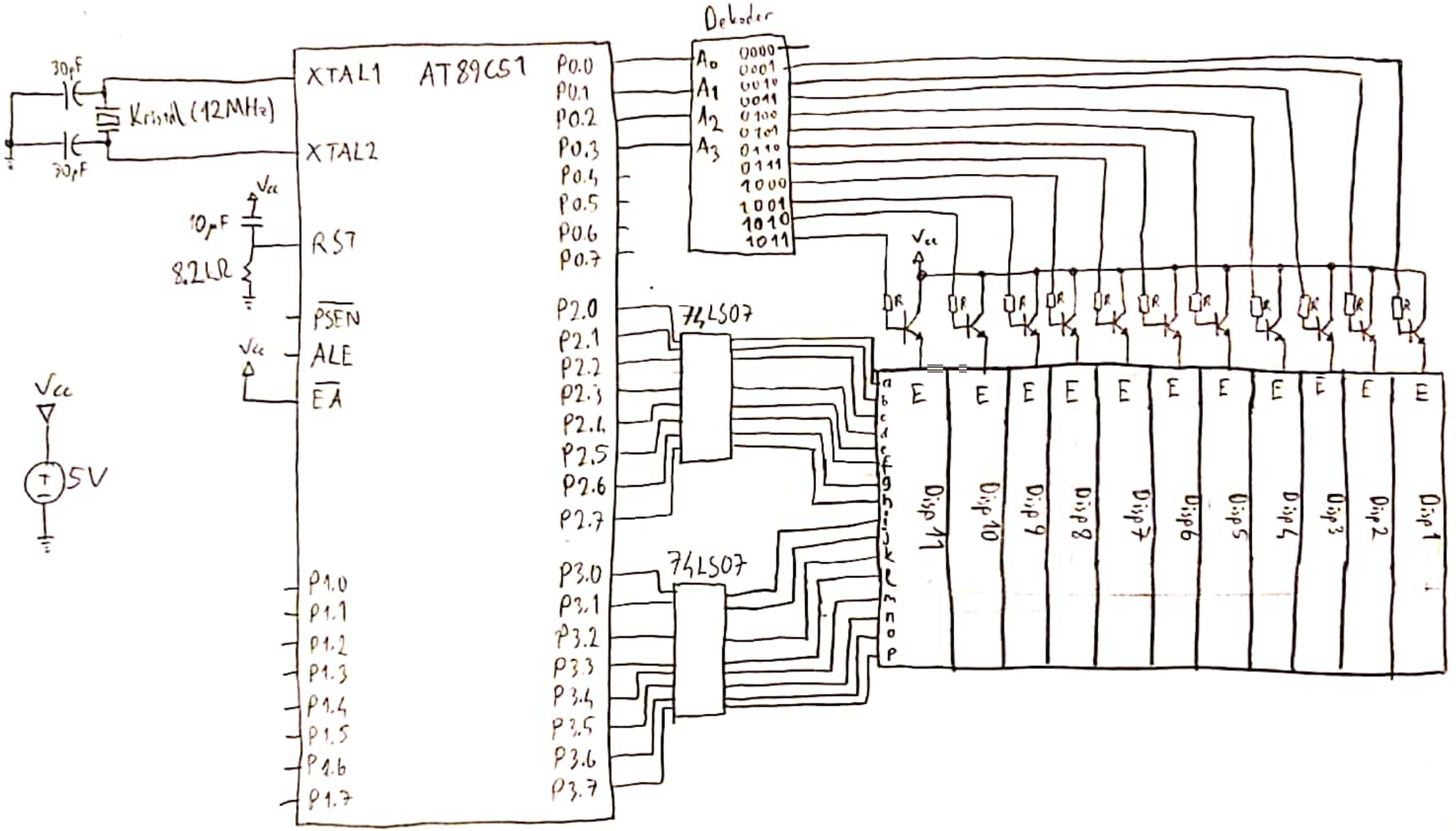
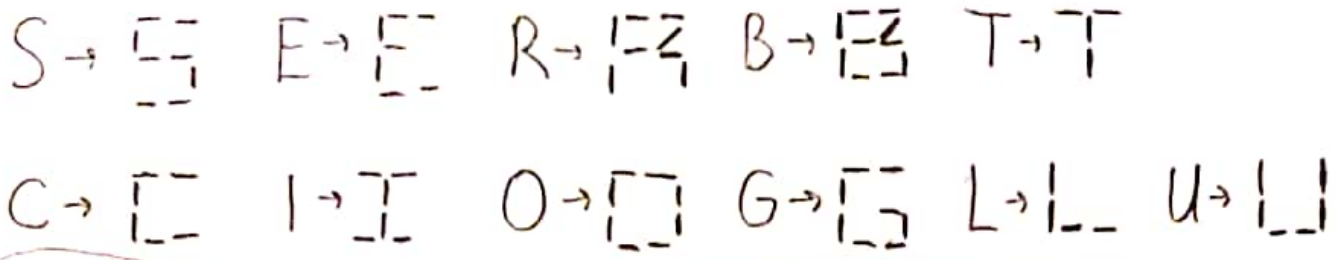


Displayler için ortak anot sistem kullanıldı.

