Microprocessors and Microcontrollers (EE-231)

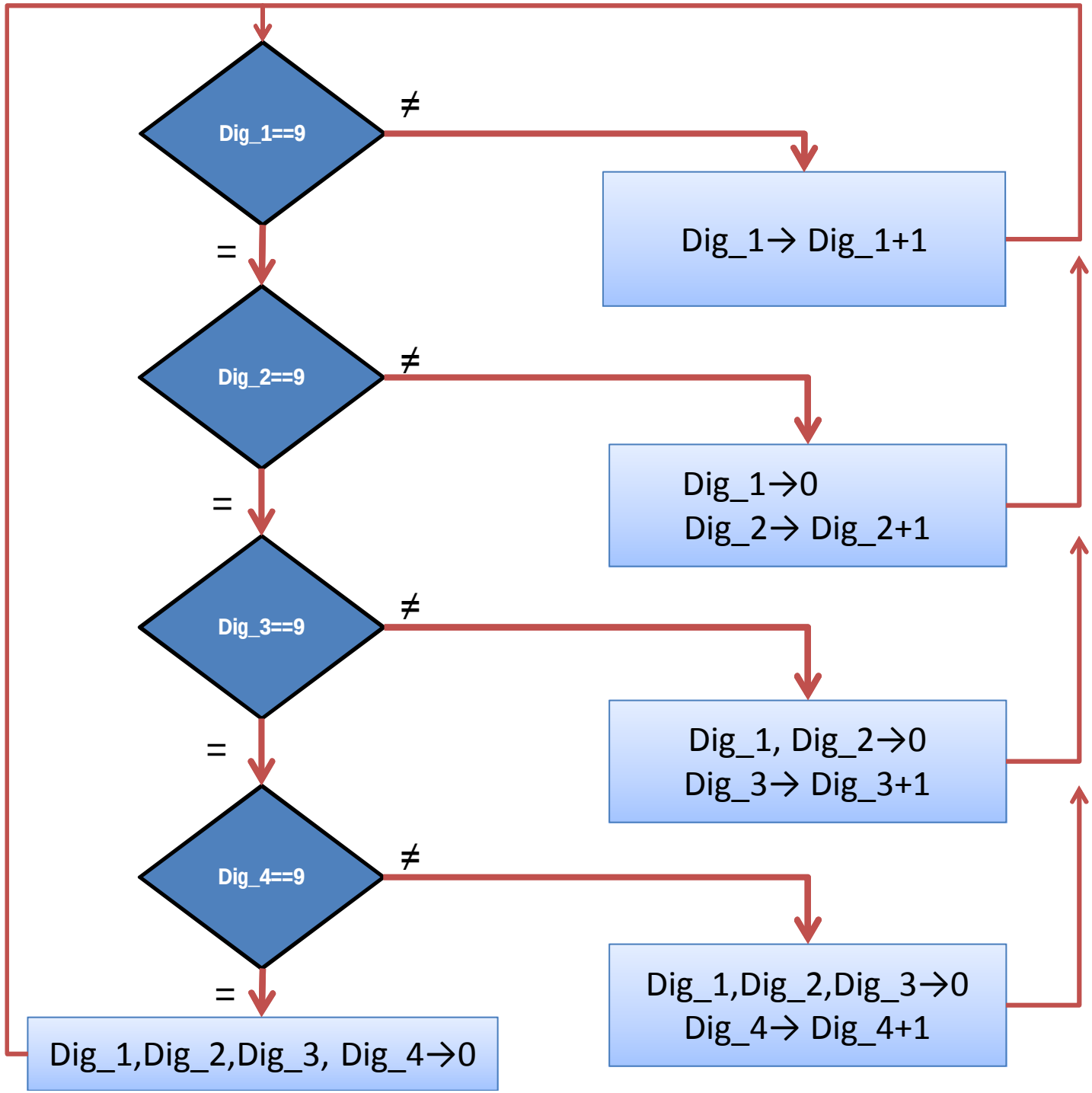
Lab-6

Main Objectives

- Implementation of a simple DIGITAL CLOCK on Easy8051v6 Development Board

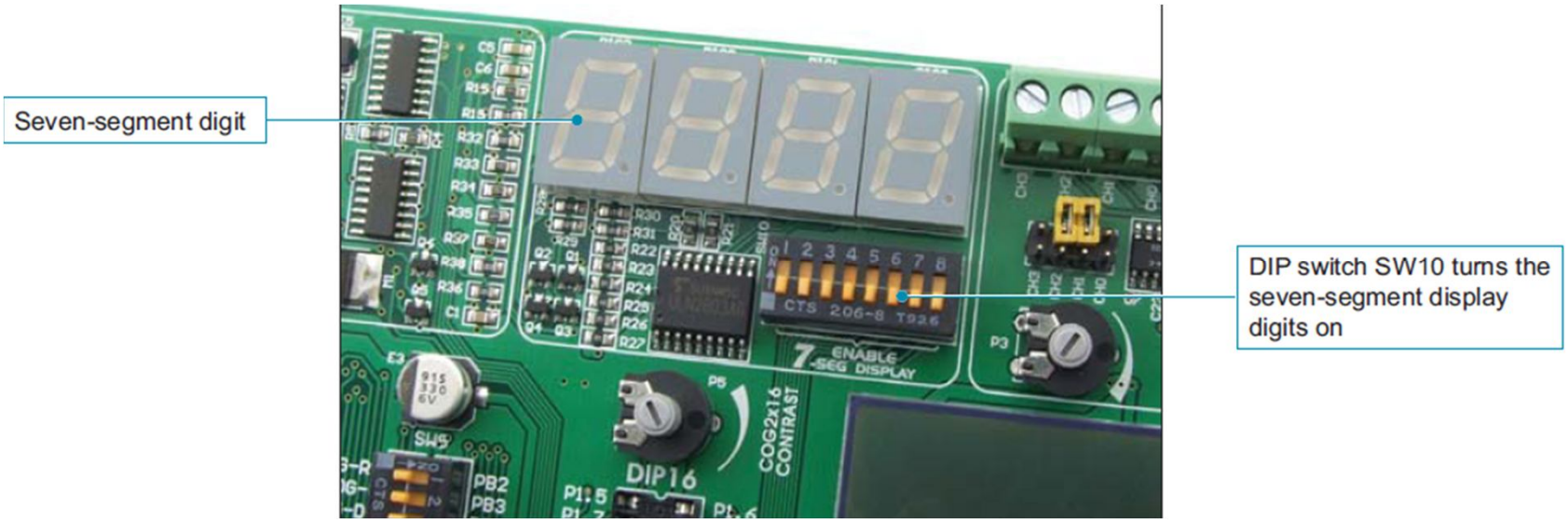
Unpacked BCD increment logic

- For Digital clock we will make 4 variables in Registers with name, Dig_1, Dig_2, Dig_3, and Dig_4. We will have to implement an increment logic that follows decimal counting.
- For that, we will have to monitor the digit to see if it has become 9.
- Then, we will make it zero and increment the next digit.


Dig_1==9
≠
Dig_1→ Dig_1+1
=
Dig_2==9
≠
Dig_1→0
Dig_2→ Dig_2+1
=
Dig_3==9
≠
Dig_1, Dig_2→0
Dig_3→ Dig_3+1
=
Dig_4==9
≠
Dig_1,Dig_2,Dig_3→0
Dig_4→ Dig_4+1
=
Dig_1,Dig_2,Dig_3, Dig_4→0

Todays Task 1

- Design a seconds counter which counts from 0000-9999 in KEIL and run it on easy 8051v6 development system. The output should be displayed on seven segments.



