

# 西安电子科技大学

## 微机系统综合实验      课程实验报告

实验名称 实验八 点阵 LED 显示设计实验

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同作者 \_\_\_\_\_

实验日期 2023 年 5 月 31 日

成 绩

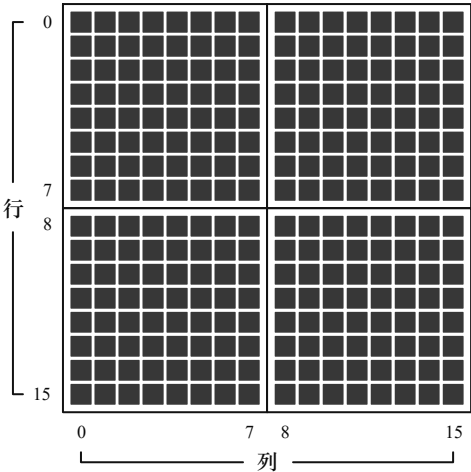
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指导教师：

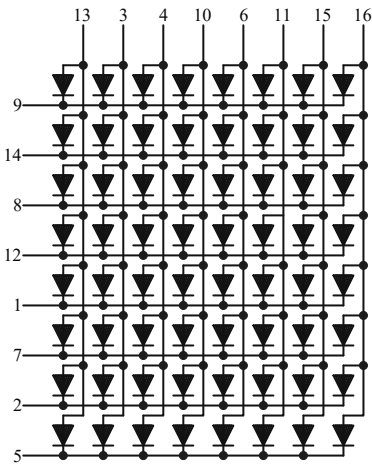
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一、 实验要求

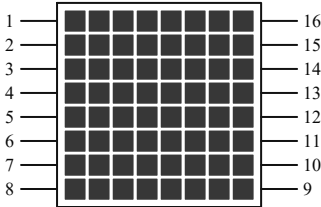
- 1. 实现 8×8 LED 点阵实验，要求在 8×8 的 LED 上循环显示 1，2，3 这三个数字。
- 2. 实验系统中的 16×16 LED 点阵由四块 8×8 LED 点阵组成，控制点阵向上（或左右）游动显示“西安电子科技大学欢迎您！-姓名”。其中，实验系统中的 16×16 LED 点阵由四块 8×8 LED 点阵组成，如图所示，8×8 点阵内部结构图如下。由图可知，当行为“0”，列为“1”，则对应行、列上的 LED 点亮。



