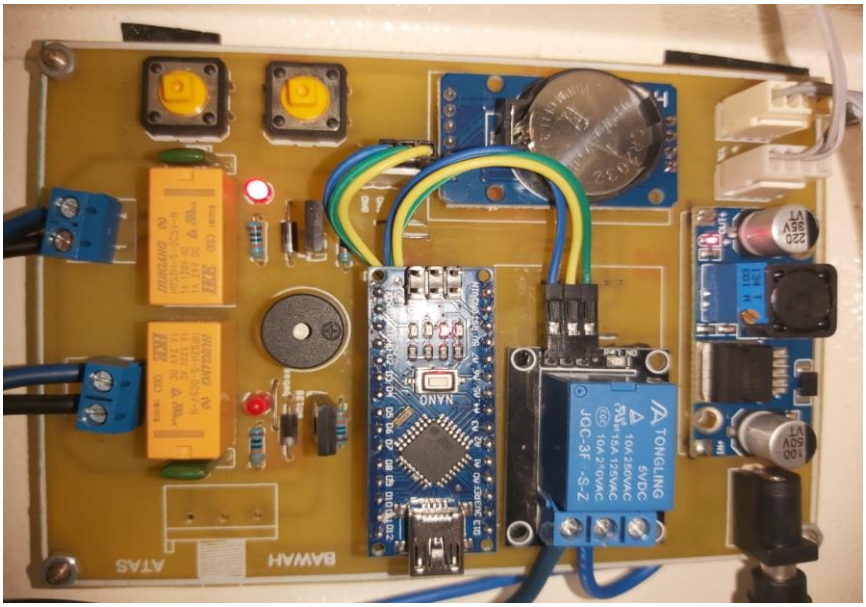
LAMPIRAN

LAMPIRAN FOTO ALAT




CMOS

LAMPIRAN PROGRAM ARDUINO NANO

A. Program Arduino Nano

```
#include <Wire.h>
#include "I2Cdev.h"
#include "MPU6050.h"
#include <LiquidCrystal_I2C.h>
#include "RTClib.h"
#define pin_buzzer 4
#define pin_relay1 2
#define pin_relay2 3
#define pin_relay3 9

#define relay1_on digitalWrite(pin_relay1,HIGH)
#define relay1_off digitalWrite(pin_relay1,LOW)

#define relay2_on digitalWrite(pin_relay2,HIGH)
#define relay2_off digitalWrite(pin_relay2,LOW)

#define relay3_on digitalWrite(pin_relay3,HIGH)
#define relay3_off digitalWrite(pin_relay3,LOW)

#define max 20
RTC_Millis rtc;

//MPU6050 accelgyro;
MPU6050 accelgyro(0x69);
LiquidCrystal_I2C lcd(0x27, 16, 2);

int16_t ax, ay, az;
int16_t gx, gy, gz;
int sample =20;
float g = 9.8;
float accX,accY,accZ;

long raw_sampleX=0;
long raw_sampleY=0;
long raw_sampleZ=0;

String speed;

byte minute = 0;
byte hour = 0;
byte weekday = 0;
byte monthday = 0;
byte month = 0;
int year = 0;
int second=0;
String xjam, xtanggal;
const int DS1307 = 0x68; // Alamat pin RTC pada arduino

float acceleration=0;
```

```
float real_acceleration=0;
float last_acceleration=0;
float last_millis;
int sig=0,last_status=0;

void setup() {
  Wire.begin();
  accelgyro.initialize();

  lcd.begin();
  lcd.backlight();
  pinMode(pin_relay1,OUTPUT);
  pinMode(pin_relay2,OUTPUT);
  pinMode(pin_relay3,OUTPUT);

  pinMode(pin_buzzer,OUTPUT);
  digitalWrite(pin_buzzer,LOW);

  relay1_off;
  relay2_off;
  relay3_off;
  get_accel();
  //delay(2000);
  Serial.begin(9600);
  Serial.println(accelgyro.testConnection() ? "MPU6050 Connection Successful" :
"MPU6050 connection fairelay1");
}

void xloop(){

}

int sp=0;
void loop() {
   time_read();
   get_accel();
   sp=map(analogRead(A0),0,1023,1,12);
   xjam =karakter(hour)+":"+karakter(minute)+":"+karakter(second);
   xtanggal = karakter(monthday)+"/"+karakter(month)+"/"+karakter(year);

   int  mmi=0;
   if (real_acceleration<2.9){
    mmi = 0;
   }else  if (real_acceleration>=2.9 && real_acceleration<=88){
    mmi = map(real_acceleration,2.9,88,3,5);
   }else  if (real_acceleration>=89 && real_acceleration<=167){
    mmi = 6;
   }else  if (real_acceleration>=168 && real_acceleration<=564){
    mmi = map(real_acceleration,168,564,6,8);;
   }else{
    mmi = map(real_acceleration,564,700,9,12);
   }
   if (mmi>12){mmi=12;}
```

```
  lcd.setCursor(0,0);
  lcd.print(xjam);
  lcd.print(" ");
  lcd.print(xtanggal);
  lcd.print("  ");

  lcd.setCursor(0,1);
  lcd.print("a:");
  lcd.print(real_acceleration);
  lcd.print(" MMI:");
  lcd.print(mmi);
  lcd.print("    ");

  if (mmi<3){
   sig=0;
  }else if (mmi>=3 && mmi<5){
  sig=1;
  }else if (mmi>=6 && mmi<8){
   sig=2;
  }else if (mmi>=9 && mmi<12){
 sig=3;
  }


if (sig!=last_status){
 last_status=sig;

 if (sig==1){
   relay1_on;
   relay2_off;
   relay3_off;
   beep(10);
  }else if (sig==2){
   relay1_off;
   relay2_on;
   relay3_off;
   beep(20);
  }else if (sig==3){
   relay1_off;
   relay2_off;
   relay3_on;
   beep(30);
  }
}
  Serial.print("T: ");
  Serial.print(xtanggal);
  Serial.print(" J:");
  Serial.print(xjam);
  Serial.print(" X:");
  Serial.print(raw_sampleX);

  Serial.print(" Y:");
```

```
  Serial.print(raw_sampleY);

  Serial.print(" Z:");
  Serial.print(raw_sampleZ);

   Serial.print(" a:");
  Serial.print(real_acceleration);

  Serial.print(" Skala MMI:");
  Serial.print(mmi); Serial.print(" SIG:");
  Serial.println(sig);

  delay(1);
}


void beep(int a){
  for (int i=0;i<a;i++){
    digitalWrite(pin_buzzer,HIGH);
    delay(100);
    digitalWrite(pin_buzzer,LOW);
    delay(100);
   }
}
```

