LAMPIRAN

```
Project :
Version :
Date    : 16/05/2019
Author  : Duanda
Company :
Comments:
Chip type               : ATmega32
Program type            : Application
AVR Core Clock frequency: 8,000000 MHz
Memory model            : Small
External RAM size       : 0
Data Stack size         : 512
*****************************************************/
#include <mega32.h>
#include <stdio.h>
#include <delay.h>
 #asm
   .equ __lcd_port=0x15 ;PORTC
#endasm
 // Alphanumeric LCD functions
#include <alcd.h>
#define ADC_VREF_TYPE 0x00
#define t_atas PINA.4
#define t_tengah PINA.3
#define t_bawah PINA.2
#define t_start PINA.0
#define t_reset PINA.1
#define buzzer PORTD.3
#define motor PORTD.4
#define heater PORTD.5
eeprom unsigned char q;
eeprom unsigned char suhu_master_max,suhu_master_min,timer_ok_master;
unsigned char baris1[20],baris2[20],baris3[20],baris4[20];
unsigned char suhu_min,suhu_max,timer_ok,timer_ok_cek;
float vin;
unsigned int temp,suhu;
void menu_utama();
volatile unsigned int count;
signed int detik;
interrupt [TIM0_OVF] void timer0_ovf_isr(void)
{
// Reinitialize Timer 0 value
TCNT0=0x94;     //x8A
count++;
}
void alarm_key()
```

```
{
buzzer=1;
delay_ms(20);
buzzer=0;
}
void logo1()
{
{
lcd_clear();
sprintf(baris1,"   TUGAS AKHIR    ");lcd_gotoxy(0,0);lcd_puts(baris1);
sprintf(baris2," ETCHER AUTOMATIC ");lcd_gotoxy(0,1);lcd_puts(baris2); //"
KWW-A010-M1 "
//delay_ms(1000);
}
}
void tampilan_setting()
{
{
//lcd_clear();
sprintf(baris1,"-=%d",suhu_min);lcd_gotoxy(0,0);lcd_puts(baris1);
sprintf(baris2,"+=%d",suhu_max);lcd_gotoxy(6,0);lcd_puts(baris2); //" KWW-
A010-M1 "
//delay_ms(1000);
}
}
void setting_suhu_max()
{
lcd_clear();
sprintf(baris2," SETTING SUHU MAX");lcd_gotoxy(0,0);
lcd_puts(baris2);
sprintf(baris3,"      %d ºC  ",suhu_master_max);lcd_gotoxy(0,1);
lcd_puts(baris3);
delay_ms(1000);
ulang:
sprintf(baris3,"      %d ºC  ",suhu_master_max);lcd_gotoxy(0,1);
lcd_puts(baris3);
   if (t_atas==0){alarm_key();delay_ms(300);suhu_master_max++;}
   if (t_bawah==0){alarm_key();delay_ms(300);suhu_master_max--;}
   if (t_tengah==0){alarm_key();delay_ms(300);menu_utama();}
   else if (suhu_master_max<40)suhu_master_max=40;
   else if (suhu_master_max>100)suhu_master_max=100;
    else if
(suhu_master_max<suhu_master_min)suhu_master_max=suhu_master_min;
goto ulang;
}
```

```c
void setting_suhu_min()
{
lcd_clear();
sprintf(baris2," SETTING SUHU MIN");lcd_gotoxy(0,0);
lcd_puts(baris2);
sprintf(baris3,"      %d ºC  ",suhu_master_min);lcd_gotoxy(0,1);
lcd_puts(baris3);
delay_ms(1000);
ulang:
sprintf(baris3,"      %d ºC  ",suhu_master_min);lcd_gotoxy(0,1);
lcd_puts(baris3);
    if (t_atas==0){alarm_key();delay_ms(300);suhu_master_min++;}
    if (t_bawah==0){alarm_key();delay_ms(300);suhu_master_min--;}
    if (t_tengah==0){alarm_key();delay_ms(300);menu_utama();}
    else if (suhu_master_min<40)suhu_master_min=40;
    else if (suhu_master_min>100)suhu_master_min=100;
    else if
(suhu_master_min>suhu_master_max)suhu_master_min=suhu_master_max;
