片收藏夹\黑白屏图片\JLX19264G-329-PC.bmp  --*/
/*--  宽度 x 高度=192x64  --*/
0xFF,0x81,0x11,0x21,0x01,0x41,0x31,0x91,0x51,0x11,0x11,0x51,0x91,0x51,0x31,0x01,
0x01,0x81,0x81,0xF9,0x81,0x81,0x01,0xF9,0x01,0x01,0xF1,0x01,0x01,0xF9,0x01,0x01,
0x01,0x21,0x21,0x21,0x21,0x21,0x29,0xF1,0x21,0x21,0x21,0x21,0x21,0x31,0x21,0x01,
0x01,0x01,0x01,0x01,0x01,0xF1,0x51,0x51,0x51,0x51,0x51,0xF9,0x11,0x01,0x01,0x01,
0x01,0x11,0xF1,0x91,0x91,0xF1,0x11,0x91,0x89,0xB1,0x81,0xA1,0x99,0x81,0x81,0x01,
0x01,0x01,0x09,0x11,0x31,0x01,0x11,0x11,0xD1,0x11,0x11,0x11,0xF9,0x11,0x01,0x01,
0x01,0x01,0x01,0xC1,0x41,0x41,0x41,0xF9,0x41,0x41,0x41,0x41,0xE1,0x41,0x01,0x01,
0x01,0x01,0x01,0x11,0x11,0x11,0x11,0x11,0x91,0x91,0x51,0x31,0x19,0x11,0x01,0x01,
0x01,0x21,0x21,0x21,0x21,0xA1,0x61,0x39,0x21,0x21,0x21,0xA1,0x21,0x31,0x21,0x01,
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0x01,0x01,0x01,0x01,0x81,0x41,0x31,0x01,0x01,0x39,0xC1,0x01,0x01,0x01,0x01,0x01,
0x01,0x81,0x91,0x91,0x91,0x91,0x91,0x91,0x91,0xD1,0x91,0x11,0xF9,0x11,0x01,0xFF,
0xFF,0x10,0xF3,0x0C,0x03,0x84,0x45,0x24,0x14,0xFF,0x0C,0x14,0x24,0xC5,0x44,0x00,
0x00,0x20,0x60,0x3F,0x10,0x90,0x40,0x3F,0x00,0x00,0x7F,0x00,0x00,0xFF,0x00,0x00,
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0x00,0x00,0xFC,0xA4,0xA4,0xA5,0xFD,0x01,0x01,0xFD,0xA5,0xA5,0xA4,0xFC,0x00,0x00,
0x00,0x40,0x7F,0x24,0x24,0xFF,0x10,0x14,0x84,0x64,0x1F,0x24,0x44,0x84,0x84,0x00,
0x00,0x01,0x01,0x01,0xFF,0x40,0x22,0x02,0xFF,0x02,0x02,0x02,0x7F,0x80,0xE0,0x00,
0x00,0x00,0x00,0x3F,0x12,0x12,0x12,0xFF,0x12,0x12,0x12,0x12,0x1F,0x00,0xC0,0x00,
0x00,0x02,0x02,0x02,0x02,0x02,0x82,0x02,0xFF,0x02,0x02,0x02,0x02,0x03,0x02,0x00,
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0x00,0x00,0x01,0x00,0x00,0x00,0x01,0x00,0x00,0x01,0x00,0x00,0x00,0x01,0x00,0x00,
0x00,0x00,0x00,0xC0,0x78,0x41,0x40,0x41,0xFC,0x40,0x40,0x40,0x60,0x41,0x00,0x00,
