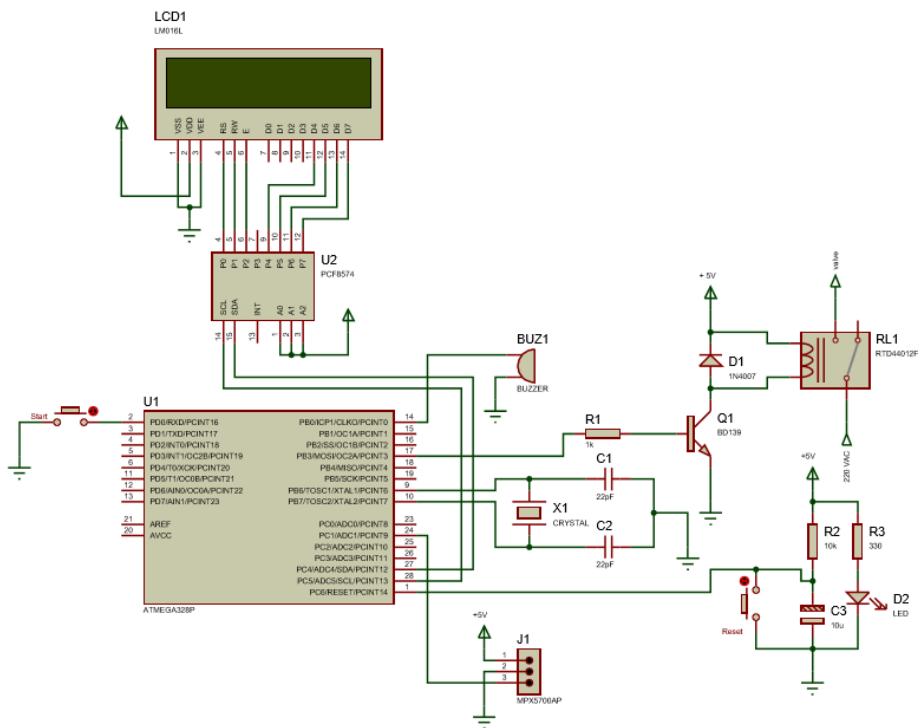


LAMPIRAN

1. Rangkaian Keseluruhan



2. Hasil Perhitungan Pada Modul Tugas Akhir

a. Perhitungan Pengujian Tekanan

1) Rata-rata $\frac{\text{Jumlah nilai data}}{\text{Banyak data}}$

$$\frac{1+1,2+1,1+1,1+1,15+1,5+1+1,05+1,2+1}{10} = 1,13$$

2) Koreksi

Koreksi = nilai terukur – nilai yang dikehendaki

$$= 1,13 - 1,1$$

$$= 0,03$$

3) Error

$$\text{Error (\%)}: \frac{\text{data setting} - \text{rata rata}}{\text{data setting}} \times 100\%$$

$$= \frac{1,1 - 1,13}{1,1} \times 100\% = 2,27\%$$

b. Perhitungan Timer 15 menit(900 detik)

1) Rata-rata = $\frac{\text{Jumlah nilai data}}{\text{Banyak data}}$

$$\frac{904+903+904+902+903+903+904+902+904+904}{10} = 903,3$$

2) Koreksi

Koreksi= nilai terukur – nilai yang dikehendaki

$$= 903,3 - 900$$

$$= 3,3$$

3) Error

Error (%): $\frac{\text{data setting}-\text{rata rata}}{\text{data setting}} \times 100\%$