goto ulang;
}
void timer_proses()
{
lcd_clear();
sprintf(baris2," SETT TIMER PROSES ");lcd_gotoxy(0,0);
lcd_puts(baris2);
sprintf(baris3,"      %d Menit  ",timer_ok_master);lcd_gotoxy(0,1);
lcd_puts(baris3);
delay_ms(1000);
ulang:
sprintf(baris3,"      %d Menit  ",timer_ok_master);lcd_gotoxy(0,1);
lcd_puts(baris3);
    if (t_atas==0){alarm_key();delay_ms(300);timer_ok_master++;}
    if (t_bawah==0){alarm_key();delay_ms(300);timer_ok_master--;}
    if (t_tengah==0){alarm_key();delay_ms(300);menu_utama();}
    else if (timer_ok_master<1)timer_ok_master=1;
    else if (timer_ok_master>60)timer_ok_master=60;
goto ulang;
}
void pilihan_1()
{
    if (q==1){setting_suhu_min();}
else if (q==2){setting_suhu_max();}
else if (q==3){timer_proses();}
}
void menu_utama()
{
```

```c
lcd_clear();
sprintf(baris1,"    PILIH MENU    ");
sprintf(baris2,"                ");
lcd_gotoxy(0,0);lcd_puts(baris1);
lcd_gotoxy(0,1);lcd_puts(baris2);
delay_ms(500);
ulang:
if (t_bawah==0){alarm_key();delay_ms(300);q++;}
if (t_atas==0){alarm_key();delay_ms(300);q--;}
if (t_tengah==0){alarm_key();delay_ms(300); pilihan_1();}
   if (q<1)q=3;
   else if (q==1){sprintf(baris3,"1.  SETT SUHU MIN
");lcd_gotoxy(0,1);lcd_puts(baris3);}
   else if (q==2){sprintf(baris3,"2.  SETT SUHU MAX
");lcd_gotoxy(0,1);lcd_puts(baris3);}
   else if (q==3){sprintf(baris3,"3.SETT TIMER PROSES
");lcd_gotoxy(0,1);lcd_puts(baris3);}
  else if (q>3)q=1;
goto ulang;
}
 // Read the AD conversion result
unsigned int read_adc(unsigned char adc_input)
{
ADMUX=adc_input | (ADC_VREF_TYPE & 0xff);
// Delay needed for the stabilization of the ADC input voltage
//delay_us(10);
// Start the AD conversion
ADCSRA|=0x40;
// Wait for the AD conversion to complete
while ((ADCSRA & 0x10)==0);
ADCSRA|=0x10;
return ADCW;
}
 // Declare your global variables here
void baca_suhu()
{
    temp=read_adc(7);
    vin=((float)temp*0.00488);
    suhu=(temp*500)/1024;
 }
void cek_suhu()
{
  if(suhu<suhu_min)heater=1;
  if(suhu>=suhu_max)heater=0;
 }
```

```c
void baca_suhu_air()
{
sprintf(baris2,"MIN=%dºC",suhu_min);lcd_gotoxy(0,0);lcd_puts(baris2);
sprintf(baris3,"MAX=%dºC",suhu_max);lcd_gotoxy(10,0);lcd_puts(baris3);
 ok:
   baca_suhu();
   sprintf(baris1,"S=%dºC",suhu);lcd_gotoxy(0,1);lcd_puts(baris1);
   if(suhu>=suhu_max){heater=0;goto end;}
   else if(suhu==suhu_min){heater=0;goto end;}
   else
if(suhu<suhu_min){sprintf(baris1,"PREPARE");lcd_gotoxy(8,1);lcd_puts(baris1)
;heater=1;goto ok;
                   heater=1;goto ok;
                 }
   //else heater=0;goto end;
   delay_ms(10);
 goto ok;
 end:
if (t_start==0)goto end1;
sprintf(baris1,"MESIN SIAP");lcd_gotoxy(8,1);lcd_puts(baris1);goto ok;
end1:
}
void hitung_waktu_mundur()
{
{
if (count>=100)
   {
   detik--;
   count=0;
   }
if (detik<0)
   {
   timer_ok_cek--;
   detik=59;
   }
 }
}
void tampil_hitungan()
{
lcd_gotoxy(11,0);
sprintf(baris4,"%d:%d  ",timer_ok_cek,detik);
lcd_puts(baris4);//tampilkan waktu di LCD baris pertama
}
 void main(void)
{
#asm("sei")
```

```
// Port A initialization
// Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In
Func0=In
// State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
PORTA=0b00011111;
DDRA=0x00;
 // Port B initialization
// Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In
Func0=In
// State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
PORTB=0x00;
DDRB=0x00;
 // Port C initialization
// Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In
Func0=In
// State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
PORTC=0x00;
DDRC=0x00;
// Port D initialization
// Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In
Func0=In
// State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
PORTD=0b00000111;
DDRD=0b11111000;
 // Timer/Counter 0 initialization
// Clock source: System Clock
// Clock value: Timer 0 Stopped
// Mode: Normal top=0xFF
// OC0 output: Disconnected
//TCCR0=0x00;
//TCNT0=0x00;
//OCR0=0x00;
TCCR0=0X05;
TCNT0=0x94;   //8A
OCR0=0X00;
 // Timer(s)/Counter(s) Interrupt(s) initialization
//TIMSK=0x00;
// USART initialization
// USART disabled
UCSRB=0x00;
 // Analog Comparator initialization
// Analog Comparator: Off
// Analog Comparator Input Capture by Timer/Counter 1: Off
ACSR=0x80;
SFIOR=0x00;
 // ADC initialization
```

```
// ADC Clock frequency: 1000,000 kHz
// ADC Voltage Reference: AREF pin
ADMUX=ADC_VREF_TYPE & 0xff;
ADCSRA=0x83;
// SPI initialization
// SPI disabled
SPCR=0x00;
 // TWI initialization
// TWI disabled
TWCR=0x00;
lcd_init(20);
TIMSK=0X01;
logo1();
delay_ms(2000);
if(t_atas==0)menu_utama();
suhu_min=suhu_master_min;
suhu_max=suhu_master_max;
timer_ok=timer_ok_master;
timer_ok_cek=timer_ok_master;
lcd_clear();
//lcd_clear();
while (1)
    {
    lcd_clear();
    baca_suhu_air();
    delay_ms(300);
    lcd_clear();
    cek:
    {
if(suhu<suhu_min){heater=1;lcd_gotoxy(11,1);sprintf(baris4,"H=1");lcd_puts(bar
is4);}
    else
if(suhu>suhu_max){heater=0;lcd_gotoxy(11,1);sprintf(baris4,"H=0");lcd_puts(ba
ris4);}
    else {heater=0;lcd_gotoxy(11,1);sprintf(baris4,"H=0");lcd_puts(baris4);}
    }
    proses:
    motor=1;
    tampilan_setting();
    baca_suhu();
    lcd_gotoxy(0,1);sprintf(baris4,"S=%d°C M=1",suhu);lcd_puts(baris4);
    cek1:
    {
if(suhu<suhu_min){heater=1;lcd_gotoxy(11,1);sprintf(baris4,"H=1");lcd_puts(bar
is4);}
```

```
    else
if(suhu>suhu_max){heater=0;lcd_gotoxy(11,1);sprintf(baris4,"H=0");lcd_puts(ba
ris4);}
    //else {heater=0;lcd_gotoxy(13,2);sprintf(baris4,"H=0");lcd_puts(baris4);}
    }
    hitung_waktu_mundur();
    tampil_hitungan();
    if(timer_ok_cek==0&&detik==0){goto reset;}
    else goto proses;
    reset:
     {
if(t_reset==0){buzzer=0;timer_ok=timer_ok_master;timer_ok_cek=timer_ok_mas
ter; goto end;}
     else
       {
       lcd_clear();
       motor=0;heater=0;buzzer=1;delay_ms(10);
       baca_suhu();
       lcd_gotoxy(0,0);sprintf(baris3,"---PROSES SELESAI---
");lcd_puts(baris3);goto reset;
       }//delay_ms(10);
     }
    end:
    }
}
```