Traffic Light System

Using 8051 (Assembly Language)

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Task Description

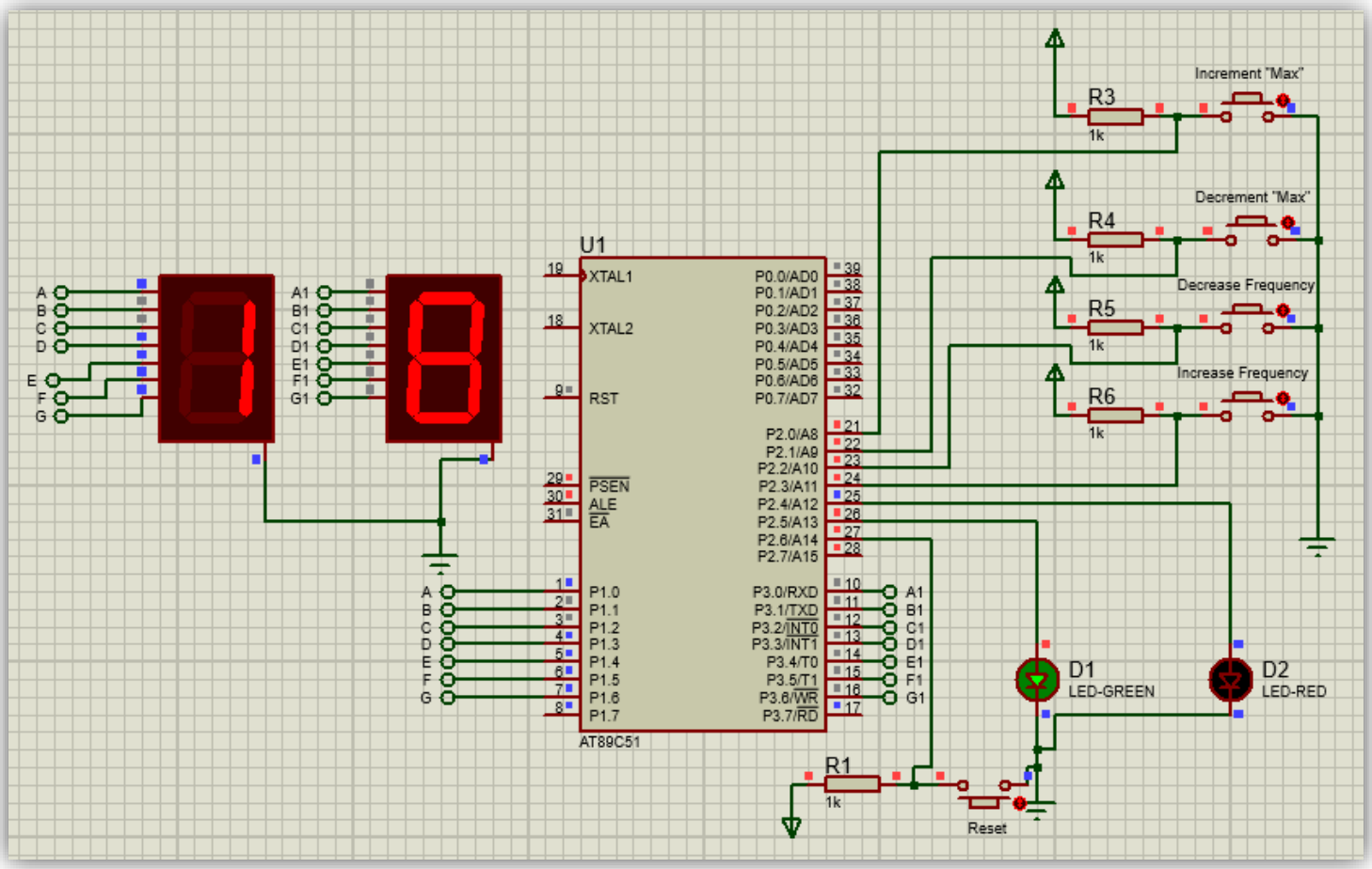
We designed a traffic light system with some features like:

- Turning ON the green light LED for a specific time period. This period can be changed based on a predetermined number “Max” shown on two 7-segments.
- “Max” starts to count down on the 7-segments until it reaches 00, when the green light is turned Off and the red light turned ON.
- After 00, the 7-segments will be reloaded to “Max” and starts to count down until 00, when the Red light is Off, green ON, and so on.
- Users have the capability to change “Max” on the 7-segments to meet several conditions of traffic. (2 push buttons to control the increment and decrement of “Max”)
- Users have the capability to change the frequency of counting using switches or push buttons. (2 push buttons to control the frequency of counting)
- Users have the capability to Reset the counting to start from the beginning.

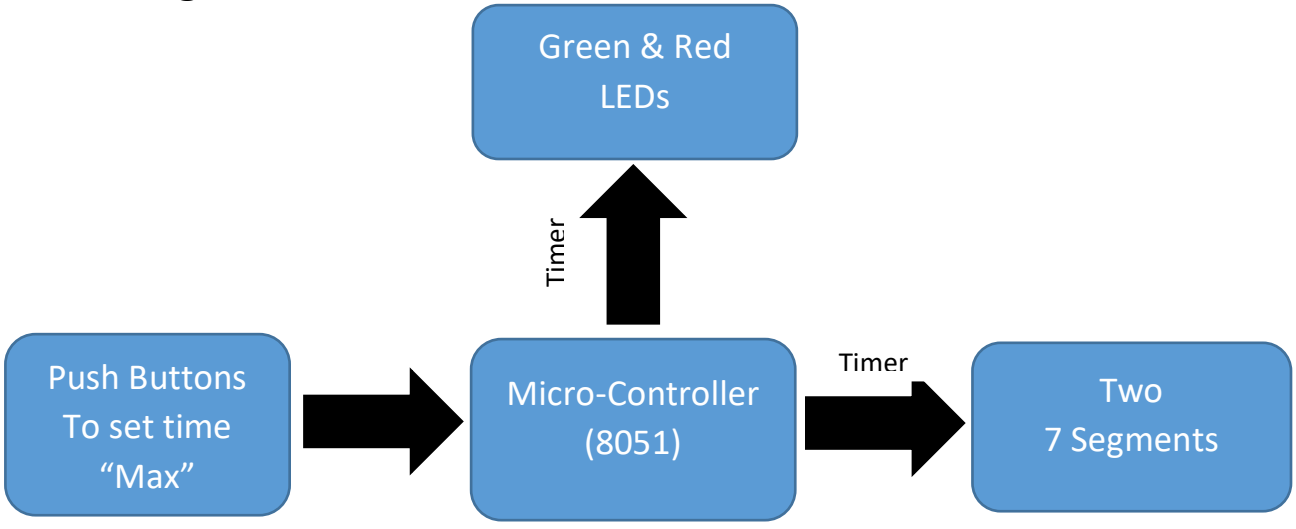
Here is a repository on Github which includes our files to test them:

https://github.com/remonalbear/Trassic_Light_Assembley_8051

Schematics



➢ Block Diagram:



Assembly Code

```
01          TABLE EQU 100H
02          ORG 0
03          MOV A, #0FFH
04          MOV P2, A
05          MOV R6, #32
06          MOV R5, #03H
07          SETB P2.5
08          CLR P2.4
09  MAIN:   MOV A, R5
10          MOV DPTR, #TABLE
11          MOV R1, A
12          MOV R0, #00H
13  LOOP:   MOV A, R0
14          MOVC A, @A+DPTR
15          MOV P3, A
16          MOV A,R1
17          MOVC A, @A+DPTR
18          MOV P1, A
19          MOV A, R6
20          MOV R2, A
21          MOV R3, #10
22          MOV R4, #0
23          ACALL DELAY
24          DEC R0
25          CJNE R0, #0FFH, LOOP
26  SUB1:   DEC R1
27          MOV R0, #09H
28          CJNE R1,#0FFH, LOOP
```

```
29          CPL P2.5
30          CPL P2.4
31          JMP MAIN
32  SBT:    DEC R5
33          MOV R3, #0
34          MOV R4, #0
35          ACALL DELAY2
36          ACALL DELAY2
37          JMP MAIN
38  DVT:    MOV A, R6
39          MOV B, #02
40          DIV AB
41          MOV R6, A
42          MOV R3, #0
43          MOV R4, #0
44          ACALL DELAY2
45          ACALL DELAY2
46          RET
47  MTV:    MOV A, R6
48          MOV B, #02
49          MUL AB
50          MOV R6, A
51          MOV R3, #0
52          MOV R4, #0
53          ACALL DELAY2
54          ACALL DELAY2
55          RET
56  ADR:    INC R5
```

```
56  ADR:    INC R5
57          MOV R3, #0
58          MOV R4, #0
59          ACALL DELAY2
60          ACALL DELAY2
61          JMP MAIN
62  DELAY:  JNB P2.0, ADR
63          JNB P2.1, SBT
64          JNB P2.2, MTV
65          JNB P2.3, DVT
66          JNB P2.6, RST
67          DJNZ R4, DELAY
68          DJNZ R3, DELAY
69          MOV R3,#10
70          DJNZ R2, DELAY
71          RET
72  RST:    MOV R5, #03H
73          MOV R6, #32
74          MOV A, #0FFH
75          MOV P2, A
76          SETB P2.5
77          CLR P2.4
78          JMP MAIN
79  DELAY2: DJNZ R3, DELAY2
80          DJNZ R4, DELAY2
81          RET
82          ORG TABLE
83          DB 3FH, 06H, 5BH, 4FH, 66H, 6DH, 7DH, 07H, 7FH, 6FH
84          END
```

To Run The File:

```
        TABLE EQU 100H
        ORG 0
        MOV A, #0FFH
        MOV P2, A
        MOV R6, #32
        MOV R5, #03H
        SETB P2.5
        CLR P2.4
MAIN:   MOV A, R5
        MOV DPTR, #TABLE
        MOV R1, A
        MOV R0, #00H
LOOP:   MOV A, R0

        MOVC A, @A+DPTR
        MOV P3, A
        MOV A,R1
        MOVC A, @A+DPTR
        MOV P1, A
        MOV A, R6
        MOV R2, A
        MOV R3, #10
        MOV R4, #0
        ACALL DELAY
        DEC R0
        CJNE R0, #0FFH, LOOP
SUB1:   DEC R1
        MOV R0, #09H
        CJNE R1,#0FFH, LOOP
```

```
        CPL P2.5
        CPL P2.4
        JMP MAIN
SBT:    DEC  R5
        MOV R3, #0
        MOV R4, #0
        ACALL DELAY2
        ACALL DELAY2
        JMP MAIN
DVT:    MOV A, R6
        MOV B, #02
        DIV AB
        MOV R6, A
        MOV R3, #0
        MOV R4, #0
        ACALL DELAY2
        ACALL DELAY2
        RET
MTV:    MOV A, R6
        MOV B, #02
        MUL AB
        MOV R6, A
        MOV R3, #0
        MOV R4, #0
        ACALL DELAY2
        ACALL DELAY2
        RET
ADR:    INC  R5
        MOV R3, #0
        MOV R4, #0
```

```
                ACALL DELAY2
                ACALL DELAY2
                JMP MAIN
DELAY:          JNB P2.0, ADR
                JNB P2.1, SBT
                JNB P2.2, MTV
                JNB P2.3, DVT
                JNB P2.6, RST
                DJNZ R4, DELAY
                DJNZ R3, DELAY
                MOV R3,#10
                DJNZ R2, DELAY
                RET
RST:            MOV R5, #03H
                MOV R6, #32
                MOV A, #0FFH
                MOV P2, A
                SETB P2.5
                CLR P2.4
                JMP MAIN

DELAY2:         DJNZ R3, DELAY2
                DJNZ R4, DELAY2
                RET
                ORG TABLE
                DB 3FH, 06H, 5BH, 4FH, 66H, 6DH, 7DH, 07H, 7FH, 6FH
                END
```