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MICROCONTROLLER AND MICROPROCESSOR LAB

EXPERIMENT 11

AIM: Write an embedded C program to generate different waves using DAC.

SOFTWARE USED: Keil uVision5

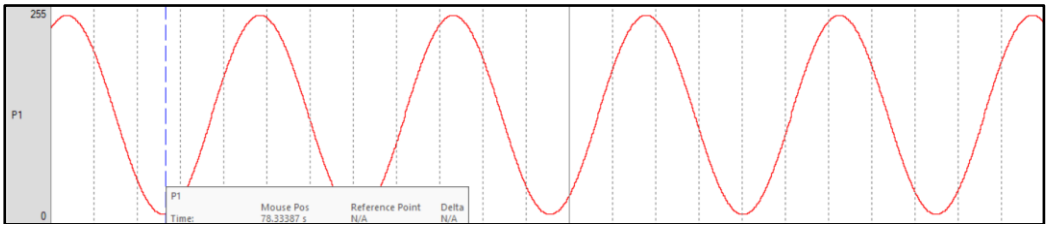
Question-1: Write an embedded C program for the generation of a sine wave of frequency 60 Hz using DAC.

Code:

```
#include<reg51.h>
#include<math.h>
#include<intrins.h>
sbit DAC_WR=P3^0;
unsigned int i=0,x=0,count;
unsigned int dac_cntr;
unsigned int xdata arr[360];
void main()
{
	TMOD=0x01;
	IE=0x82;
	TH0=0xFF;
	TL0=0xCC;
	TR0=1;
	for(i=0;i<360;i++)
	{
		count=(sin(i*3.14/180)*127)+128;
		arr[i]=count;
	}
	while(1)
	{
		if(x==1)
		{
			x=0;
			DAC_WR=1;
			dac_cntr++;
			P1=arr[dac_cntr];
			DAC_WR=0;
			if(dac_cntr==359)
			{
				dac_cntr=0;
			}
		}
	}
}
void timer0_int() interrupt 1
{
	x=1;
```

```
        TH0=0xFF;
        TL0=0xCC;
        return;
}
```

Result:



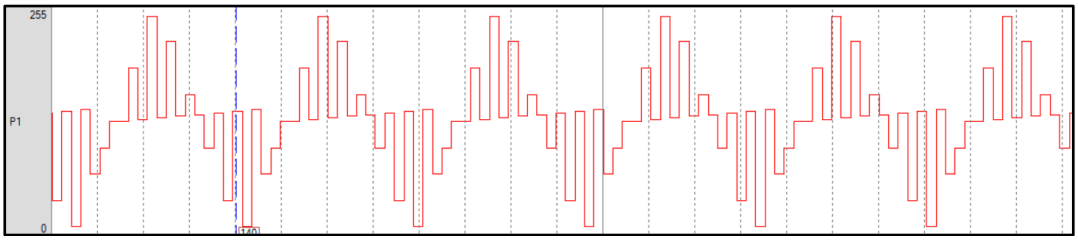
<u>Question-2</u>: Write an embedded C program for the generation of a unipolar triangular wave of frequency 50 Hz using DAC.

Code:

```
#include <reg51.h>
#include <math.h>
sbit DAC_WR=P3^0;
unsigned int i=0,x=0,z=0;
unsigned int dac_cntr = 0;
void main()
{
        TMOD=0X01;
        IE=0X82;
        TH0=0XFF; // Timer value for 39*10^(-6) sec =  [10*10^(-3)/256]
        TL0=0X88;
  TR0=1;
        while(1)
        {
                if(x==1)
                {
                        x=0;
                        if(z==0)
                        {
                                DAC_WR=1;
      P1=dac_cntr;
      dac_cntr++;
      DAC_WR=0;
      if(dac_cntr==255)
              {
                                        z=1;
              }
                        }
    if(z==1)
            {
                                DAC_WR=1;
                                P1=dac_cntr;
```

```
                                dac_cntr--;
                                DAC_WR=0;
                                if(dac_cntr==0)
                                {
                                        z=0;
                                }
                        }
                }
        }
}
void timer0_int() interrupt 1
{
         x=1;
        TH0=0xFF;
        TL0=0x88;
         return;
}
```

Result:



<u>Question-3</u>: Write an embedded C program for the generation of a bipolar triangular wave of frequency 50 Hz using DAC.

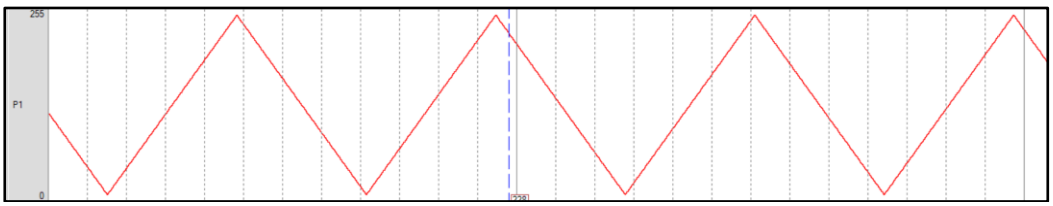
Code:

```
#include <reg51.h>
#include <math.h>
sbit DAC_WR=P3^0;
unsigned int i=0,x=0,z=0;
unsigned int dac_cntr;
void main()
{
        TMOD=0X01;
         IE=0X82;
         TH0=0XFF;   // Timer value for 39*10^(-6) second [10*10^(-3)/256]
         TL0=0X88;
          TR0=1;
         dac_cntr=127;
                while(1)
                {
                if(x==1)
                  {
                        x=0;
                                if(z==0)
```

```
{
        DAC_WR=1;
        P1=dac_cntr;
       dac_cntr++;
       DAC_WR=0;
         if(dac_cntr==255)
                {
                   z=1;
                }
 }
           if(z==1)
              {
                  DAC_WR=1;
                  P1=dac_cntr;
                      dac_cntr--;
                   P1=dac_cntr;
                            if(dac_cntr==0)
                                    {
                                          z=2;
                                     }
                  }
                                    if(z==2)
                                           {
                                                 DAC_WR=1;
                                                       P1=dac_cntr;
             dac_cntr++;
               DAC_WR=0;
             if(dac_cntr==127)
                   {
                           z=0;
                   }
                }
           }
         }
}

void timer0_int() interrupt 1
{
          x=1;
         TH0=0xFF;
         TL0=0x88;
          return;
}
```

Result:



Question-4: Write an embedded C program for the generation of a staircase wave of frequency 50 Hz using DAC.

Code:

```
#include<reg51.h>
#include<math.h>
#include<intrins.h>

sbit DAC_WR=P3^0;
unsigned int i=0,x=0,count;
unsigned int dac_cntr;
unsigned int xdata
arr[18]={128,160,192,224,255,255,224,192,160,128,96,64,32,1,1,32,64,96};

void main()
{
        TMOD=0x01;
        IE=0x82;
        TH0=0xFC;
        TL0=0x00;
        TR0=1;
        for(i=0;i<15;i++)
        {
                count=((i+)+128;
        arr[i]=count;
        }
        while(1)
        {
                if(x==1)
                {
                        x=0;
                        DAC_WR=1;
                        dac_cntr++;
                        P1=arr[dac_cntr];
                        DAC_WR=0;
                        if(dac_cntr==17)
                        {
                                dac_cntr=-1;
                        }
                }
        }
}

void timer0_int() interrupt 1
{
x=1;
TH0=0xFC;
TL0=0x00;
return;
}
```

Result: