



**YILDIZ TECHNICAL UNIVERSITY
MECHATRONICS ENGINEERING
MICROPROCESSORS AND PROGRAMMING
LAB EXPERIMENT#2**

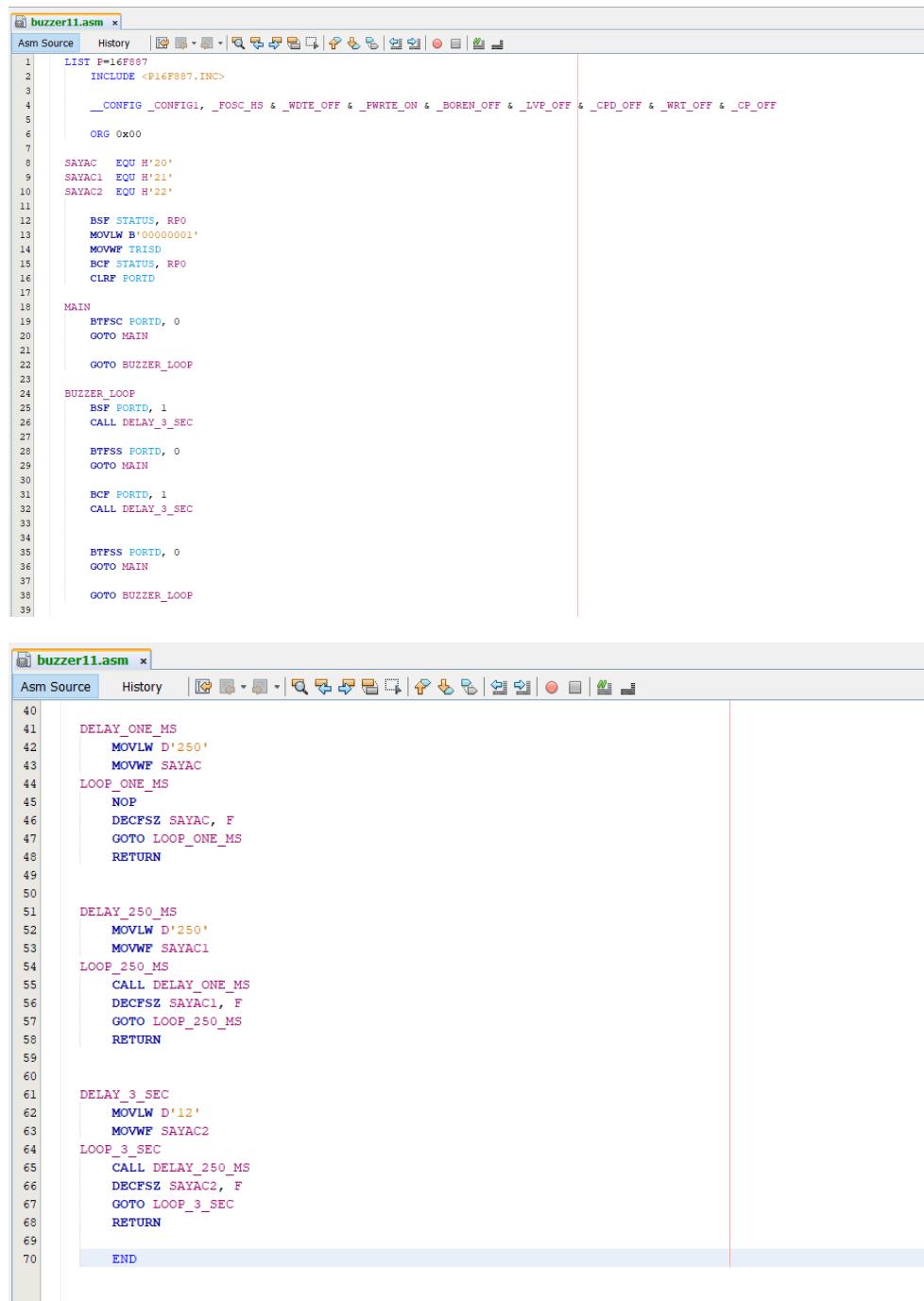
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1. Purpose of the Experiment

The purpose of this experiment is to learn the digital input–output operations of the PIC16F887 microcontroller, correctly configure its configuration bits, and use software-based delay subroutines to control a buzzer through a push button. In addition, the experiment aims to apply fundamental microcontroller programming principles such as the use of an external crystal oscillator, configuring TRIS and PORT registers, and performing input reading and output control through the polling (continuous monitoring) method.