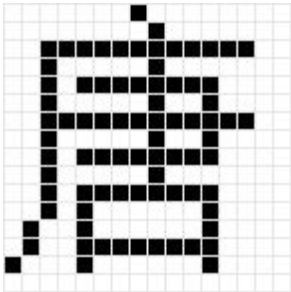
16×16 点阵示意图



点阵内部结构图



点阵外部引脚图

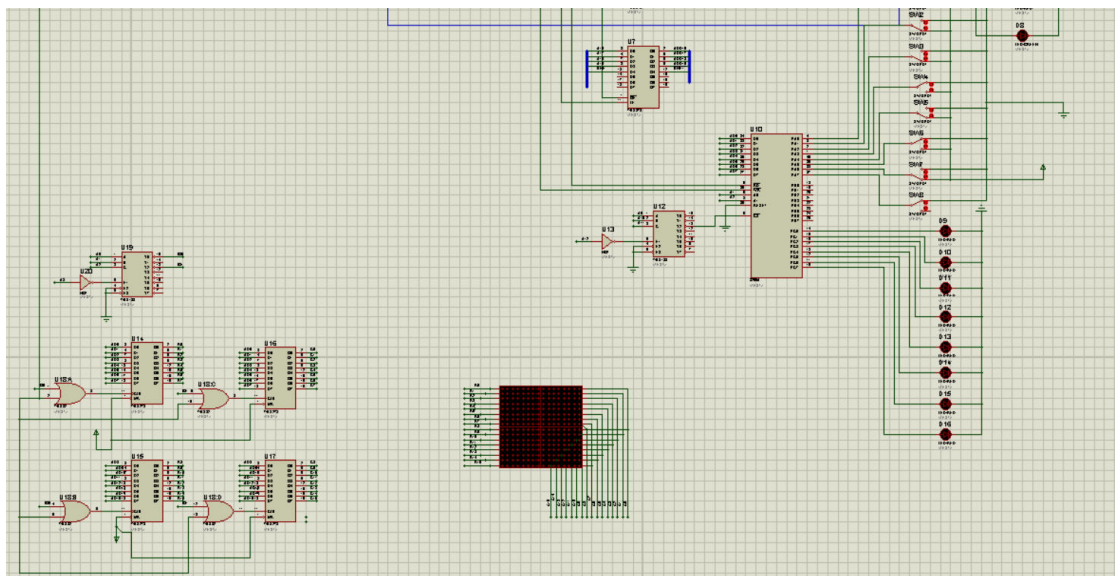
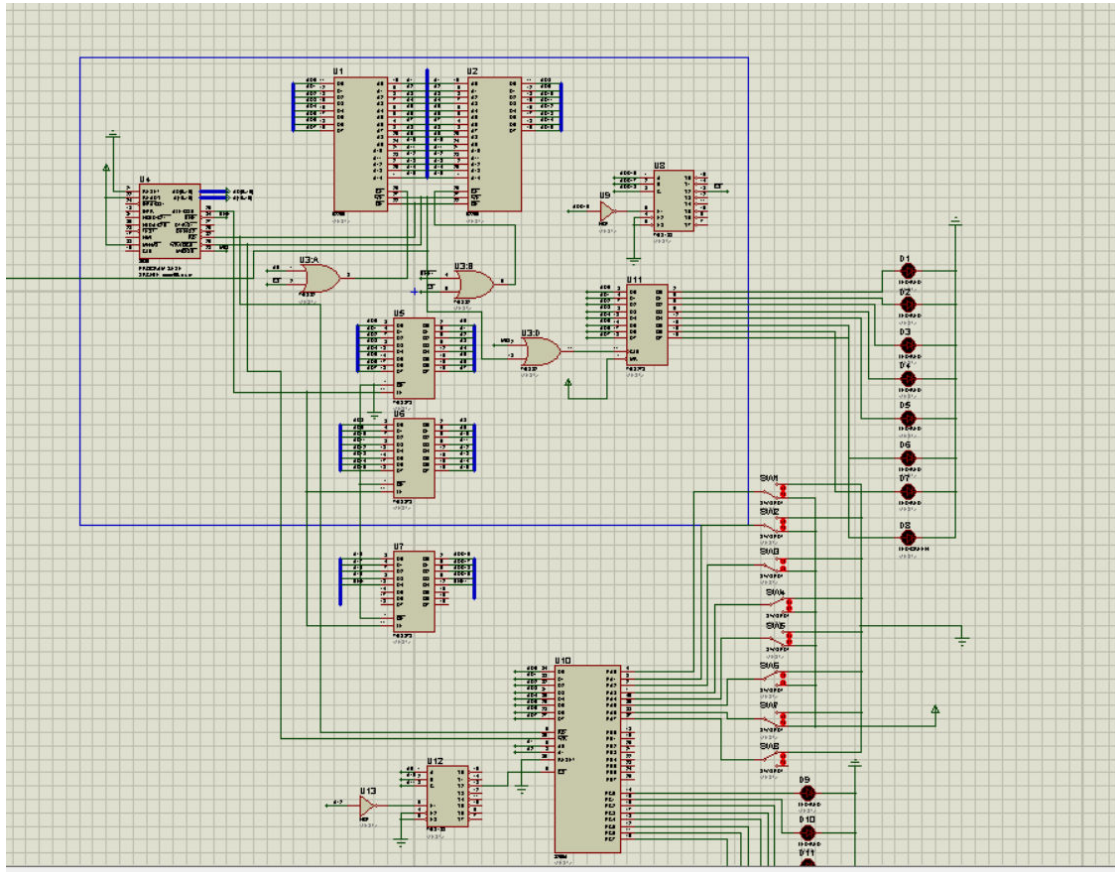


