//lcdm.h

#include<reg51.h>

#define lcd\_d P2

sbit rs = P1^0;

sbit rw = P1^1;

sbit e = P1^2;

void delay\_1ms(int);

void lcd\_init(void);

void lcd\_cmd(unsigned char);

void lcd\_data(unsigned char);

void string(unsigned char \*);

void disp\_temp(float);

void number(int);

void float\_val(float);

void delay\_1ms(int d)

{

unsigned char i;

for(;d>0;d--)

{

for(i=250;i>0;i--);

for(i=250;i>0;i--);

}

}

void lcd\_init(void)

{

lcd\_cmd(0x01);//clear the display

lcd\_cmd(0x02);//bring the cursor and lcd to starting position of ddram

lcd\_cmd(0x0c);//display ON cursor OFF

lcd\_cmd(0x38);//8 bit interface and both the lines enabled

lcd\_cmd(0x80);//select ddram

}

void lcd\_cmd(unsigned char c)

{

lcd\_d = c;

rs = 0;

rw = 0;

e=1;

delay\_1ms(2);

e=0;

}

void lcd\_data(unsigned char d)

{

lcd\_d = d;

rs = 1;

rw = 0;

e = 1;

delay\_1ms(2);

e=0;

}

void string(unsigned char \*p)

{

while(\*p)

lcd\_data(\*p++);

}

void number(int n)

{

int arr[5],i=0;

if(n==0)

lcd\_data('0');

else

{

if(n<0)

{

lcd\_data('-');

n=-n;

}

while(n>0)

{

arr[i++] = n%10;

n=n/10;

}

for(--i;i>=0;i--)

lcd\_data(arr[i]+48);

}

}

void float\_val(float f)

{

float temp;

int n;

n=f;

number(n);

lcd\_data('.');

temp=(f-n)\*100;

n=temp;

number(n);

}

void disp\_time(unsigned char h,unsigned char m,unsigned char s)

{

lcd\_cmd(0x80);

string("TIME");

if(h >= 0x12)

{

h = h-(0x12);

lcd\_cmd(0x8e);

string("PM");

}

else

{

lcd\_cmd(0x8e);

string("AM");

}

lcd\_cmd(0x86);

lcd\_data((h/16)+48);

lcd\_data((h%16)+48);

lcd\_data(':');

lcd\_data((m/16)+48);

lcd\_data((m%16)+48);

lcd\_data(':');

lcd\_data((s/16)+48);

lcd\_data((s%16)+48);

}

void disp\_temp(float temp)

{

lcd\_cmd(0xc0);

string("TEMP ");

// temp = spi\_adc\_read(0,0);

lcd\_cmd(0xc6);

float\_val(temp);

lcd\_cmd(0xcb);

//string("^C");

lcd\_data(0xdf); // degree symbol

lcd\_data('C');

}