

ภาคผนวก ค

โปรแกรมภาษาซีของระบบ

## โปรแกรม main.c

```

#include <REG51F.H>
#include <absacc.h>
#include <string.h>
#include <intrins.h>
#include <stdio.h>
#include <stdlib.h>
#include <lcd.h>
#include <i2c.h>
#include <rtc.h>
#include <step.h>

sfr          Data    = 0x80; //P0
sbit  rs          = P1^6;
sbit  rw          = P1^5;
sbit  lcd         = P1^3; // 0x93

sbit red=P2^3;    //menu
sbit bul=P2^7;    //up +
sbit whi=P1^7;    //start
sbit gre=P2^5;    //down -
sbit bz_DO = P2^6;
unsigned char buffadc[4];
int lenadc,buffint,TNum;
int V_DO=5;
int Do;
int Keep_Do_value; // Value save after 18:00
float Do_value = 300,cal;
void delay (int a) {
int i;
while(a--)
for(i=0;i<200;i++)
{}
}
/*****/

```

```
void clear_lcd_buf()
{
    unsigned char i;
    for(i=0;i<15;i++)
        LCDBUF[i] = 0x20;
}

void display_LCD(unsigned char x,unsigned char *str)
{
    unsigned char i,count;
    count = strlen(str);
    LCD_comm(x);
    for(i=0;i<count;i++)
        LCD_data(str[i]);
}

void Time_to_Buff()
{
    clear_lcd_buf();
    LCDBUF[0] = hex_to_ash(RTC.hour);
    LCDBUF[1] = hex_to_asl(RTC.hour);
    LCDBUF[2] = ':';
    LCDBUF[3] = hex_to_ash(RTC.min);
    LCDBUF[4] = hex_to_asl(RTC.min);
    LCDBUF[5] = ':';
    LCDBUF[6] = hex_to_ash(RTC.sec);
    LCDBUF[7] = hex_to_asl(RTC.sec);
}

void Show_Time()
{
    RTC_READ_DATA();
    Time_to_Buff();
    display_LCD(0x88,LCDBUF);
}
```



```
case 0x05:{    LCDBUF[7] = 'M';
              LCDBUF[8] = 'a';
              LCDBUF[9] = 'y';
              }
              break;
case 0x06:{    LCDBUF[7] = 'J';
              LCDBUF[8] = 'u';
              LCDBUF[9] = 'n';
              }
              break;
case 0x07:{    LCDBUF[7] = 'J';
              LCDBUF[8] = 'u';
              LCDBUF[9] = 'I';
              }
              break;
case 0x08:{    LCDBUF[7] = 'a';
              LCDBUF[8] = 'u';
              LCDBUF[9] = 'g';
              }
              break;
case 0x09:{    LCDBUF[7] = 'S';
              LCDBUF[8] = 'e';
              LCDBUF[9] = 'p';
              }
              break;
case 0x10:{    LCDBUF[7] = 'O';
              LCDBUF[8] = 'c';
              LCDBUF[9] = 't';
              }
              break;
case 0x11:{    LCDBUF[7] = 'N';
              LCDBUF[8] = '0';
              LCDBUF[9] = 'v';
              }
              break;
```

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        case 0x12:{          LCDBUF[7] = 'D';
                           LCDBUF[8] = 'e';
                           LCDBUF[9] = 'c';
                           }
                           break;
    }
    LCDBUF[10] = '/';
    LCDBUF[11] = x;
    LCDBUF[12] = y;
    LCDBUF[13] = '/';
    LCDBUF[14] = '2';
    LCDBUF[15] = '0';
    LCDBUF[16] = '0';
    LCDBUF[17] = year;
    display_LCD(0xC0,LCDBUF);
}

void inital_value_RTC()
{
    RTC.hour = 0x00;
    RTC.min  = 0x00;
    RTC.sec  = 0x00;
    RTC.day  = 0x01;
    RTC.date = 0x01;
    RTC.month= 0x01;
    RTC.year = 0x06;
    RTC_WRITE_DATA();
}

void ch_time()
{ RTC_READ_DATA();
  Time_to_Buff();
  if(LCDBUF[0]==0x30 ){ TNum=0;}
  if(LCDBUF[0]==0x31 ){ TNum=1;}
  if(LCDBUF[0]==0x32 ){ TNum=2;}
  if(LCDBUF[0]==0x33 ){ TNum=3;}
}