8051 cihaz için AT89C51 kullanıldı.

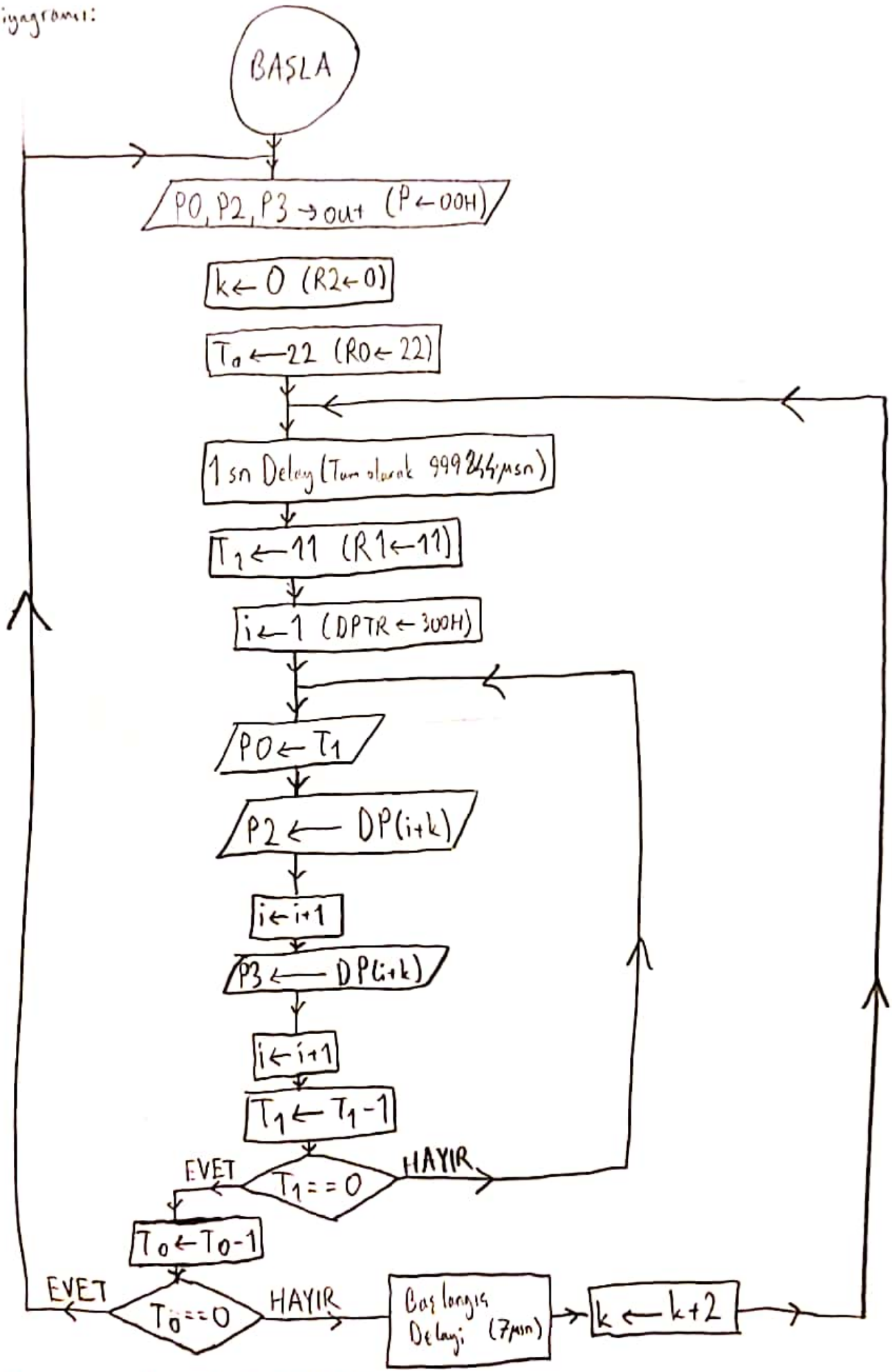
Mehmet Şerbetçioğlu

040160056



	a b c d	e f g h	i j k l	m n o p	Hex
S	1 1 1 0	0 0 0 1	1 0 0 0	0 1 1 1	E187
E	1 1 1 0	0 0 0 1	0 1 0 0	0 0 1 1	E143
R	1 1 1 0	0 1 0 1	1 1 0 0	0 1 0 0	E5C4
B	1 1 1 0	0 1 0 1	1 1 0 0	0 1 1 1	E5C7
T	1 1 0 0	1 0 0 0	0 0 0 1	0 0 0 0	C810
C	1 1 1 0	0 0 0 0	0 1 0 0	0 0 1 1	E043
I	1 1 0 0	1 0 0 0	0 0 0 1	0 0 1 1	C813
O	1 1 1 0	0 0 1 0	0 1 0 0	0 1 1 1	E247
G	1 1 1 0	0 0 0 0	1 1 0 0	0 1 1 1	E0C7
L	0 0 1 0	0 0 0 0	0 1 0 0	0 0 1 1	2043
U	0 0 1 0	0 0 1 0	0 1 0 0	0 1 1 1	2247

Akış Diyagramı:



DB = { 00H, 00H, ..., 00H (20x), S_0, S_1, E_0, E_1, R_0, R_1, B_0, B_1, E_0, E_1, T_0, T_1, C_0, C_1, I_0, I_1, O_0, O_1, G_0, G_1, L_0, L_1, U_0, U_1, 00H, ..., 00H (20x)

Delay: Makine kodları ve başlangıç delayi çıkarıldığında, kodun LOOP1 döngüsünü her saniye çalıştırabilmesi için 999844 µsn delay gerekmekte.
Bu hesap, 12 MHz kristal frekanslı, 1 makine döngüsü = 1 µsn alınarak yapıldı.

999844 µsn delay için biri timerlı diğeri timer kullanmadan iki farklı delay kodu kullanıldı.

Timer ile:

```
DELAY:
    MOV R5, #nD
    MOV TMOD, #01
LOOP:
    MOV TL0, #0
    MOV TH0, #0
    SETB TR0
AGAIN:
    JNB TF0, AGAIN
    CLR TR0
    CLR TF0
    DJNZ R5, LOOP
    RET
```

n.65544 + 6 µsn delay sağlar

Kodda n=15 alınıp 983166 µsn delay elde edilir.

Kalan delay: 16678 µsn

Timer kullanmadan:

```
DELAY:
    MOV R5, #nD
LABEL:
    ACALL DEL
    DJNZ R5, LABEL
    RET
DEL:
    MOV R6, #mD
DELLOOP:
    DJNZ R6, DELLOOP