B. Program Sensor MPU 6050

```
void get_accel(){
raw_sampleX=0;
raw_sampleY=0;
raw_sampleZ=0;

for (int i = 0;i<sample;i++){
accelgyro.getMotion6(&ax, &ay, &az, &gx, &gy, &gz);
int x = abs(ax);
int y = abs(ay);
int z = abs(az);
raw_sampleX=raw_sampleX+x;
raw_sampleY=raw_sampleX+y;
raw_sampleZ=raw_sampleX+z;
```

```
delay(20);
}
raw_sampleX=raw_sampleX/sample;
raw_sampleY=raw_sampleY/sample;
raw_sampleZ=raw_sampleZ/sample;

acceleration= (raw_sampleX+raw_sampleY+raw_sampleZ)*0.1;
real_acceleration= abs(acceleration-last_acceleration)/7;
last_acceleration = acceleration;


}
```

C. Program RTC

```
void time_read(){
  Wire.beginTransmission(DS1307);
  Wire.write(byte(0));
  Wire.endTransmission();
  Wire.requestFrom(DS1307, 7);
  second = bcdToDec(Wire.read());
  minute = bcdToDec(Wire.read());
  hour = bcdToDec(Wire.read());
  weekday = bcdToDec(Wire.read());
  monthday = bcdToDec(Wire.read());
  month = bcdToDec(Wire.read());
  year = bcdToDec(Wire.read());
}

void setTime(int jam,int menit,int detik,int hari,int bulan,int tahun,int nama) {
// "1 Sun | 2 Mon | 3 Tues | 4 Weds | 5 Thu | 6 Fri | 7 Sat - "
 second = detik;
 minute=menit;
 hour=jam;

 monthday=hari;
 month=bulan;
 year=tahun;
```

```
 weekday = nama;

// Kode untuk mentransmisikan atau mengirimkan data ke RTC
  Wire.beginTransmission(DS1307);
  Wire.write(byte(0));
  Wire.write(decToBcd(second));
  Wire.write(decToBcd(minute));
  Wire.write(decToBcd(hour));
  Wire.write(decToBcd(weekday));
  Wire.write(decToBcd(monthday));
  Wire.write(decToBcd(month));
  Wire.write(decToBcd(year));
  Wire.write(byte(0));
  Wire.endTransmission();

}

byte decToBcd(byte val) {
  return ((val/10*16) + (val%10));
}
byte bcdToDec(byte val) {
  return ((val/16*10) + (val%16));
}
String karakter(int jumlahbilangan){
  String stringdata = String(jumlahbilangan);
  if (jumlahbilangan < 10){
    stringdata = "0" + stringdata;
  }

  return stringdata;
}
```