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if(LCDBUF[0]==0x34 ){ TNum=4;}
if(LCDBUF[0]==0x35 ){ TNum=5;}
if(LCDBUF[0]==0x36 ){ TNum=6;}
if(LCDBUF[0]==0x37 ){ TNum=7;}
if(LCDBUF[0]==0x38 ){ TNum=8;}
if(LCDBUF[0]==0x39 ){ TNum=9;}

if(LCDBUF[0]==0x31 && LCDBUF[1]==0x30){ TNum=10; }
if(LCDBUF[0]==0x31 && LCDBUF[1]==0x31){ TNum=11; }
if(LCDBUF[0]==0x31 && LCDBUF[1]==0x32){ TNum=12; }
if(LCDBUF[0]==0x31 && LCDBUF[1]==0x33){ TNum=13; }
if(LCDBUF[0]==0x31 && LCDBUF[1]==0x34){ TNum=14; }
if(LCDBUF[0]==0x31 && LCDBUF[1]==0x35){ TNum=15; }
if(LCDBUF[0]==0x31 && LCDBUF[1]==0x36){ TNum=16; }
if(LCDBUF[0]==0x31 && LCDBUF[1]==0x37){ TNum=17; }
if(LCDBUF[0]==0x31 && LCDBUF[1]==0x38){ TNum=18; }
if(LCDBUF[0]==0x31 && LCDBUF[1]==0x39){ TNum=19; }
if(LCDBUF[0]==0x32 && LCDBUF[1]==0x30){ TNum=20; }
if(LCDBUF[0]==0x32 && LCDBUF[1]==0x31){ TNum=21; }
if(LCDBUF[0]==0x32 && LCDBUF[1]==0x32){ TNum=22; }
if(LCDBUF[0]==0x32 && LCDBUF[1]==0x33){ TNum=23; }
if(LCDBUF[0]==0x32 && LCDBUF[1]==0x34){ TNum=24; }

/*****check 18:00 *****/

if(TNum<=18) //Keep_Do_value; // Value save after 18:00
{
    Keep_Do_value = Do ;
}

/*****/
}

menuselect()
{
    int RecValue=0,Do_h=0x30,Do_l=0x30,i,recph,recdo,LookEEProm;

    /*****Menu*****/

    LCD_comm(0x81);LCD_data('S'); LCD_data('e');LCD_data('l'); LCD_data('e'); LCD_data('c');
LCD_data('t');LCD_data(' '); LCD_data('M'); LCD_data('e');LCD_data('n'); LCD_data('u');

    ch_time();

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delay(250); LCD_comm(0x8f);LCD_data('+');delay(250);LCD_comm(0x8f);LCD_data('-');
for(i=0;i<11;i++)
{
    delay(210);
LCD_comm(0x8d);LCD_data('=');LCD_comm(0x8f);
if (bul==0) // Up Value +
    { while(bul==1)delay(120);
        RecValue++; i=0;
        if(RecValue==1) //select Do
            {
LCD_Clrline2();
LCD_comm(0x8f);LCD_data('1');LCD_comm(0xC5);LCD_data('D'); LCD_data('o');
            }
        if(RecValue==2) //select Read
            {
LCD_Clrline2();
LCD_comm(0x8f);LCD_data('2');LCD_comm(0xC1);LCD_data('R'); LCD_data('e');
LCD_data('a');LCD_data('d');LCD_data(' ');
LCD_comm(0xCc);LCD_data(',');LCD_comm(0xcd);LCD_data('D');
LCD_data('o');LCD_data('=');
            }
        if(RecValue==3) //select Default
            {
LCD_Clrline2();
LCD_comm(0x8f);LCD_data('3');
LCD_comm(0xC1);LCD_data('D');LCD_data('e'); LCD_data('f');LCD_data('a');
LCD_data('u');LCD_data('l'); LCD_data('t');
                delay(500);