0x00,0x00,0x10,0x10,0x10,0x30,0xD0,0x14,0x19,0x90,0x70,0x10,0x10,0x10,0x11,0x00,
0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x00,
0x00,0x80,0xE0,0x9C,0x90,0x90,0x10,0xC9,0x50,0x40,0x7C,0x40,0x50,0xC8,0x00,0x00,
0x00,0x80,0x40,0x20,0xFC,0x51,0x50,0x54,0xF8,0x50,0x51,0x51,0x58,0x10,0x00,0x00,
0x00,0x00,0x01,0x08,0x08,0x08,0x08,0x09,0xF8,0x08,0x08,0x08,0x0C,0x89,0x00,0x00,
0x00,0x00,0x00,0x00,0x01,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x01,0x80,0x00,0x00,
0x00,0x00,0x80,0xE0,0x1C,0x20,0x20,0x20,0xA0,0xFC,0xA0,0x21,0x20,0x30,0x20,0xFF,
0xFF,0x90,0x90,0x50,0x57,0x35,0x15,0x15,0xFF,0x15,0x35,0x55,0x55,0x94,0x90,0x00,
0x00,0x02,0x7F,0x10,0x10,0x1F,0x81,0x41,0x31,0x0F,0x01,0x01,0xFF,0x01,0x01,0x00,
0x00,0x80,0x40,0xA0,0x98,0x86,0x41,0x47,0x29,0x11,0x29,0x45,0x43,0xC0,0x40,0x00,
0x00,0x00,0x08,0x30,0x60,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x82,0x81,0x80,0x84,0x84,0x84,0x84,0xFF,0x84,0x84,0x84,0x84,0xC0,0x80,0x00,
```

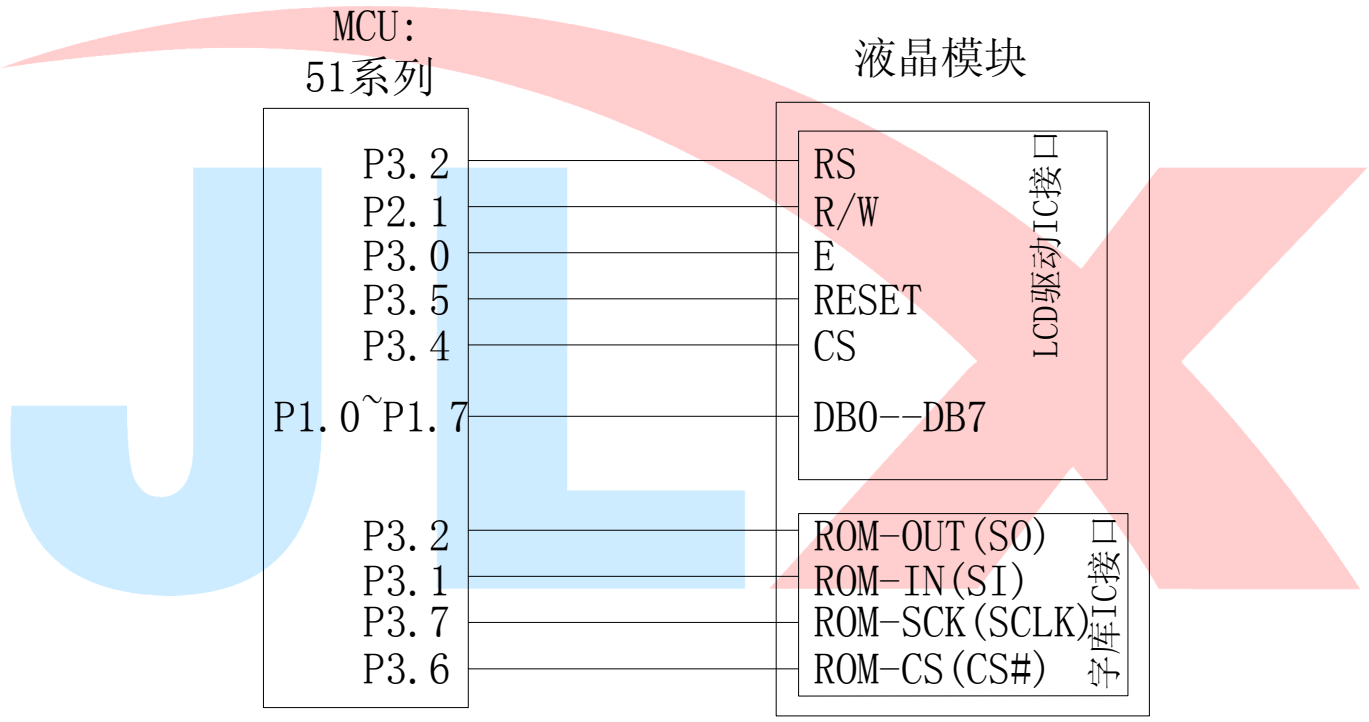
0x00, 0x80, 0x60, 0x1F, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x00,
0x00, 0x00, 0x08, 0x30, 0x60, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x04, 0x04, 0xFF, 0x44, 0x24, 0x00, 0xFF, 0x0A, 0x0A, 0x0A, 0x4A, 0x8A, 0x7F, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0xFF, 0x95, 0x95, 0x95, 0x97, 0x95, 0x95, 0x95, 0xF5, 0x04, 0x00, 0x00,
0x00, 0x01, 0x01, 0x01, 0x01, 0x01, 0x41, 0x81, 0x7F, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x00,
0x00, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x00,
0x00, 0x01, 0x00, 0xFF, 0x10, 0x08, 0x14, 0x13, 0x10, 0xFF, 0x10, 0x13, 0x14, 0x08, 0x10, 0xFF,
0xFF, 0x20, 0xC2, 0x0C, 0xC0, 0x08, 0xC8, 0x38, 0x08, 0x8A, 0x7C, 0x48, 0x48, 0xCC, 0x08, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x7C, 0x54, 0x54, 0x54, 0x54, 0x54, 0x7E, 0x04, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0xFC, 0x54, 0x54, 0x54, 0x54, 0x54, 0x54, 0x54, 0xFE, 0x04, 0x00, 0x00,
