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

G21

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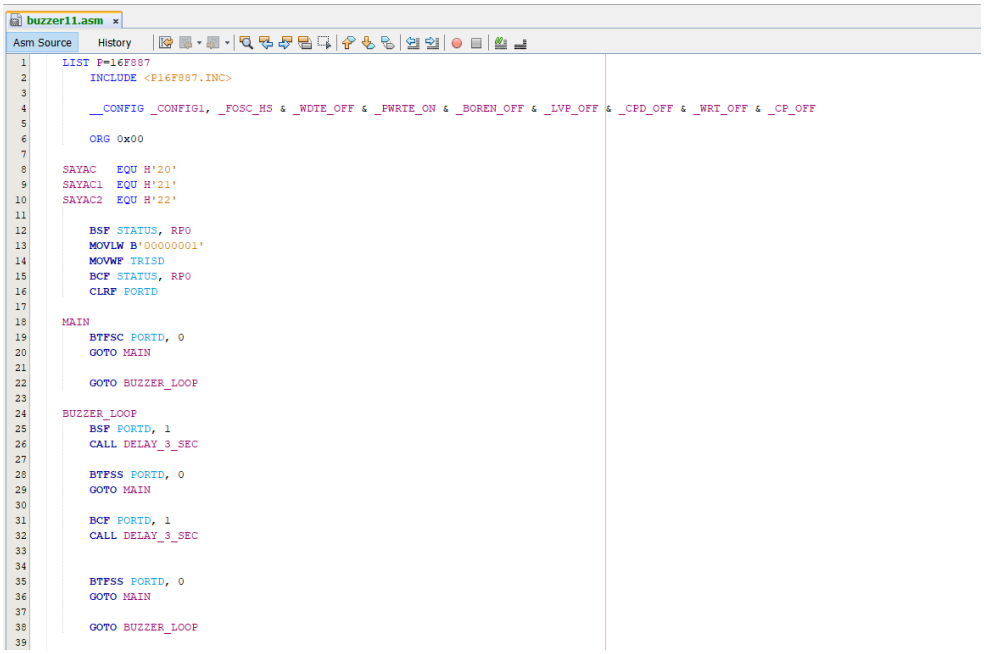
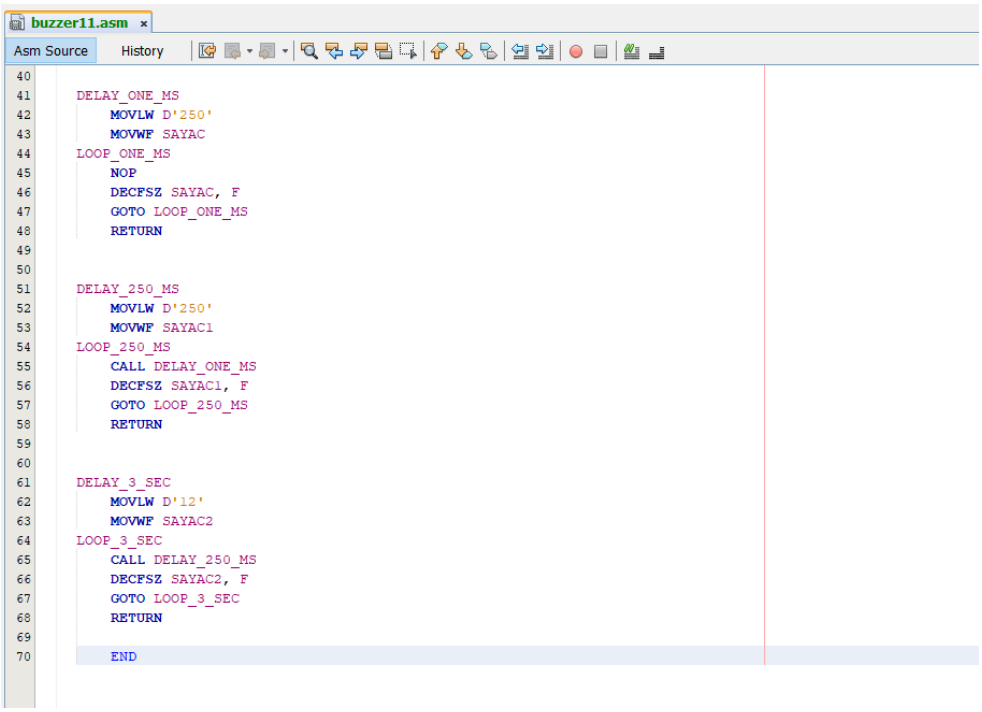
1. Purpose of the Experiment

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



```
buzzer11.asm
Asm Source  History
LIST P=16F887
    INCLUDE <P16F887.INC>

    __CONFIG _CONFIG1, _FOSC_HS & _WDTE_OFF & _PWRTE_ON & _BOREN_OFF & _LVP_OFF & _CPD_OFF & _WRT_OFF & _CP_OFF

