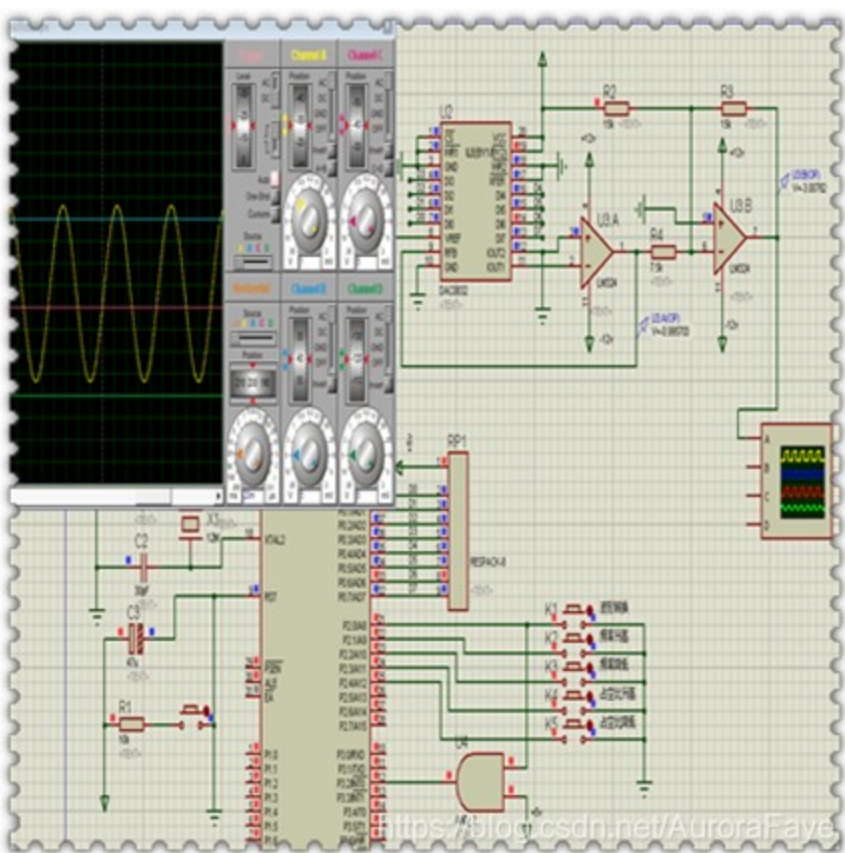


信号发生器是一种常用的信号源，广泛地应用于电子电路、自动控制系统和教学实验等领域。 本设计采用AT89C51单片机作为控制核心，外围采用数字/模拟转换电路（DAC0832）、运放电路（LM324）、按键和LCD液晶显示电路。电路采用单片机和一片DAC0832数模转换器组成数字式低频信号发生器,可产生正弦波、矩形波、锯齿波和三角波四种波形。系统通过单片机产生数字信号，通过DAC0832转换为模拟信号，再通过放大器LM324就可以得到双极性的各种波形，最终由示波器显示出来。通过键盘来控制四种波形的类型选择、频率变化，并通过液晶1602显示其各自的波形类型以及频率数值。