0x00, 0x00, 0x40, 0x44, 0x44, 0x44, 0x44, 0x44, 0xC4, 0x44, 0x44, 0x44, 0x46, 0x64, 0x40, 0x00,
0x00, 0x10, 0x90, 0xFE, 0x50, 0x90, 0x08, 0xE8, 0xBE, 0xA8, 0xA8, 0xBE, 0xA8, 0xEC, 0x08, 0x00,
0x00, 0x20, 0x20, 0xFE, 0x20, 0x20, 0x20, 0x10, 0x10, 0xFE, 0x10, 0x10, 0xF8, 0x10, 0x00, 0x00,
0x00, 0x00, 0xF0, 0x18, 0x16, 0x10, 0xF0, 0x40, 0x20, 0x98, 0x16, 0x10, 0x10, 0xF8, 0x10, 0x00,
0x00, 0x00, 0x04, 0x04, 0x04, 0x74, 0x54, 0x54, 0x56, 0x54, 0x54, 0x74, 0x04, 0x04, 0x04, 0x00,
0x00, 0x28, 0x28, 0x28, 0xFC, 0x26, 0x24, 0x00, 0x40, 0x88, 0x30, 0x00, 0xFE, 0x00, 0x00, 0x00,
0x00, 0x10, 0x10, 0x10, 0xFE, 0x90, 0x00, 0x90, 0x90, 0x90, 0xFE, 0x90, 0x90, 0x98, 0x10, 0x00,
0x00, 0x00, 0x80, 0x40, 0x20, 0x10, 0x0C, 0x80, 0x00, 0x0E, 0x30, 0x40, 0x80, 0x80, 0x80, 0x00,
0x00, 0x20, 0x24, 0xA4, 0xA4, 0xA4, 0xA4, 0xA4, 0xA4, 0x34, 0x24, 0x04, 0xFE, 0x04, 0x00, 0xFF,
0xFF, 0x04, 0x7C, 0x03, 0x00, 0x01, 0x7F, 0x42, 0x41, 0x22, 0x14, 0x09, 0x16, 0x21, 0x40, 0x00,
0x00, 0x00, 0x7F, 0x29, 0x29, 0x29, 0x7F, 0x00, 0x00, 0x7F, 0x29, 0x29, 0x29, 0x7F, 0x00, 0x00,
0x00, 0x40, 0x42, 0x44, 0x58, 0x40, 0x7F, 0x40, 0x40, 0x7F, 0x50, 0x48, 0x44, 0x62, 0x40, 0x00,
0x00, 0x00, 0x10, 0x08, 0x04, 0x03, 0x20, 0x40, 0x3F, 0x00, 0x01, 0x02, 0x04, 0x18, 0x00, 0x00,
0x00, 0x06, 0x01, 0x7F, 0x00, 0x49, 0x48, 0x2B, 0x1A, 0x0E, 0x0A, 0x1A, 0x2A, 0x4B, 0x48, 0x00,
0x00, 0x08, 0x18, 0x0F, 0x44, 0x44, 0x22, 0x12, 0x0E, 0x03, 0x06, 0x0A, 0x13, 0x62, 0x22, 0x00,
0x00, 0x00, 0x7F, 0x21, 0x21, 0x21, 0x7F, 0x00, 0x00, 0x00, 0x23, 0x40, 0x20, 0x1F, 0x00, 0x00,
0x00, 0x00, 0x00, 0x7F, 0x01, 0x01, 0x1D, 0x15, 0x15, 0x15, 0x1D, 0x01, 0x41, 0x7F, 0x00, 0x00,
0x00, 0x08, 0x06, 0x01, 0x7F, 0x01, 0x02, 0x04, 0x04, 0x05, 0x04, 0x04, 0x7F, 0x02, 0x02, 0x00,