Task Code

```
ORG 0H
DIG_1 EQU R7
DIG_2 EQU R6
DIG_3 EQU R5
DIG_4 EQU R4
MOV DPTR,#200H

;Start of Main Code
START:
MOV R3,#255
LOOP:
MOV A,DIG_1
MOVC A,@A+DPTR
MOV P1,#01H
MOV P0,A
ACALL DELAY

MOV A,DIG_2
MOVC A,@A+DPTR
MOV P1,#02H
MOV P0,A
ACALL DELAY

MOV A,DIG_3
MOVC A,@A+DPTR
MOV P1,#04H
MOV P0,A
ACALL DELAY

MOV A,DIG_4
MOVC A,@A+DPTR
MOV P1,#08H
MOV P0,A
ACALL DELAY
DJNZ R3,LOOP

;INCREMENT LOGIC

CJNE DIG_1,#09H,STEP1
CJNE DIG_2,#09H,STEP2
CJNE DIG_3,#09H,STEP3
CJNE DIG_4,#09H,STEP4
MOV DIG_4,#00H
MOV DIG_4,#00H
MOV DIG_4,#00H
MOV DIG_4,#00H
SJMP START
STEP1:
INC DIG_1
INC DIG_1
SJMP START

STEP2:
MOV DIG_1,#00H
INC DIG_2
SJMP START

STEP3:
MOV DIG_1,#00H
MOV DIG_2,#00H
INC DIG_3
SJMP START

STEP4:
MOV DIG_1,#00H
MOV DIG_2,#00H
MOV DIG_3,#00H
INC DIG_4
SJMP START

;--Delay Sub-Routine
DELAY:
MOV R0,255 ;DELAY
HERE:DJNZ R0,HERE
RET

ORG 200H
DB 0C0H,0F9H,0A4H,0B0H,099H,092H,082H,0F8H,080H,090H,0A0H,083H,0A7H,0A1H,84H,8EH
END
```

Todays Task 2

- Design a digital clock in KEIL and run it on easy 8051v6 development system. The output should be displayed on seven segments.
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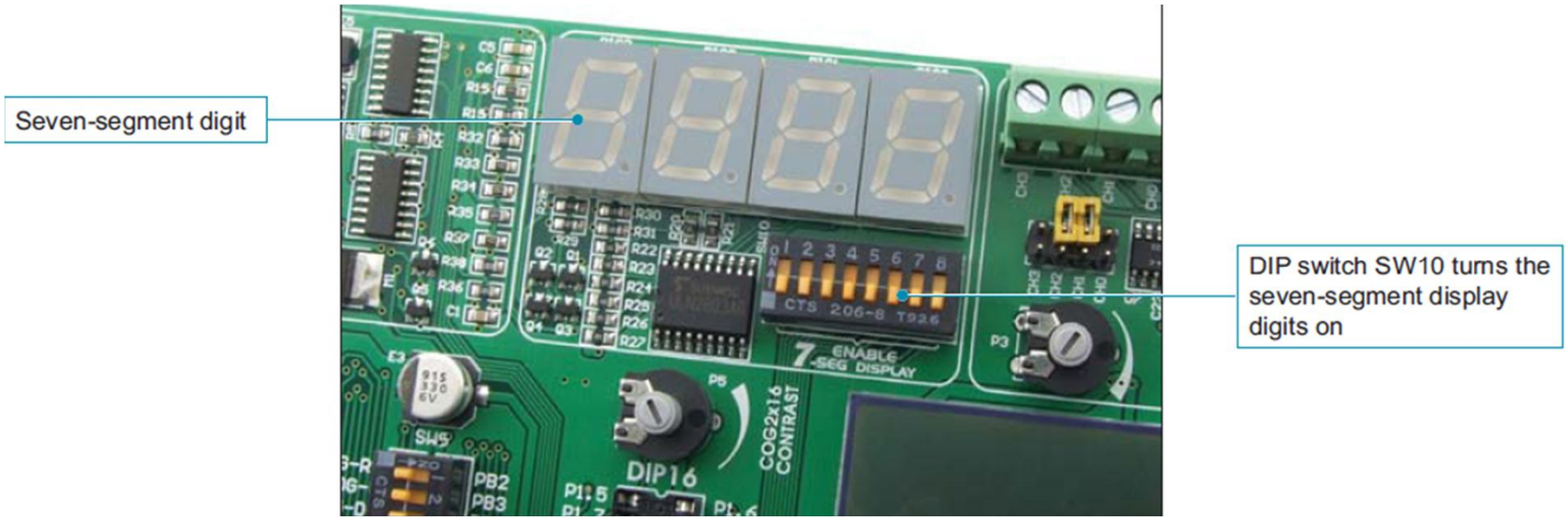

Proteus Diagram