

It is the same as problem 11 except that the display is driven by a serial to parallel register 4094



Same as problem 11 with the addition of the definitions of 4094 pins (dat,clk,stb)

Section 2 Main code

```

49 Start:
50
51     MOV A,#10
52     MOV DPTR,#DIGIT_CODE
53     MOVC A,@A + DPTR
54     MOV P1,A
55 LOOP:
56     CALL READ_KEY
57     JNC LOOP
58     MOV A,KEY
59     MOV DPTR,#DIGIT_CODE
60     MOVC A ,@A + DPTR
61     CALL DISP_KEY
62     JMP LOOP

```

Same as problem 11 except that we call a function to send the required key value to the 7-segment through converting it to serial data to the 4094 register (line 61 "CALL DISP_KEY")

Function DISP_KEY

```

153 DISP_KEY:
154     CLR STB
155     MOV R7,#8
156 ALL_BITS:
157     RLC A
158     MOV DAT,C
159     SETB CLK
160     CLR CLK
161     DJNZ R7,ALL_BITS
162     SETB STB
163     RET

```

The shift register accepts serial data bit by bit. With each bit, a clock pulse must be sent.

To convert the key value "8-bits parallel" into serial bit stream, we use the rotate left with carry instruction "RLC" (157). This instruction will make internal bit left shift

$$C \leftarrow A7 \leftarrow A6 \leftarrow A5 \leftarrow A4 \leftarrow A3 \leftarrow A2 \leftarrow A1 \leftarrow A0 \leftarrow C$$

So after executing it the first time, C will contain the value of A7, and we move it to the "DAT" line of the 4094 (158), then we send clock pulse (159-160). We repeat this process for 8 bits (161).

To make the 4094 send this value to the 7-segment, we finally activate the strobe signal "STB".