LCD_comm(0xC1);LCD_data('D');LCD_data('o');LCD_data('=');LCD_data(' ');
LCD_data(' ');LCD_data(' ');
            }
        if(RecValue>2)RecValue==0;
    }
}

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if (gre==0) // Down Value -
    { while(gre==1)delay(120);
      RecValue--; i=0;
      if(RecValue==1) //select Do
          {
              LCD_Clrline2();
LCD_comm(0x8f);LCD_data('1');LCD_comm(0xC5);LCD_data('D');LCD_data('o');
          }
      if(RecValue==2) //select Read
          {
LCD_Clrline2();
LCD_comm(0x8f);LCD_data('2');LCD_comm(0xC1);LCD_data('R'); LCD_data('e');
LCD_data('a');LCD_data('d');LCD_data(' ');
LCD_comm(0xcd);LCD_data('D');LCD_data('o');LCD_data('=');
          }
      if(RecValue==3) //select Default
          {
LCD_Clrline2();
LCD_comm(0x8f);LCD_data('3');
LCD_comm(0xC1);LCD_data('D');LCD_data('e'); LCD_data('f');LCD_data('a');
LCD_data('u');LCD_data('T'); LCD_data('t');
delay(500);
LCD_comm(0xC1);LCD_data('D');LCD_data('o');LCD_data('=');LCD_data(' ');
LCD_data(' ');LCD_data(' ');
          }
      if(RecValue<=0)RecValue==1;
    }
if (red==0) // Enter Value
    { i=0;
      while(red==1)delay(50);LCD_comm(0x8f); LCD_data('O');LCD_data('K');
      delay(300);
      if(RecValue==1) //Defaule Do Value Memory
          {
              while(1){

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LCD_comm(0xC8);LCD_data('=');
if (bul==0) //select Do ++
{
    Do_l++;
    if(Do_l>=0x3A)
    {
        Do_l=0x30;Do_h++;
LCD_comm(0xCA);LCD_data(Do_h);
LCD_comm(0xCb);LCD_data(Do_l);delay(100);
    }
if(Do_h==0x31&&Do_l==0x31)
    {
        Do_l=0x30;Do_h=0x30;
LCD_comm(0xCA);LCD_data(Do_h);
LCD_comm(0xCb);LCD_data(Do_l);delay(100);
    }
    else
    {
LCD_comm(0xCA);LCD_data(Do_h);
LCD_comm(0xCb);LCD_data(Do_l);delay(100);
    }
}
if(gre==0) //select Do --
{
if(Do_h==0x31&&Do_l==0x30)
    {
        Do_h=0x30;Do_l=0x3A;
    }
    if(Do_l>0x30)
    {
        Do_l--; LCD_comm(0xCb);LCD_data(Do_l);
LCD_comm(0xCA);LCD_data(Do_h);delay(100);
    }
}
}
}

```

```

        if(red==0) // OK save value
            {
                V_DO=Do_1;
                V_DO=V_DO-0x30;
LCD_comm(0x8f); LCD_data('S');LCD_data('a');LCD_data('v');LCD_data('e');
delay(350);
LCD_comm(0x8f); LCD_data('O');LCD_data('K');LCD_data(' ');LCD_data(' ');
LCD_comm(0xCA); LCD_data(' ');LCD_data(' ');
delay(500);
LCD_comm(0x8f);LCD_data(' ');LCD_data(' ');
                RecValue=0;break;
            }
        }