本设计硬件电路简单，软件功能完善，控制系统可靠，性价比较高，具有一定的实用价值和参考价值。

关键词：AT89C51 单片机； 函数信号发生器； DAC0832； LCD液晶显示



```
1  #include <reg51.h>
2  #include<string.h>
3  #define uchar unsigned char
4  #define uint unsigned int
5
6      uchar code tosin[256]=
7  {0x80,0x83,0x86,0x89,0x8d,0x90,0x93,0x96,0x99,0x9c,0x9f,0xa2,0xa5,0xab,
8  0xae,0xb1,0xb4,0xb7,0xba,0xbc,0xbf,0xc2,0xc5,0xc7,0xca,0xcc,0xcf,0xd1,0xd4,0xd6,0xd8,
9  0xda,0xdd,0xdf,0xe1,0xe3,0xe5,0xe7,0xe9,0xea,0xec,0xee,0xef,0xf1,0xf2,0xf4,
10 0xf5,0xf6,0xf7,0xf8,0xf9,0xfa,0xfb,0xfc,0xfd,0xfe,0xff,0xff,0xff,0xff,0xff,
11 0xff,0xff,0xff,0xff,0xff,0xff,0xfe,0xfd,0xfd,0xfc,0xfb,0xfa,0xf9,0xf8,0xf7,0xf6,0xf5,
12 0xf4,0xf2,0xf1,0xef,0xee,0xec,0xea,0xe9,0xe7,0xe5,0xe3,0xe1,0xde,0xdd,0xda,0xd8,
13 0xd6,0xd4,0xd1,0xcf,0xcc,0xca,0xc7,0xc5,0xc2,0xbf,0xbc,0xba,0xb7,0xb4,0xb1,0xae,0xab,
14 0xa8,0xa5,0xa2,0x9f,0x9c,0x99,0x96,0x93,0x90,0x8d,0x89,0x86,0x83,0x80,
15 0x80,0x7c,0x79,0x76,0x72,0x6f,0x6c,0x69,0x66,0x63,0x60,0x5d,0x5a,0x57,0x55,
16 0x51,0x4e,0x4c,0x48,0x45,0x43,0x40,0x3d,0x3a,0x38,0x35,0x33,0x30,0x2e,0x2b,
17 0x29,0x27,0x25,0x22,0x20,0x1e,0x1c,0x1a,0x18,0x16,0x15,0x13,0x11,0x10,0x0e,
18 0x0d,0x0b,0x0a,0x09,0x08,0x07,0x06,0x05,0x04,0x03,0x02,0x02,0x01,0x00,0x00,
19 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x01,0x02 ,0x02,0x03,0x04,
20 0x05,0x06,0x07,0x08,0x09,0x0a,0x0b,0x0d,0x0e,0x10,0x11,0x13,0x15,0x16,0x18,
21 0x1a,0x1c,0x1e,0x20,0x22,0x25,0x27,0x29,0x2b,0x2e,0x30,0x33,0x35,0x38,0x3a,
22 0x3d,0x40,0x43,0x45,0x48,0x4c,0x4e ,0x51,0x55,0x57,0x5a,0x5d,0x60,0x63,0x66 ,
23 0x69,0x6c,0x6f,0x72,0x76,0x79,0x7c,0x80 }; //正弦波码
24
25  //--按键
26  sbit K1=P2^0;
27  sbit K2=P2^1;
28  sbit K3=P2^2;
29  sbit K4=P2^3;
30  sbit K5=P2^4;
31
32  uchar WaveChoice=0;
33  uchar ys=30;
34  uchar i,a=0;
35  uchar sqar_num=128;
36
37
38  //--延时MS          输入一个确切的值用于键盘输入时消除按键抖动
39  void DelayMS(uchar ms)
40  {
41      uchar i;
42      while(ms--) for(i=0;i<120;i++);
43  }
44  //--延时y*9us      改变ys的值进而利用该函数达到调频率的目的
45  void Delay1(uint y)
46  {
47      uint i;
48      for(i=y;i>0;i--);
49  }
50
51
52  //--输出波形
53  void Out_Wave(uchar i)
54  {
55      uchar j;
56      switch(i)
57      {
58          case 0: P0=0x00;break;
59          case 1:
60              //---正弦波
61              for (j=0;j<255;j++)
62              {
63                  P0=tsin[j];
64                  Delay1(ys);
65              }
66              break;
67          case 2:
68              //---矩形波
69              {
70                  if(a<sqar_num)
71                  {
72                      P0=0xff;
73                      Delay1(ys);
74                  }
75                  else
76                  {
77                      P0=0x00;
78                      Delay1(ys);
79                  }
80                  a++;
81              } break;
82          case 3:
83              //---三角波
84              {
85                  if(a<128)
86                  {
87                      P0=a;
88                      Delay1(ys);
89                  }
90                  else
91                  {
92                      P0=255-a;
93                      Delay1(ys);
94                  }
95                  a++;
96              } break;
97          case 4:
98              //---锯齿波
99              {
100                  if(a<255)
101                  {
102                      P0=a;
103                      Delay1(ys);
104                  }
```