    RET
```

(2m+5)n+5 µsn delay sağlar.
Kodda iki kez kullanılıp
Delay1 → 10205 µsn
Delay2 → 6473 µsn delay sağlar.

Delay1 → $n_1 = 200$ $m_1 = 23$
Delay2 → $n_2 = 196$ $m_2 = 14$

Assembly Kodu:

```
ORG 000H
    START:
        MOV P0,#00H
        MOV P2,#00H
        MOV P3,#00H
        MOV R2,#0D
        MOV R0,#22D
        SJMP SKIPSTARTDELAY
  LOOP1:
        NOP
        NOP
        NOP
        NOP
        NOP
        NOP
        NOP
        INC R2
        INC R2
  SKIPSTARTDELAY:
        ACALL DELAY
        MOV R1,#11D
        MOV DPTR,#300H
LOOP2:
        MOV P0,R1
        MOV A,R2
        MOVC A,@A+DPTR
        MOV P2,A
        INC DPTR
        MOV A,R2
        MOVC A,@A+DPTR
        MOV P3,A
        INC DPTR
        DJNZ R1,LOOP2
        DJNZ R0,LOOP1
        SJMP START
```

```
ORG 300H
    DB 00H,00H,...,00H,0E1H,87H,0E1H,43H,0E5H,0C4H,0E5H,0C7H,0E1H,043H,-
       20x  --- 0C8H,10H,0E0H,43H,0C8H,13H,0E2H,47H,0E0H,0C7H,20H,-
       --- 43H,22H,47H,00H,00H,...,00H
                                  20x

DELAY:
    ACALL DELAY1
    ACALL DELAY2
    MOV R5,#15
    MOV TMOD,#01
DELAYLOOP:
    MOV TL0,#0
    MOV TH0,#0
    SETB TR0
AGAIN:
    JNB TF0,AGAIN
    CLR TR0
    CLR TF0
    DJNZ R5,DELAYLOOP
    RET

DELAY1:
    MOV R5,#200D
LABEL1:
    ACALL DEL1
    DJNZ R5,LABEL1
    RET
DEL1:
    MOV R6,#23D

DEL1LOOP:
    DJNZ R6,DEL1LOOP
    RET
```

```
DELAY2:
    MOV R5, #196D
LABEL2:
    ACALL DEL2
    DJNZ R5, LABEL2
    RET
DEL 2:
    MOV R6, #14D
DEL2LOOP:
    DJNZ R6, DEL2LOOP
    RET
```