汉字显示示例

二、 实验目的

- 1. 了解 LED 点阵的基本结构。
- 2. 学习 LED 点阵扫描显示程序的设计方法。

三、 实验电路



## 四、 实验代码及实验结果

### 1. 实验代码

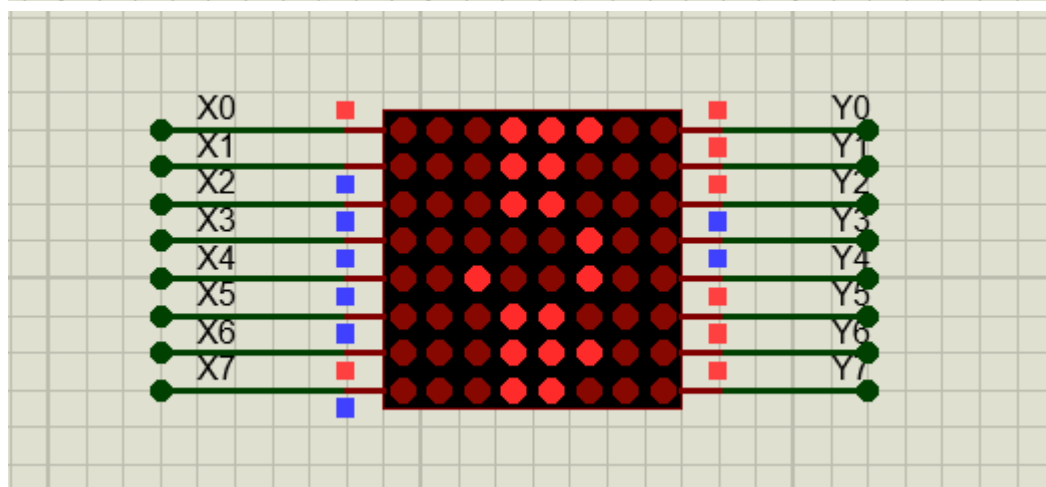
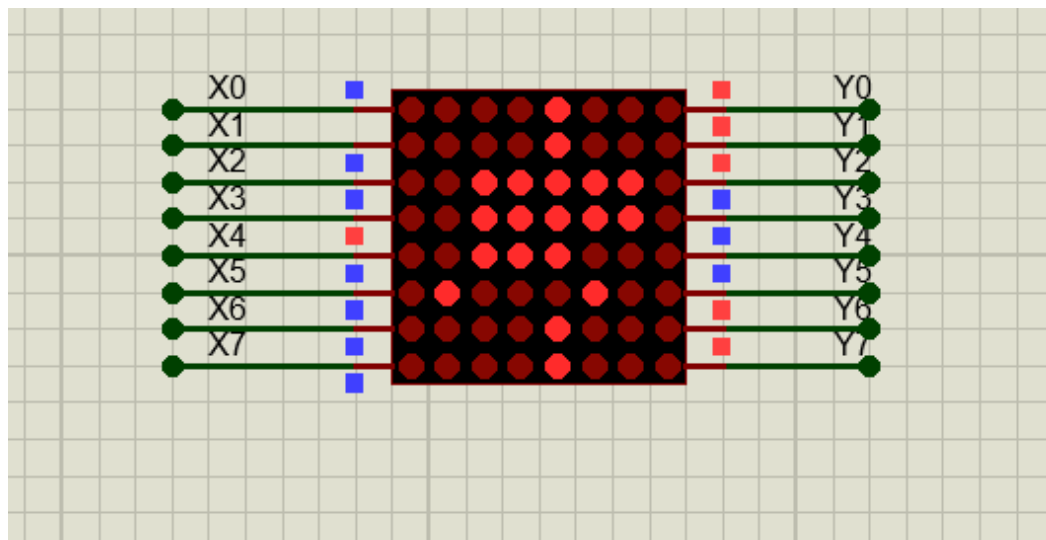
1. DATA SEGMENT
2. NUMS:

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3.      DB 08H,18H,28H,08H,08H,08H,08H,3EH ;数字 1
4.      DB 38H,44H,04H,04H,08H,10H,20H,7EH ;数字 2
5.      DB 18H,24H,04H,18H,18H,04H,24H,18H ;数字 3
6. DATA ENDS
7. CODE SEGMENT
8.      ASSUME CS:CODE,DS:DATA
9. START:
10.     MOV AX,DATA
11.     MOV DS,AX
12.     MOV AH,01H
13.     MOV BX,00H
14. RUN:
15.     MOV DX,OFFSET NUMS;设置数据段地址
16.     MOV SI,DX ; 将 DX 寄存器的值传给 SI 寄存器
17.     ADD SI,BX ; 将 BX 寄存器的值加到 SI 寄存器中
18.     MOV CX,08H ; 将 08H 装入 CX 寄存器,即循环 8 次
19.
20. WAITE:
21.     MOV AL,0H;AL=0
22.     OUT 00H,AL;输入全零到端口 00H,输出全零清屏
23.     MOV AL,[SI];AL=数字 1[SI]
24.     OUT 02H,AL;输出 AL 到端口 02H
25.     MOV AL,AH;AL=AH
26.     OUT 00H,AL;输出 AL 到端口 00H,决定哪一行 输出
27.     ROL AH,1; AH=AH<<1
28.     PUSH CX;保存 CX
29.     MOV CX,700H;CX=700H
30.     LOOP $;延时
31.     POP CX ;恢复 CX
32.     INC SI;SI=SI+1
33.     LOOP WAITE ;循环 WAITE (循环八次输出一个数字)
34.     INC BX; BX+1
35.     CMP BX,24;证明 1, 2, 3 已经结束
36.     JA RESET;重置 BX
37. CONTINUE:
38.     JMP RUN
39. RESET:
40.     MOV BX,00H
41.     JMP CONTINUE
42. CODE ENDS
43. END START

```

## 实验结果



## 2. 实验代码

1. DATA SEGMENT
2. LEFT:;左侧 1\*2 块屏幕, 从低位到高位, 每个字节是半行
3. DB 0H, 0FFH, 20H, 20H, 20H, 0FCH, 24H, 24H, 24H, 24H, 14H, 0CH, 04H, 4H, 0FCH, 4H ;西
4. DB 40H, 80H, 0FCH, 04H, 42H, 40H, 40H, 0FFH, 20H, 10H, 18H, 60H, 80H, 40H, 30H, 0EH ;安
5. DB 80H, 80H, 80H, 0FCH, 84H, 84H, 84H, 0FCH, 84H, 84H, 84H, 0FCH, 84H, 80H, 80H, 00H ;电
6. DB 00H, 0FEH, 00H, 00H, 00H, 80H, 80H, 0FFH, 80H, 80H, 80H, 80H, 80H, 80H, 0A0H, 40H ;子
7. DB 10H, 0B8H, 0FH, 08H, 08H, 0BFH, 8H, 01CH, 2CH, 0AH, 0CAH, 9H, 8H, 8H, 8H, 8H ;科
8. DB 8H, 8H, 8H, 0C8H, 3FH, 8H, 8H, 0A8H, 18H, 0CH, 0BH, 08H, 08H, 08H, 08H, 064H ;技
9. DB 80H, 80H, 80H, 80H, 80H, 0FFH, 80H, 80H, 40H, 40H, 20H, 20H, 10H, 8H, 4H, 3H ;大