    if(RecValue==2) //Defaule Do Value Memory
        {
            while(1)
                {
                    //show Save Do
                    Save=Keep_Do_value;
if(Save==1) { LCD_comm(0xd1);LCD_data('1');LCD_data(' ');}
else if(Save==2){ LCD_comm(0xd1);LCD_data('2');LCD_data(' ');}
else if(Save==3){ LCD_comm(0xd1);LCD_data('3');LCD_data(' ');}
else if(Save==4){ LCD_comm(0xd1);LCD_data('4');LCD_data(' ');}
else if(Save==5){ LCD_comm(0xd1);LCD_data('5');LCD_data(' ');}
else if(Save==6){ LCD_comm(0xd1);LCD_data('6');LCD_data(' ');}
else if(Save==7){ LCD_comm(0xd1);LCD_data('7');LCD_data(' ');}
else if(Save==8){ LCD_comm(0xd1);LCD_data('8');LCD_data(' ');}
else if(Save==9){ LCD_comm(0xd1);LCD_data('9');LCD_data(' ');}
else if(Save==10){ LCD_comm(0xd1);LCD_data('1');LCD_data('0');}
                    if(whi==0)break;
                }
        }
    }

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```

        if(RecValue==3) //Defaule Do Value Memory
        {
            while(1)
            {
                LCD_comm(0xC4);LCD_data(V_PH+0x30);LCD_data(' ');
                LCD_comm(0xCA);LCD_data(V_DO+0x30);LCD_data(' ');
                if(whi==0)break;
            }
        }
    }if (whi==0) i=2000;
}
}
void ch_Do(float Do_value)
{
    LCD_comm(0xC0);LCD_data('D');LCD_data('o');LCD_data('=');
    if(Do_value>=0&&Do_value<=24.1) {Do =0; LCD_comm(0xC4);LCD_data('0');LCD_data(' '); }
    else if(Do_value>24.1&&Do_value<=52.1){Do =1; LCD_comm(0xC4);LCD_data('1');LCD_data(' '); }
    else if(Do_value>52.1&&Do_value<=85.1){Do =2; LCD_comm(0xC4);LCD_data('2');LCD_data(' '); }
    else if(Do_value>85.1&&Do_value<=104.1){Do =3; LCD_comm(0xC4);LCD_data('3');LCD_data(' '); }
    else if(Do_value>104.1&&Do_value<=131.1){Do =4; LCD_comm(0xC4);LCD_data('4');LCD_data(' '); }
    else if(Do_value>131.1&&Do_value<=161.1){Do =5; LCD_comm(0xC4);LCD_data('5');LCD_data(' '); }
    else if(Do_value>161.1&&Do_value<=185.1){Do =6; LCD_comm(0xC4);LCD_data('6');LCD_data(' '); }
    else if(Do_value>185.1&&Do_value<=193.1){Do =7; LCD_comm(0xC4);LCD_data('7');LCD_data(' '); }
    else if(Do_value>203.1&&Do_value<=224.1){Do =8; LCD_comm(0xC4);LCD_data('8');LCD_data(' '); }
    else if(Do_value>224.1&&Do_value<=255.1){Do =9; LCD_comm(0xC4);LCD_data('9');LCD_data(' '); }
    else if(Do_value>255.1&&Do_value<=290){Do =10; LCD_comm(0xC4);LCD_data('1');LCD_data('0'); }
    else if(Do_value==300){ LCD_comm(0xC4);LCD_data('0');LCD_data('0'); }
    if(Do<V_DO)
    {
        bz_DO = 1; delay(30); bz_DO = 0; delay(200); bz_DO = 1; delay(30); bz_DO = 0;
    }
}
}

```