2. Code Part



The image shows two windows of a PIC assembly code editor, both titled "buzzer11.asm". The top window displays lines 1 through 39 of the assembly code, while the bottom window displays lines 40 through 70. The code is written in PIC assembly language and includes directives, variable definitions, and several subroutines for controlling a buzzer and managing delays.

```
1 LIST P=16F887
2 INCLUDE <P16F887.INC>
3
4 _CONFIG1 _CONFIG1, _FOSC_HS & _WDTE_OFF & _PWRTE_ON & _BOREN_OFF & _LVP_OFF & _CPD_OFF & _WRT_OFF & _CP_OFF
5
6 ORG 0x00
7
8 SAYAC EQU H'20'
9 SAYAC1 EQU H'21'
10 SAYAC2 EQU H'22'
11
12 BSF STATUS, RP0
13 MOVLM B'00000001'
14 MOVWF TRISD
15 BCF STATUS, RP0
16 CLRF PORTD
17
18 MAIN
19 BTFSC PORTD, 0
20 GOTO MAIN
21
22 GOTO BUZZER_LOOP
23
24 BUZZER_LOOP
25 BSF PORTD, 1
26 CALL DELAY_3_SEC
27
28 BTFS PORTD, 0
29 GOTO MAIN
30
31 BCF PORTD, 1
32 CALL DELAY_3_SEC
33
34
35 BTFS PORTD, 0
36 GOTO MAIN
37
38 GOTO BUZZER_LOOP
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```

DELAY_ONE_MS
MOVlw D'250'
MOVwf SAYAC
LOOP_ONE_MS
NOP
DECFSZ SAYAC, F
GOTO LOOP_ONE_MS
RETURN

DELAY_250_MS
MOVlw D'250'
MOVwf SAYAC1
LOOP_250_MS
CALL DELAY_ONE_MS
DECFSZ SAYAC1, F
GOTO LOOP_250_MS
RETURN

DELAY_3_SEC
MOVlw D'12'
MOVwf SAYAC2
LOOP_3_SEC
CALL DELAY_250_MS
DECFSZ SAYAC2, F
GOTO LOOP_3_SEC
RETURN

END

3. Images of Simulation (Proteus)

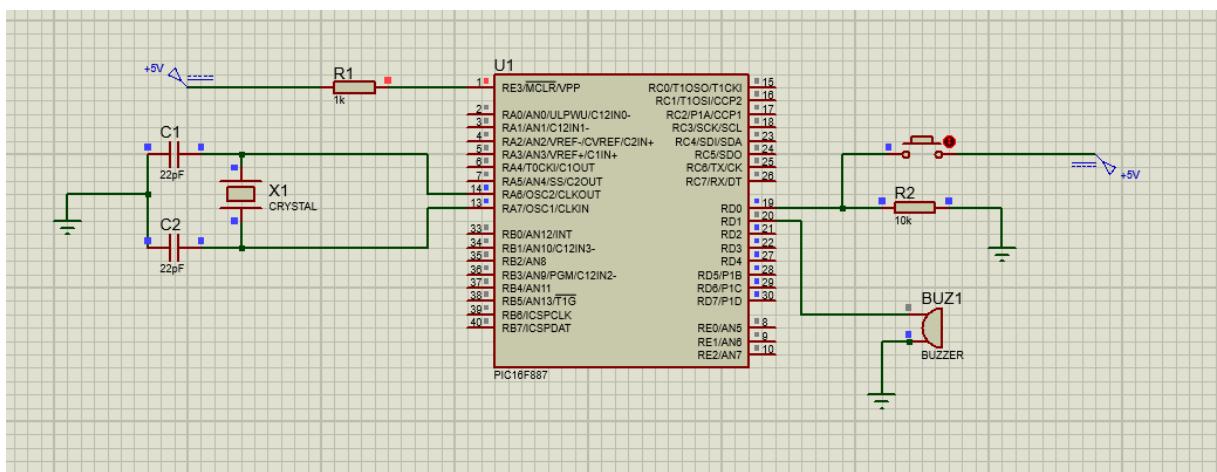


Figure 1:Circuit Diagram Description (Switch Open / Buzzer Off)

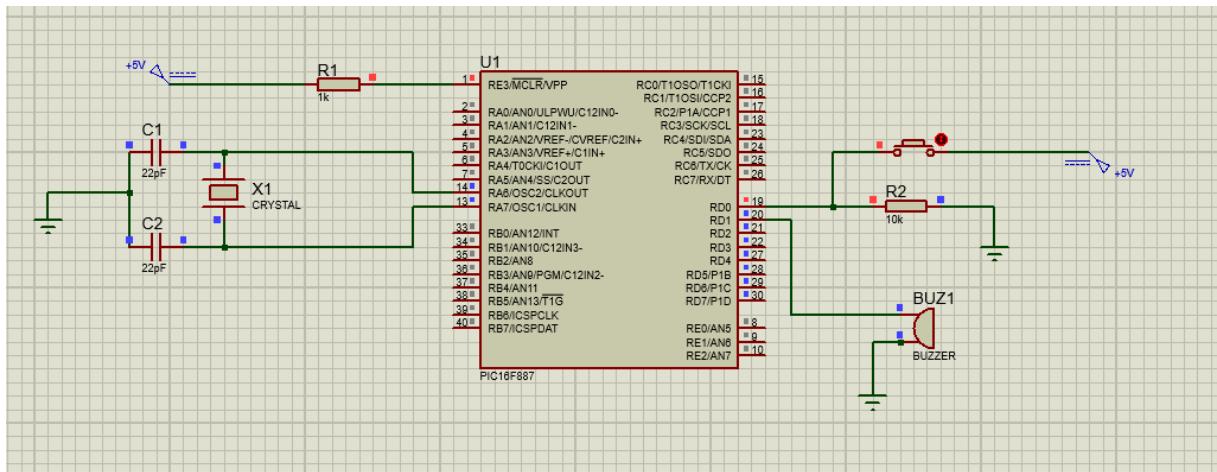


Figure 2:Circuit Status: Switch CLOSED (Buzzer ON for 3 Seconds)

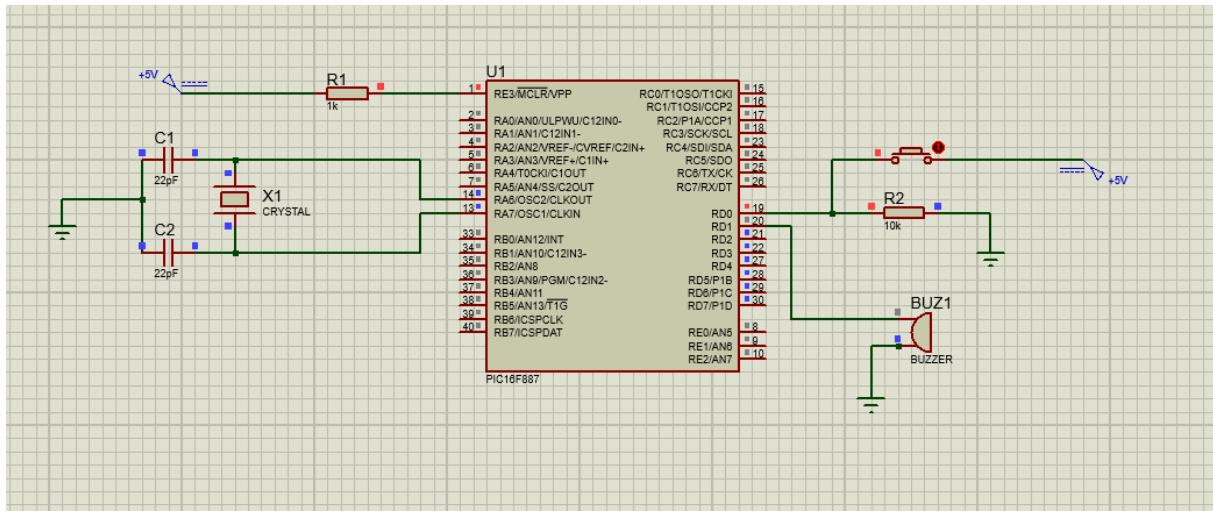


Figure 3: Circuit Status: Switch CLOSED (Buzzer OFF for 3 Seconds)