$$= \frac{900-903,3}{900} \times 100\% = 0,36\%$$

3. Pembuatan Program Keseluruhan

```
#include <Wire.h>
#include <Event.h>
#include <Timer.h>
#include <LiquidCrystal_I2C.h>

const int Asts = 0;
const int RELAY_ENABLE=11;
const int BUZZER_ENABLE=12;
int pb=1;
int x;
float v;
float kpa;
float bar;
//timer
int S = 0; // count seconds
int M = 13; // count minutes
int A; // baca push button
```

```
int B;  
  
int a=0;  
  
const int heater = 13;// pin digital 1  
  
float V;  
  
float temp;  
  
float Rx;  
  
float C =79.489;  
  
float slope = 14.187;  
  
float R0=100.0;  
  
float alpha=0.00385;  
  
  
int kunci=0;  
  
int Vin = A2;  
  
Timer t;  
  
  
LiquidCrystal_I2C lcd(0x27,16,2); // Set the LCD I2C address  
  
  
unsigned long sebelum=0;  
const long interval=100;  
  
  
void setup()  
{  
    Serial.begin(9600);  
    lcd.init();  
    lcd.backlight();  
  
  
    lcd.setCursor (3,0);  
    lcd.print("AUTOCLAVE");
```

```
lcd.setCursor (5,1);
lcd.setCursor (0,0);
delay(2000);
lcd.print("FILDZAH ALIFAH KHOIRINA");
lcd.setCursor (0,1);
lcd.print("20163010044");
delay(2000);
lcd.setCursor (0,0); lcd.print("TRI HARDONO");
lcd.print("    ");
lcd.setCursor (0,1);
lcd.print("20163010063");
delay(2000);
lcd.clear();
pinMode(Asts,INPUT_PULLUP);
pinMode(pb,INPUT_PULLUP);
pinMode(RELAY_ENABLE, OUTPUT);
pinMode(BUZZER_ENABLE, OUTPUT);
pinMode(Vin,INPUT);
pinMode (heater, OUTPUT);
digitalWrite(heater, LOW);
digitalWrite(RELAY_ENABLE,LOW);
digitalWrite(BUZZER_ENABLE,LOW);
t.every(100,takeReading);
}
```

```
void loop()
{
    A= digitalRead(Asts);

    t.update();

    //tampil tekanan

    lcd.setCursor(0, 0);

    lcd.print(bar,1 );

    lcd.print(" ");

    lcd.print("bar");

    lcd.print(" ");

    //tampil suhu

    lcd.setCursor(0, 1);

    lcd.print(temp);

    lcd.print(" ");

    lcd.print("C");

    lcd.print(" ");

    //tampil timer

    lcd.setCursor(11,0);

    lcd.print ("TIMER");

    lcd.setCursor(11,1);

    lcd.print(M);

    lcd.print(" ");

    lcd.setCursor(13,1);

    lcd.print(":");

    lcd.setCursor(14,1);
```

```
lcd.print(S);

lcd.print(" ");

preasure();

if(A == LOW)

{

a = 1;

B = 0;

}

if(a==0)

{

digitalWrite(heater, HIGH);

}

if(a == 1)

{

if (temp >= 121)

{

digitalWrite(heater, HIGH); //maka ‘ledSaya’ menyala

}

else

{

digitalWrite(heater, LOW); //apabila tidak ada, maka ‘ledSaya’ mati

}

if(bar>=1.1)

{

kunci=1;

}
```

```
if(kunci==1)
{
    timer();
}

}

if(B == 1)
{
    a=0;
    digitalWrite(heater, HIGH);
    digitalWrite(BUZZER_ENABLE, HIGH);
    digitalWrite(RELAY_ENABLE, HIGH);
    delay(300000);
    digitalWrite(BUZZER_ENABLE, LOW);
    digitalWrite(RELAY_ENABLE, LOW);
}

void timer()
{
    if(kunci==1)
    {
        unsigned long currentMillis = millis();
        if(currentMillis-sebelum>=interval)
        {
            sebelum=currentMillis;
            S--;
        }
    }
}
```

```
}

else{ }

if(S<0)

{

M--;

S=59;

}

if(M<0)

{

B=1;

kunci=0;

S=0;

M=0;

//lcd.clear();

}

}

void pressure()

{

x = analogRead(A1);

v = x*(5.0/1023.0);

kpa = ((v/5.0)-0.04)/0.0012858;

kpa = kpa - 95.09;

bar = (float)(kpa*0.01);

if ( bar <0)

{

kpa = 0.0;
```

```
bar= bar * -1;  
}  
delay(474);  
}  
  
void takeReading()  
{  
    V = (analogRead(Vin)/1023.0)*5.0;  
    Rx = V*slope+C;  
    temp= (Rx/R0-1.0)/alpha;  
    delay(474);  
}
```

4. Foto Saat Kegiatan Bimbingan Tugas Akhir



5. SOP Alat

1. Buka pintu *Autoclave*.
2. Isi air sampai batas tanda.
3. Masukkan peralatan yang akan disterilkan.
4. Tutup pintu *Autoclave* dengan rapat agar tidak terjadi kebocoran.
5. Hubungkan ke jala-jala PLN .
6. Tombol *power on* dinyalakan.
7. Atur tombol timer yang diinginkan sesuai dengan bahan yang akan disterilkan dengan menekan *push button* pemilihan timer.
8. Tunggu beberapa saat ± 1 jam untuk proses sterilisasi berlangsung.
9. Jika sudah selesai proses sterilisasi dengan ditandai buzzer berbunyi dan tekanan sudah turun menjadi 0,0 bar, lalu tekan tombol *reset*.
10. Kemudian matikan tombol *power off*, Tunggu beberapa saat, lalu buka pegunci peutup *Autoclave*.