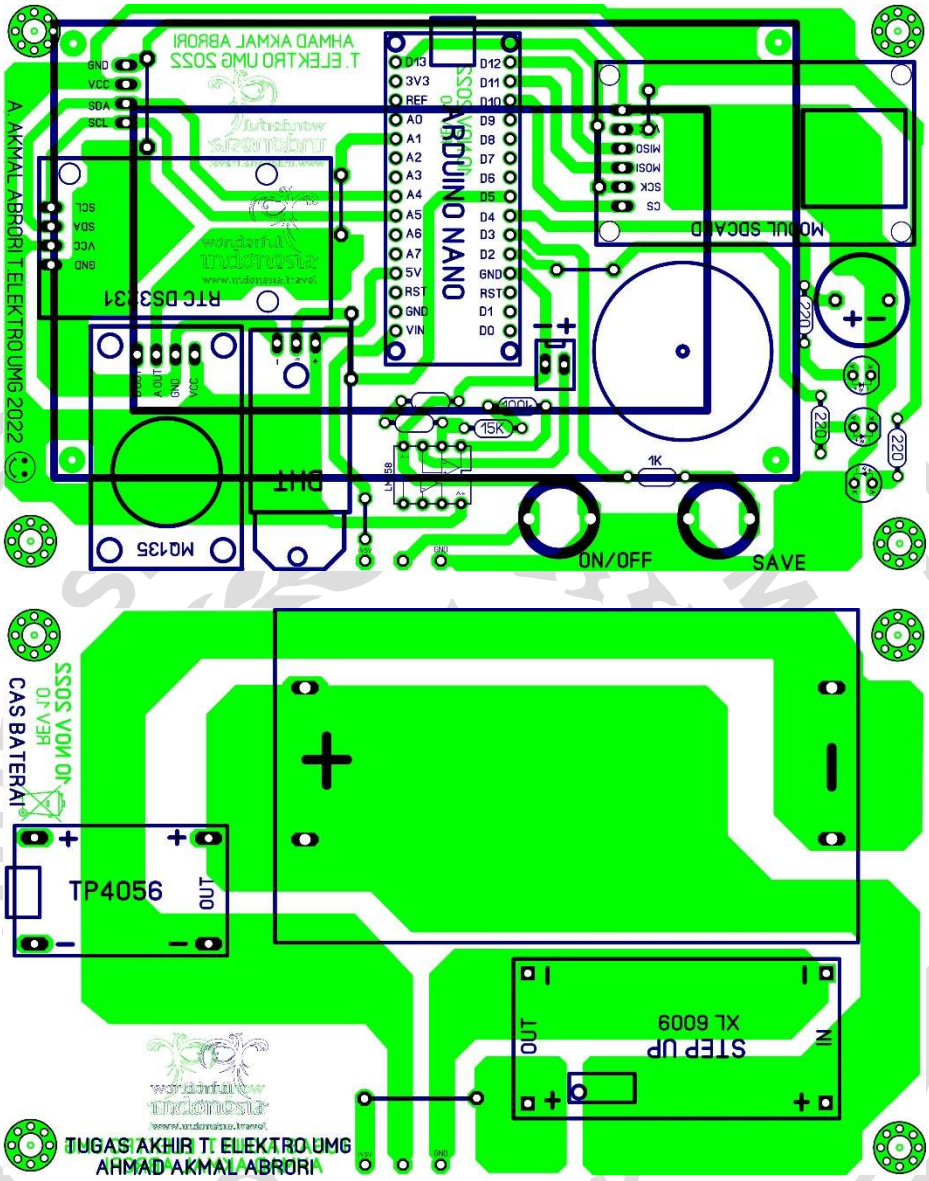
LAMPIRAN



CODING

```
#include "DHT.h"
#include <MQUnifiedsensor.h>
```

```
#include <LiquidCrystal_I2C.h>
#include <DS3231.h>
#include <SPI.h>
#include <SD.h>

DS3231 rtc (SDA, SCL); //pub rtc sda= A4 scl=A5
LiquidCrystal_I2C lcd(0x27, 20, 4);
File file;
#define placa "Arduino NANO"
#define Voltage_Resolution 5
#define pin A1 //Analog input 0 of your arduino
#define type "MQ-135" //MQ135
#define ADC_Bit_Resolution 10 // For arduino UNO/MEGA/NANO
#define RatioMQ135CleanAir 3.6//RS / R0 = 3.6 ppm
#define DHTPIN 5 // pin dht
#define DHTTYPE DHT22 //tipe dht


const int PIN_BZ = 6;
const int PIN_S = 2;
float tgain, oksigen, tsensor, so;
const int cs = 10;
float CO2 ;
byte hum ;
float temp ;

MQUnifiedsensor MQ135(placa, Voltage_Resolution, ADC_Bit_Resolution, pin, type);
DHT dht(DHTPIN, DHTTYPE);


void setup() {

// bagian mq135
  Serial.begin(9600);
  dht.begin();
  lcd.init();
  lcd.backlight();
  pinMode ( cs ,OUTPUT );
  pinMode (PIN_BZ, OUTPUT);
  pinMode (PIN_S, OUTPUT);
  pinMode(3,INPUT_PULLUP);
  rtc.begin();
  //SPI.begin();
  //bagian rtc
//  rtc.setDate(21, 11, 2022);
  //rtc.setTime(20, 48, 30); //waktu jam menit detik
 // rtc.setDOW(1); //harai 3 = rabu jadi 0-6 artinya minggu-sabtu
  lcd.setCursor(0,0);
  lcd.print(" RANCANG BANGUN ALAT");
  lcd.setCursor(4,1);
  lcd.print("SURVEYOR GUA");
```

```
  lcd.setCursor(3,2);
  lcd.print("A.AKMAL ABRORI");
  lcd.setCursor(1,3);
  lcd.print("TEKNIK ELEKTRO UMG");
  delay (1000);
  lcd.clear();
  lcd.setCursor(5,1);
  lcd.print("PREHEATING");
  lcd.setCursor(7,2);
  lcd.print("SENSOR");
  //delay(120000);
  delay (2000);
  lcd.clear();
  MQ135.setRegressionMethod(1); //_PPM =  a*ratio^b
  /*****************************MQInit ********************************************/
  MQ135.init();
 // MQ135.setRL(33);
  /*****************************MQCAlibration
*****************************************/
  float calcR0 = 0;
  for(int i = 1; i<=10; i ++)
  {
   MQ135.update(); // Update data, the arduino will read the voltage from the analog pin
   calcR0 += MQ135.calibrate(RatioMQ135CleanAir);