    ORG 0x00

SAYAC   EQU H'20'
SAYAC1  EQU H'21'
SAYAC2  EQU H'22'

    BSF STATUS, RP0
    MOVLW B'00000001'
    MOVWF TRISD
    BCF STATUS, RP0
    CLRF PORTD

MAIN
    BTFSC PORTD, 0
    GOTO MAIN

    GOTO BUZZER_LOOP

BUZZER_LOOP
    BSF PORTD, 1
    CALL DELAY_3_SEC

    BTFSS PORTD, 0
    GOTO MAIN

    BCF PORTD, 1
    CALL DELAY_3_SEC


    BTFSS PORTD, 0
    GOTO MAIN

    GOTO BUZZER_LOOP
```



```
buzzer11.asm
Asm Source  History
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)

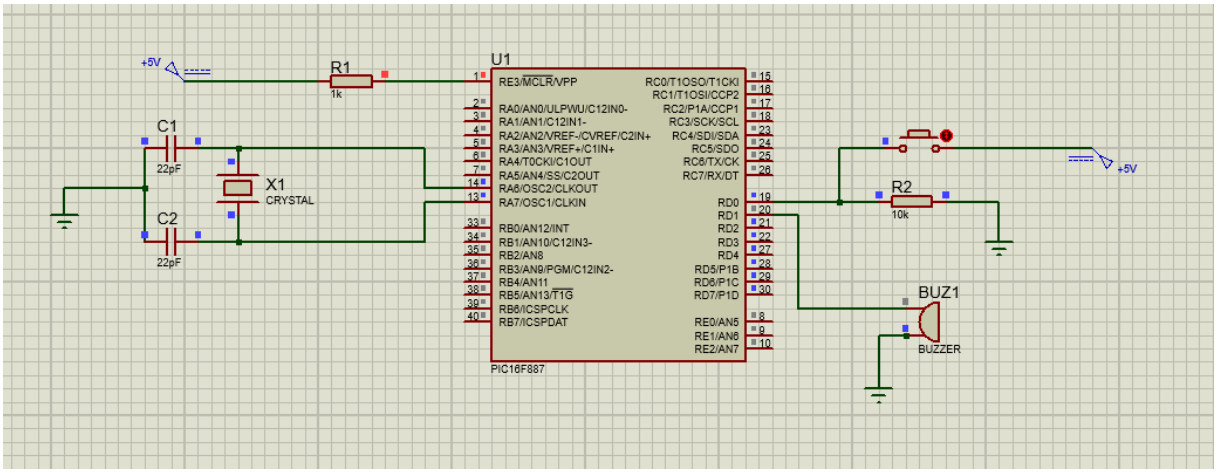


Figure 1:Circuit Diagram Description (Switch Open / Buzzer Off)

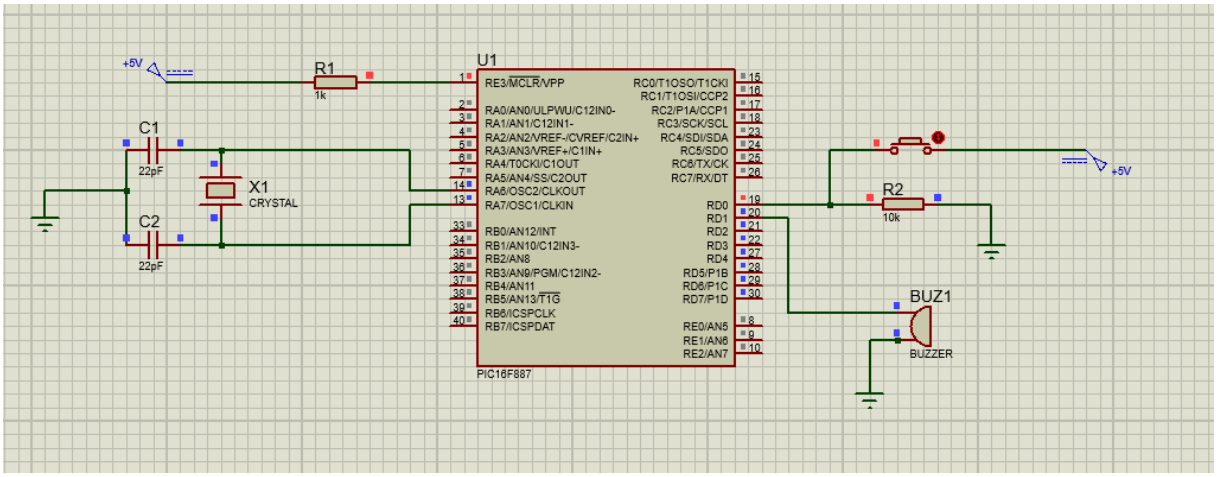


Figure 2:Circuit Status: Switch CLOSED (Buzzer ON for 3 Seconds)

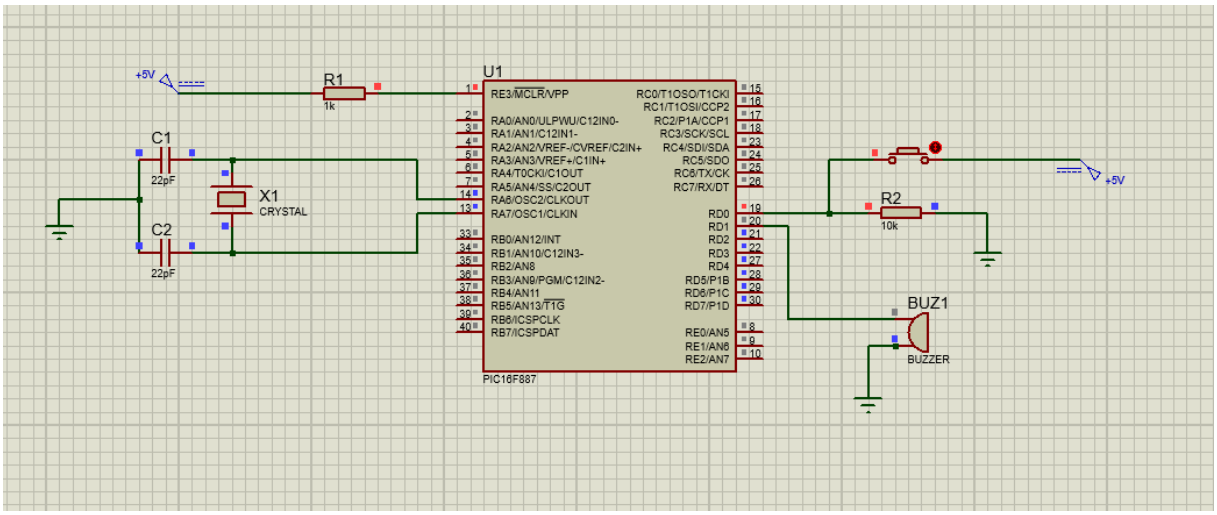


Figure 3:Circuit Status: Switch CLOSED (Buzzer OFF for 3 Seconds)