0x00, 0x02, 0x22, 0x41, 0x3F, 0x00, 0x40, 0x40, 0x23, 0x14, 0x08, 0x14, 0x22, 0x41, 0x40, 0x00,
0x00, 0x01, 0x00, 0x20, 0x70, 0x28, 0x26, 0x21, 0x20, 0x24, 0x28, 0x30, 0x60, 0x01, 0x00, 0x00,
0x00, 0x00, 0x00, 0x0F, 0x04, 0x04, 0x04, 0x04, 0x0F, 0x00, 0x20, 0x40, 0x3F, 0x00, 0x00, 0xFF,
0xFF, 0x00, 0x00, 0x00, 0x00, 0x08, 0x08, 0xF8, 0x08, 0x08, 0x00, 0x08, 0xF8, 0x08, 0x00, 0x00,
0x00, 0x00, 0x08, 0x38, 0xC0, 0xC8, 0x38, 0x08, 0x00, 0x00, 0x00, 0x10, 0xF8, 0x00, 0x00, 0x00,
0x00, 0xF0, 0x08, 0x08, 0x88, 0xF0, 0x00, 0x00, 0x30, 0x08, 0x08, 0x88, 0x70, 0x00, 0x00, 0xE0,
0x90, 0x48, 0x48, 0x98, 0x00, 0x00, 0xC0, 0x20, 0x10, 0xF8, 0x00, 0x00, 0xE0, 0x10, 0x08, 0x08,
0x18, 0x00, 0x00, 0x80, 0x80, 0x80, 0x80, 0x80, 0x80, 0x00, 0x00, 0x10, 0x08, 0x48, 0x48, 0xB0,
0x00, 0x00, 0x30, 0x08, 0x08, 0x88, 0x70, 0x00, 0x00, 0xF0, 0x08, 0x08, 0x88, 0xF0, 0x00, 0x80,
0x80, 0x80, 0x80, 0x80, 0x80, 0x00, 0x08, 0xF8, 0x88, 0x88, 0x88, 0x70, 0x00, 0xE0, 0x10, 0x08,
0x08, 0x08, 0x18, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x80, 0x68, 0xA8, 0xBE, 0xA8, 0xA8,
0xFE, 0xA8, 0xBE, 0xA8, 0xA8, 0x60, 0x00, 0x00, 0xF8, 0x88, 0x88, 0x88, 0xFE, 0x88, 0x88, 0x88,
0x88, 0xF8, 0x00, 0x00, 0x08, 0x08, 0x08, 0x38, 0xC8, 0x0A, 0x0C, 0x88, 0x78, 0x08, 0x08, 0x08,
0x00, 0x10, 0x0C, 0x24, 0x24, 0x24, 0x24, 0xA6, 0x64, 0x24, 0x04, 0x14, 0x0C, 0x00, 0x00, 0xFC,
0x04, 0x94, 0xD4, 0xBC, 0x96, 0xD4, 0x94, 0x94, 0x94, 0x04, 0x00, 0x00, 0x00, 0x00, 0x00, 0xFF,
0xFF, 0x80, 0x80, 0x80, 0x98, 0x90, 0x90, 0x8F, 0x80, 0x80, 0x80, 0x88, 0x8F, 0x88, 0x88, 0x88,
0x8C, 0x80, 0x88, 0x8E, 0x89, 0x81, 0x8E, 0x88, 0x80, 0x80, 0x80, 0x88, 0x8F, 0x88, 0x80, 0x80,
0x80, 0x8C, 0x89, 0x89, 0x84, 0x83, 0x80, 0x80, 0x8C, 0x8A, 0x89, 0x88, 0x88, 0x80, 0x80, 0x87,

```
0x88,0x88,0x88,0x87,0x80,0x81,0x82,0x82,0x8A,0x8F,0x88,0x80,0x83,0x84,0x88,0x89,