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10.    DB 44H, 88H, 88H, 0H,0FEH, 2H, 1H,0F8H, 0H, 80H,0FFH, 80H, 80H, 80H,
    0A0H, 40H ;学
11.    DB 0H, 0H, 3FH, 20H,0A0H, 92H, 54H, 28H, 8H, 14H, 24H,0A2H, 81H, 40H,
    20H, 10H ;欢
12.    DB 0H, 4H,0C8H, 48H, 40H, 40H, 4FH, 48H, 48H, 48H,0C8H, 48H, 8H, 14H,
    0E2H, 0H ;迎
13.    DB 90H, 90H, 88H, 4CH, 2AH, 99H, 88H, 48H, 28H, 88H, 8H, 40H, 8AH, 8AH,
    9H,0F0H ;您
14.    DB 10H, 20H, 0FEH, 80H, 80H, 0FCH, 01H, 01H, 0FFH, 00H, 00H, 0FCH, 24H,
    24H, 24H, 0FFH ;盖
15.    DB 00H, 00H, 0F8H, 08H, 88H, 84H, 84H, 0FCH, 80H, 90H, 90H, 88H, 84H, 82
    H, 0A0H, 40H ;乐
16.    DB 00H, 00H, 00H, 00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00
    H
17.    DB 00H, 00H, 00H, 00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00
    H
18.    RIGHT:;右侧 1*2 块屏幕
19.    DB 00H, 07FH,02H,02H,02H,1FH,12H,12H,12H,12H,1CH,10H,10H,10H,1FH,10H
20.    DB 00H, 00H,3FH,20H,10H,00H,00H,7FH,04H,04H,02H,02H,01H,06H,08H,10H
21.    DB 00H, 00H,00H,01FH,10H,10H,10H,01FH,10H,10H,10H,01FH,50H,40H,40H,7FH
22.    DB 00H, 01FH,08H,04H,02H,01H,00H,07FH,00H,00H,00H,00H,00H,00H,00H,00H
23.    DB 08H, 08H,09H,09H,08H,008H,9H,09H,08H,78H,0FH, 08H,08H,08H,08H,08H
24.    DB 04H, 04H,4H,07FH,04H,04H,04H,3FH,21H,11H,12H,0AH,4H,0AH,11H,60H
25.    DB 00H, 00H,00H,00H,00H,07FH,00H,00H,01H,01H,02H,02H, 4H,8H,10H,60H
26.    DB 10H, 10H,08H,4H,07FH,40H,20H,7H,2H,01H,07FH,00H,00H,00H,00H, 0H
27.    DB 01H, 01H, 1H,3FH, 20H,10H,02H, 2H,2H, 5H, 5H, 08H, 8H,10H,20H,40H
28.    DB 00H, 01H, 3CH,24H,24H,24H,24H,24H,2DH,14H, 04H,4H, 4H,07FH,0H
29.    DB 00H, 00H,3FH,20H,12H,0AH,12H,22H,22H,2H, 1H, 0H,20H,48H,48H,0FH
30.    DB 04H, 02H, 03FH, 00H, 00H, 01FH, 00H, 00H, 07FH, 00H, 00H, 1FH, 12H, 1
    2H, 12H, 07FH