  }
  MQ135.setR0(calcR0/10);

}

void loop() {

  //bagian dht
  hum = dht.readHumidity();
  temp = dht.readTemperature();

  // bagian oksigen
  so = analogRead(A0);
  tgain = (5*so)/1023;
  tsensor = tgain/0.0482;
  oksigen = (tsensor/60)*100;

  //bagian mq135
  MQ135.update();
  MQ135.setA(110.74); MQ135.setB(-2.856); // Configure the equation to calculate CO2 concentration
value
  CO2 = MQ135.readSensor(); // Sensor will read PPM concentration using the model, a and b values
set previously or from the setup

  lcd.setCursor(0, 0);
  lcd.print(" SUHU    KELEMBAPAN");
  lcd.setCursor(0, 1);
```

```
 lcd.print(temp);
 lcd.print(" C    ");
 lcd.print(hum);
 lcd.print(" %");
 lcd.setCursor(0, 2);
 lcd.print("KADAR CO2 "); lcd.print(CO2+400);
 lcd.print(" PPM");
 lcd.setCursor(0, 3);
 lcd.print("KADAR OKSIGEN ");lcd.print(oksigen);
 lcd.print("%");
 delay(500);
 lcd.clear();

 if (CO2+400 >= 601){ //max kadar co2
 lcd.setCursor(0, 0);
 lcd.print(" CO2 TINGGI BAHAYA");
 lcd.setCursor(0, 1);
 lcd.print(CO2);
 lcd.print(" PPM");
 digitalWrite(PIN_BZ, HIGH);
  Data() ;
  delay (3000);
 lcd.clear();
 }

else if (oksigen <= 19) { //max kadar o2
 lcd.setCursor(0, 0);
 lcd.print(" O2 RENDAH BAHAYA");
 lcd.setCursor(0, 2);
 lcd.print(oksigen);
 lcd.print(" %");
 digitalWrite(PIN_BZ, HIGH);
   Data () ;
   delay (3000);
 lcd.clear();
}
 else if(digitalRead(3)==LOW){
  lcd.setCursor(5, 1);
  lcd.print("Data diSimpan");
   digitalWrite(PIN_S, HIGH);
  delay(500);
     Data ();
 }
 else {
  digitalWrite(PIN_BZ, LOW);
   digitalWrite(PIN_S, LOW);
   delay (50);
 }
}
void Data(){
 SD.begin(cs);
```

```
 file=SD.open("gua1.txt", FILE_WRITE);
if(file) {
 file.print(rtc.getDateStr());
 file.print(" ,");
 file.print(rtc.getDOWStr());
 file.print(" ,");
 file.print(rtc.getTimeStr());
 file.print(" ,");
 file.print(temp);
 file.print(" ,");
 file.print(hum);
 file.print(" ,");
 file.print(CO2+400);
 file.print(",");
 file.println(oksigen);
 delay(1000);
  file.close();

  Serial.println("Data berhasil ditambahkan!!");
 }
 else {
 Serial.println("error");
  loop();
 }
}
```