0x87,0x81,0x80,0x80,0x80,0x80,0x80,0x80,0x80,0x80,0x80,0x84,0x88,0x88,0x88,0x87,
0x80,0x80,0x8C,0x8A,0x89,0x88,0x88,0x80,0x80,0x8C,0x89,0x89,0x84,0x83,0x80,0x80,
0x80,0x80,0x80,0x80,0x80,0x80,0x88,0x8F,0x88,0x80,0x80,0x80,0x80,0x83,0x84,0x88,
0x88,0x88,0x84,0x80,0x80,0x80,0x80,0x80,0x80,0x80,0x80,0x80,0x80,0x8F,0x80,0x80,0x80,
0x9F,0x80,0x88,0x8F,0x80,0x80,0x80,0x80,0x81,0x80,0x80,0x80,0x9F,0x80,0x80,0x80,
0x80,0x81,0x80,0x80,0x90,0x90,0x90,0x88,0x88,0x85,0x82,0x85,0x88,0x88,0x90,0x90,
0x80,0x81,0x81,0x81,0x81,0x81,0x91,0x9F,0x81,0x81,0x81,0x81,0x81,0x80,0x98,0x87,
0x80,0x84,0x84,0x84,0x84,0x9F,0x84,0x84,0x84,0x84,0x80,0x80,0x80,0x80,0x80,0xFF,

};
```

7.2 当 LCD 驱动 IC 采用并行接口方式时的硬件设计及例程：

7.2.1 硬件接口：下图为并行方式的硬件接口：



7.2.2 以下为并行方式的例程：

与串行方式相比较，只需改变传送数据、指令的子程序改一下即可：

```
/*--------------------------------------------------
Test program for JLX19264G-329，并行接口，带中文字库 IC
   驱动 IC 是:IST3020R(or competible),字库 IC:JLX-GB2312
   晶联讯电子：网址  http://www.jlxlcd.cn;
--------------------------------------------------*/
#include <reg51.H>
#include <intrins.h>
sbit lcd_wr=P2^1;     /*接口定义:lcd_rw 就是 LCD 的 wr*/
```

```
sbit lcd_rd=P3^0;     /*接口定义:lcd_e 就是 LCD 的 rd*/
sbit Rom_IN=P3^1;     /*字库 IC 接口定义:Rom_IN 就是字库 IC 的 SI*/
sbit Rom_OUT=P3^2;    /*字库 IC 接口定义:Rom_OUT 就是字库 IC 的 SO*/
sbit lcd_rs=P3^3;     /*接口定义:lcd_rs 就是 LCD 的 rs*/
sbit lcd_cs1=P3^4;    /*接口定义:lcd_cs1 就是 LCD 的 cs1*/
sbit lcd_reset=P3^5; /*接口定义:lcd_reset 就是 LCD 的 reset*/
sbit Rom_CS=P3^6;     /*字库 IC 接口定义 Rom_CS 就是字库 IC 的 CS#*/
sbit Rom_SCK=P3^7;    /*字库 IC 接口定义:Rom_SCK 就是字库 IC 的 SCLK*/


/*写指令到 LCD 模块*/
void transfer_command_lcd(int data1)
{

 lcd_cs1=0;
 lcd_rs=0;
 lcd_rd=0;
 lcd_wr=0;
 P1=data1;
 lcd_rd=1;
 lcd_cs1=1;
 lcd_rd=0;
}

/*写数据到 LCD 模块*/
void transfer_data_lcd(int data1)
{
 lcd_cs1=0;
 lcd_rs=1;
 lcd_rd=0;
 lcd_wr=0;
 P1=data1;
 lcd_rd=1;
 lcd_cs1=1;
 lcd_rd=0;

}
```