31.    DB 04H, 0FH, 00H, 00H, 00H, 00H, 00H, 03FH, 00H, 04H, 08H, 10H, 20H, 20H,
    00H, 00H
32.    DB 00H, 00H, 00H, 00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00
    H
33.    DB 00H, 00H, 00H, 00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00
    H
34. DATA ENDS
35.
36. CODE SEGMENT
37.    ASSUME CS:CODE,DS:DATA
38. START:
39.    MOV AX,DATA
40.    MOV DS,AX
41.    MOV AH,01H

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42. MOV BX,00H ;滚动行数(移向下一字节代表从下一行开始打印)

43. RUN:

44. MOV DX,OFFSET LEFT

45. MOV SI,DX

46. ADD SI,BX ;计算当前行数(本轮从该行开始打印)

47. MOV DX,OFFSET RIGHT

48. MOV DI,DX

49. ADD DI,BX ;计算当前行数(本轮从该行开始打印)

50. MOV CX,08H;共8行

51. WRITE1: ;在上面两块屏幕上输出

52. MOV AL,0H

53. OUT 0H,AL;清屏操作

54. MOV AL,[SI];左边内容

55. OUT 4H,AL

56. MOV AL,[DI];右边内容

57. OUT 6H,AL

58. MOV AL,AH ;设置目标行

59. OUT 0H,AL

60. ROL AH,1;目标行下移

61. INC SI;指向下一行

62. INC DI

63. PUSH CX

64. MOV CX,0500H ;延迟

65. LOOP \$

66. POP CX

67. LOOP WRITE1

68.

69. MOV AL,0H

70. OUT 0H,AL

71. MOV CX,08H

72. WRITE2:;在下面两块屏幕上输出

73. MOV AL,0H

74. OUT 2H,AL ;清屏操作

75. MOV AL,[SI] ;左边内容

76. OUT 4H,AL

77. MOV AL,[DI] ;右边内容

78. OUT 6H,AL

79. MOV AL,AH ;设置目标行

80. OUT 2H,AL

81. ROL AH,1 ;目标行下移

82. INC SI

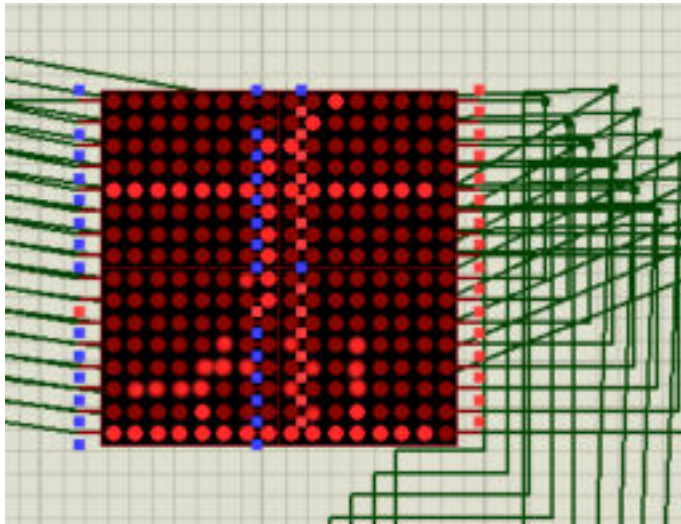
83. INC DI

84. PUSH CX

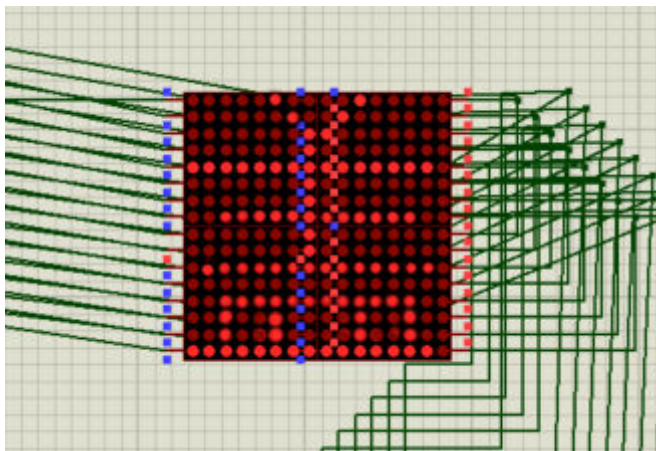
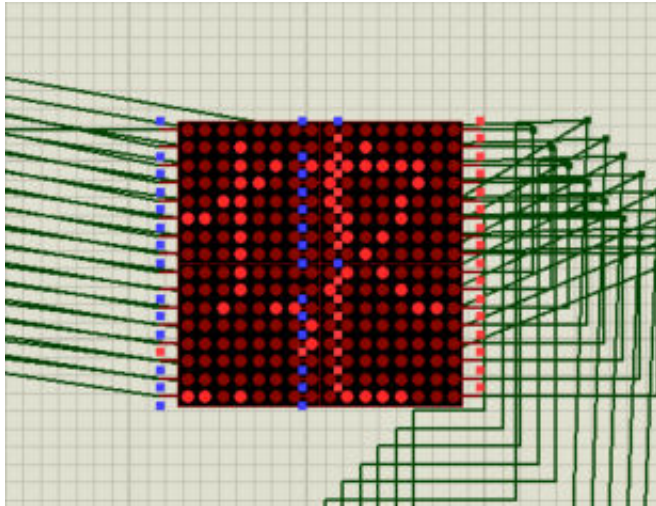
85. MOV CX,0500H

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86.    LOOP $
87.    POP CX
88.    LOOP WRITE2
89.
90.    INC BX
91.    CMP BX,224 ;14 个字，向上滚 14*16 行
92.    JA RESET
93. CONTINUE:
94.    JMP RUN
95. RESET: ;滚动值清零
96.    MOV BX,0
97.    JMP CONTINUE
98. CODE ENDS
99. END START
```

## 实验结果







## 五、 实验总结

本次实验通过对 LED 点阵的学习,对 LED 点阵的基本结构有了清楚的认识,了解了 LED 点阵显示程序的设计方法,并学习掌握了点阵字模的表示方法;