

FACULTY OF ENGINEERING AND IT
COMPUTER SYSTEMS ENGINEERING DEPARTMENT

Embedded Systems Lab Report

<7-Segment>

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Experiment Name:	7-Segment
Experiment No.:	3
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1. OBJECTIVES

This experiment aims to:

1. Learn about the 7-segment display board and how to operate it.
2. Learn how to connect the 7-segment display board to the PIC micro multiprogrammer board.
3. Use of external hardware interrupts in the PIC18.

2. INTRODUCTION

The 7-segment display, also written as “seven segment display” consists of seven LEDs arranged in a rectangular fashion. Each of the seven LEDs is called a segment because when illuminated the segment forms part of a numerical digit both Decimal and Hex to be displayed. As each LED has two connecting pins, one called the Anode and the other called the Cathode. An additional 8th LED is sometimes used within the same package thus allowing the indication of a decimal point, (DP) when two or more 7-segment displays are connected together to display numbers greater than ten.

This board provides a quad seven-segment common anode display, with an option to operate off only one port using links. This display requires two E-blocks ports to operate all four displays. If only one seven segment display is needed then only one E-block port is required and a jumper link of the board can be used to permanently engage one of the display digits.

3. COMPONENTS REQUIRED:

ID	Component name	Amount
1	PIC micro multiprogrammer board	1
2	7-segment display board	1
3	Switch board	1
4	Power source	1
5	Wires	2
6	MPLAB IDE Program	1
7	MLoader	1

4. TASKS

- display the number 11 on the seven segment displays for two seconds, then display the number 54.
- display the repeating sequence 10, 11 ,12, ... 19, 10, 11, ... etc. Use a 0.5 second delay between the steps. Whenever SW2 is pressed, the sequence is restarted from 10 (Use INT2).

5. FLOWCHART (USE ANY DIAGRAM APP LIKE [DIAGRAMS.NET](https://diagrams.net))

Figure 1: Task

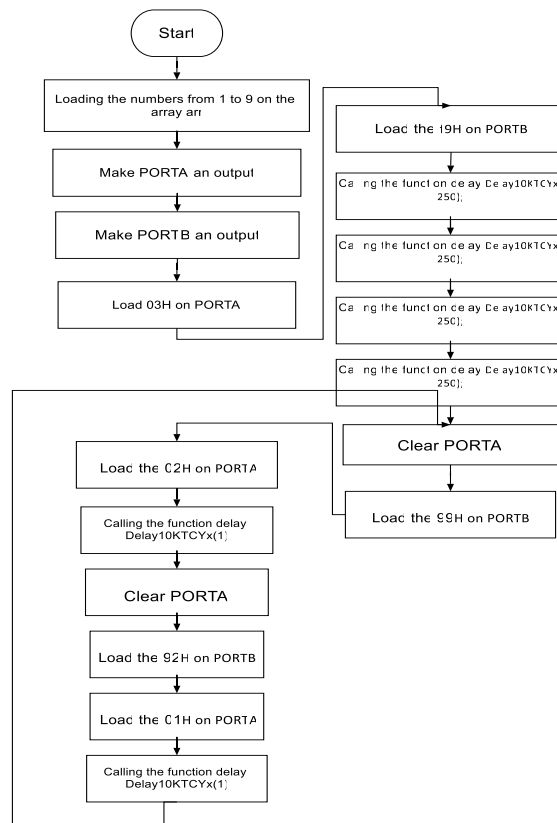
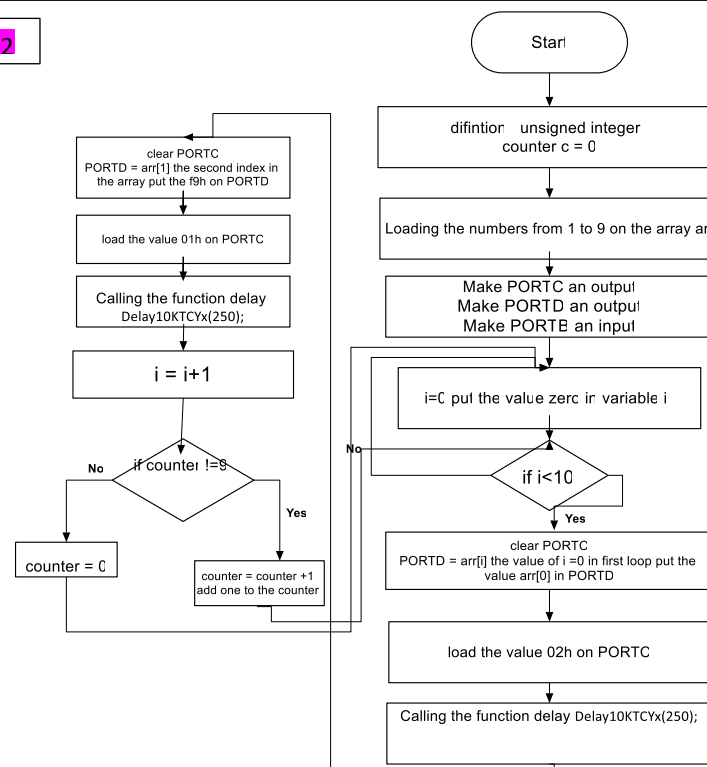