```

void delayshowValue(int a) {
    int Loop1,i;
    /******Read Value Do******/
    delay(900);stop_step();
    for(Loop1=0;Loop1<200;Loop1++){Do_value=i2c_readAdc(0x40);delay(10);}
    cal=(cal+Do_value)/200;
    ch_Do(Do_value);
    /*******/
    while(a--)
    {
        for(i=0;i<10;i++)
        {
            Show_Time();
            if(red==0){while(red==0)delay(120);LCD_ClrAll();Menuselect();LCD_ClrAll(); i=10;}
        }
    }
}

void prob_down()
{ int i;
  ch_Do(Do_value);
  for(i=0;i<740;i++)
  {
    if(red==0){while(red==0)delay(120);LCD_ClrAll();Menuselect();LCD_ClrAll();}
    step_anticlock();
  }
  for(i=0;i<25;i++){step_clock();}
  for(i=0;i<25;i++){step_anticlock();}
  for(i=0;i<25;i++){step_clock();}
  for(i=0;i<25;i++){step_anticlock();}
  for(i=0;i<25;i++){step_clock();}
  for(i=0;i<25;i++){step_anticlock();}
  stop_step();
  Show_Time();
}

//          delayshowValue(8); //read ADC

```

```

}

void prob_up()
{
    int i;
    ch_Do(Do_value);
    for(i=0;i<740;i++)
    {
        if(red==0){while(red==0)delay(120);LCD_ClrAll();Menuselect();LCD_ClrAll();}
        step_clock();
    }stop_step();
}

main()
{
    int Loop1;
    unsigned char ch,count; //ch_timedown
    inital_value_RTC();
    bz_DO = 0;
    LCD_init();

    /******<<Read Adc Do Value>>******/
    while(1)
    {
        /******<< Show Program >>******/
        LCD_comm(0x83);LCD_data('S');LCD_data('t');LCD_data('a');LCD_data('r');LCD_data('t');LCD_data("");
        LCD_data(' ');
        LCD_data('P');LCD_data('r');LCD_data('o');LCD_data('g');LCD_data('r');LCD_data('a');LCD_data('m');
        LCD_comm(0xc5);LCD_data('A');LCD_data('/');LCD_data('D');LCD_data(' ');LCD_data(' ');
        LCD_data('P');LCD_data('r');LCD_data('o');LCD_data('b');

        while(whi==0)
        {
            LCD_ClrAll();
            while(1)
            {
                if(red==0){while(red==0)delay(120);LCD_ClrAll();ch_time();Menuselect();LCD_ClrAll();}
                Show_time();Show_Date();LCD_comm(0xD2);LCD_data(' ');LCD_data(' ');
                /******down*****
                prob_down();
                /******

```

```

Show_Time();
ch=LCDBUF[4]; //ch_timedown min =lcdbuf[4],sec=lcdbuf[7];
count=0;
while(1)
{
    Show_Time();
    if(ch!=LCDBUF[4])
    {
        count++;
        Show_Time(); //Read RTC
        ch=LCDBUF[4]; //keep value time //ch_timedown min =lcdbuf[4],sec=lcdbuf[7];
    }
}
if(red==0){while(red==0)delay(120);LCD_ClrAll();ch_time();Menuselect();LCD_ClrAll();}

//*****BZ*****

ch_Do(Do_value);
//*****

if(count==2){count=0; break;} //count=vlaue sec = 300sec
}

//*****Read A/D*****

delayshowValue(4);

//*****up*****

prob_up();

//*****

Show_Time();
ch=LCDBUF[4]; //ch_timedown min =lcdbuf[4],sec=lcdbuf[7];
count=0;
while(1)
{
    Show_Time();
    if(ch!=LCDBUF[4])
    {
        count++;
        Show_Time(); //Read RTC
        ch=LCDBUF[4]; //keep value time //ch_timedown min =lcdbuf[4],sec=lcdbuf[7];

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```
        }
        if(count==28)    {count=0; break;}//count=vlaue sec = 600sec
if(red==0){while(red==0)delay(120);LCD_ClrAll();ch_time();Menuselect();LCD_ClrAll();}
        //*****BZ*****
        ch_Do(Do_value);
        //*****
    }

}

}

}

while(1){}

}
```