#### MICROPROCESSOR BASED SYSTEM DESIGN

#### TASK 9



## Spring 2021 CSE307 MBSD

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Class Section: **B** 

"On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work."

Student Signature:

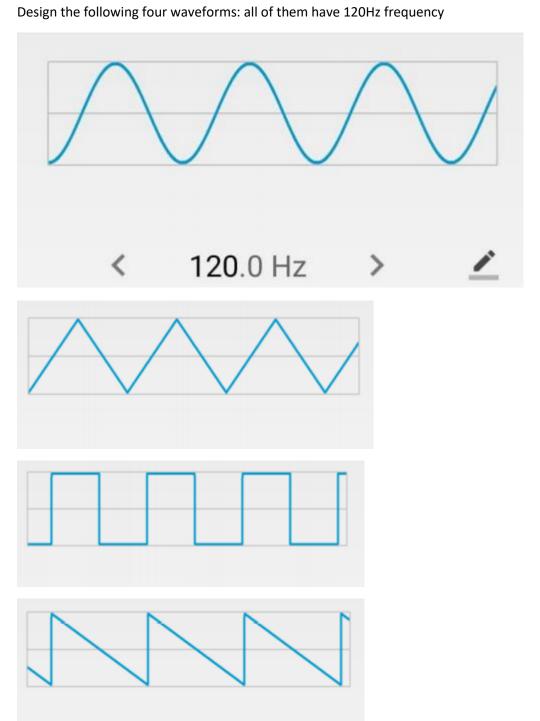
Submitted to:

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Sunday, July 4, 2021

Department of Computer Systems Engineering
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Task:



### **Problem Analysis:**

### **DAC:**

DAC is used for digital to analog conversion. We will be using DAC0808 in this task. DAC0808 has 8-bits digital input and it converts this input into analog. It has Iout and Vref pins. Formulas for DAC:

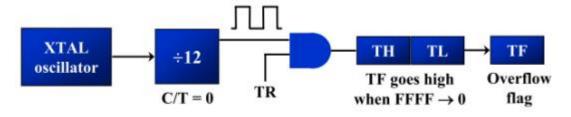
$$Iref = Vref / R \\ Iout = Iref(D7/2 + D6/4 + D5/8 + D4/16 + D3/32 + D2/64 + D1/128 + D0/256) \\ Vout = Iout*R$$

#### TMOD:

Timer 0: Used as Timer with mode 1

IE:

#### Timer 0 (Used as timer in Mode 1):



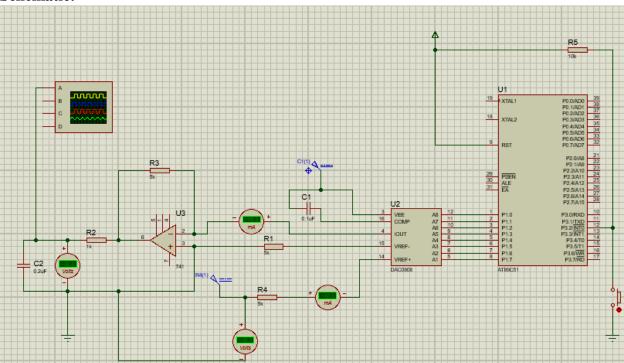
#### Code:

```
#include <reg51.h>
#include <stdio.h>
int wave = 0; //Used to keep track of which waveform to show
int index =0; //Used in the formation of a sine wave
unsigned char i=0; //Used in the formation of triangular wave and square wave
unsigned char ramp = 255; //Used in the formation of ramp wave
char sine [12] = \{128,192,239,255,239,192,128,64,17,0,17,64\};
                                                                 //Digital values that needs to
be sent at P1 to form sine wave
void ext0() interrupt 0//Called when a button is pressed at P3.2
 wave++;
 i = 0;
 index = 0;
 ramp = 255;
void timer() interrupt 1
                            //Called when the TF0 bit is set
       switch(wave%4)
         case 0:
                             //Sine wave
           index++;
           index = index \% 12;
           TH0 = 0xFD;
                            //8.4ms/12 = 0.7ms delay
           TL0 = 0x43;
           break:
         case 1:
                     //Do nothing
           break:
         case 2:
                     //Ramp wave
           ramp--;
           TH0 = 0xFF;
                            //32usec delay
           TL0 = 0xDF;
           break:
         case 3:
                     //Square Wave
           if(i==0)
               i=255;
           else
               i = 0;
           TH0 = 0xEF; //8.4/2 = 4.2msec delay
           TL0 = 0x97;
           break:
```

```
void init()
                     //Timer 0 mode 1
 TMOD = 0x1;
 EA = 1;
                             //Enable Global interrupt
 ET0 = 1;
                     //Enale Timer 0 interrupt
                     //Enable external interrupt 0
 EX0 = 1;
 TH0 = 0xFD;
                             //700usec delay
 TL0 = 0x43;
                             //Make interrupt 0 edge triggered
 IT0 = 1;
}
void delay()
  unsigned int a;
  for(a=0;a<1;a++);
void main(void)
 init();
  TR0 = 1;
              //Start timer 0
 while (1)
    switch(wave%4)
       case 0:
           P1 = sine[index];//Send sine wave
         break;
        case 1:
                     //Send Triangular Wave
         for(i = 0; i < 255; i++)
           P1 = i;
           delay();
         for(i=255;i>0;i--)
           P1 = i;
          delay();
         break;
        case 2:
                             //Send Ramp wave
           P1 = ramp;
         break;
```

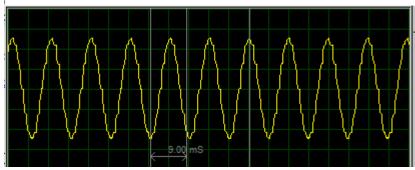
# Output / Graphs / Plots / Results:

## **Schematic:**



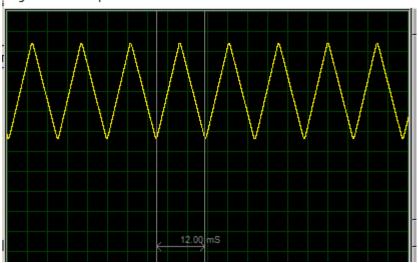
### **Sine Wave(Button not pressed):**

Digital Oscilloscope



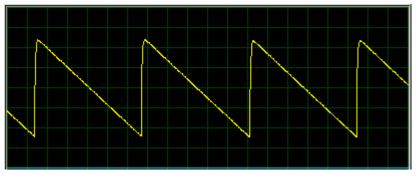
## **Triangular Wave (Button pressed once):**

Digital Oscilloscope



### **Ramp Wave (Button pressed twice):**

Digital Oscilloscope



## **Square Wave (Button Pressed trice):**

Digital Oscilloscope