Figure 2: Task 2



6. CODES

6.1. Task 1

```
Void main( ){  
Char arr[ ]={0xc0 , 0xf9 , 0xa4 , 0xb0 , 0x99 , 0x92, 0x82 , 0xf8 , 0x80 , 0x98};  
TRISA=0X00;  
TRISB=0X00;  
While(1){  
PORTA= 0x03;  
PORTB =arr[1];  
Delay10KTCYx(250);  
Delay10KTCYx(250);  
Delay10KTCYx(250);  
Delay10KTCYx(250);  
While(1){  
PORTA= 0x00;  
PORTB =arr[4];  
PORTA=0x02;  
Delay10KTCYx(1);  
PORTA =0x00;  
PORTB =arr[5];  
PORTA =0x01;  
Delay10KTCYx(1);  
}  
}  
}
```

6.2. Task 2

```

void INTO_ISR(void);
unsigned int i;
#pragma interrupt chk_isr
void chk_isr(void){
if(INTCON3bits.INT2IF == 1) INTO_ISR(); }
#pragma code My_HiPrio_Int=0x08
void My_HiPrio_Int (void){
    _asm
    GOTO chk_isr
    _endasm
}
void main(){
    unsigned int i;
    char C = 0;

        char arr[ ] = {0xc0 , 0xf9,0xa4,0xb0 ,0x99, 0x92, 0x82 , 0xf8 ,0x80 , 0x98 };
        TRISC = 0x00;
        TRISD = 0x00;
        TRISBbits.TRISB2 = 1;
        INTCON3bits.INT2IF = 0;
        INTCON3bits.INT2IE = 1;
        INTCONbits.GIE = 1;
            while(1){
                for(i = 0 ; i < 10; i++){
                    PORTC = 0x00;
                    PORTD = arr[i];
                    PORTC = 0x02;
                    Delay10KTCYx(250);
                    PORTC = 0x00;
                    PORTD = arr[1];
                    PORTC = 0x01;
                    Delay10KTCYx(250);

                }
            If(c! = 9)
            C=C+1;
            Else
            C=0;
            Delay10KTCYx(250);}}
void INTO_ISR(void){
    INTCON3bits.INT2IF = 0;}

```

7. PROCEDURES

- 1- We learned about the 7-segment display board and how to operate it and connect it with the PIC micro multiprogrammer board.
- 2- In 7-segment has 2-PORT one of them use to define the 7-segment and the second use to put the data.
- 3- There are 2 type of 7-segment :
 1. common Anode
 2. Common Cathode.
- 4- Do the first task that shows the number 11 for two seconds, then the number 54.
- 5- Applying the second task, we ran the timer from 10 to 19 and it was turned on and put out.
- 6- When we did the second task, we encountered a problem that we could not complete the second part of the code. When pressing sw2, the interrupt occurred, and we activated the interrupt and checked if it happened or not, that is, if sw2 was pressed or not, but an error was shown in this part of the code .

8. DISCUSSIONS AND CONCLUSIONS

In our third lab experiment, we got to know the 7-segment display board, how to operate it and program it, and we ran two tasks, one on the 7-segment just to display numbers with a 2-second delay function, and we finished it. The second task is to use the seven-part board as well as the switch board, but we were not able to finish it completely. We finished the counter part and tried to fix the code and complete the switch board part and the interrupt occurred.

We applied segment 7 and how to show one or two digits on it. We implemented the second task and made a counter to display the numbers 10 to 19 on the 7-segment display board. We used the for and if loop.