

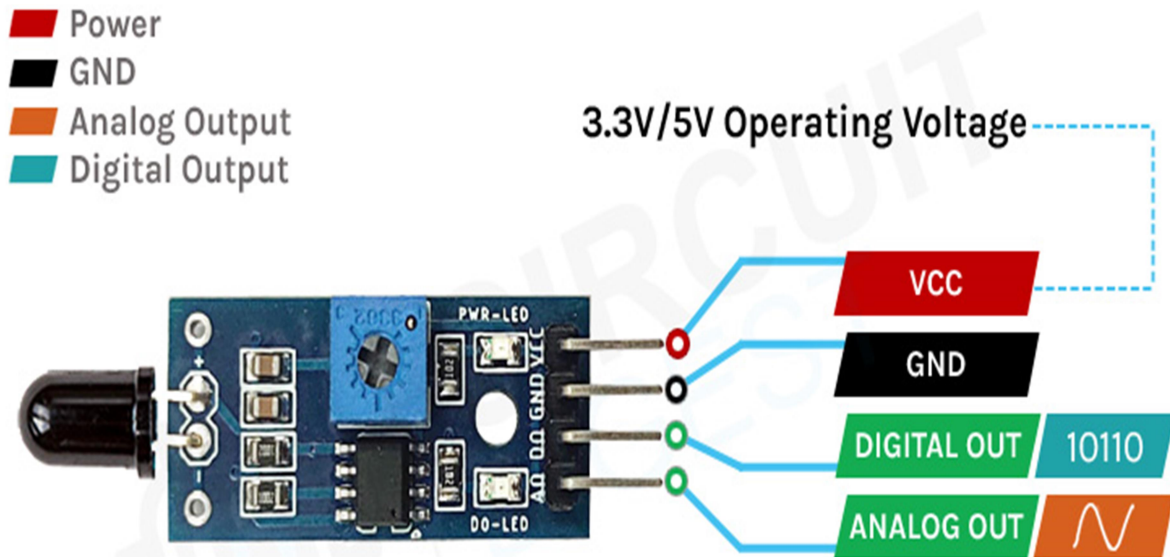
Al-Mustaqbal University
College Of Engineering & Technology
Department of Computer Engineering Techniques
(Stage: 3)
Digital Control
Lecture 11
Arduino programming
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Flame Sensor

The damages that can be done by fire are devastating. To prevent casualties or damages, it is necessary to detect the fire, so that warnings can be provided and even automatic fire suppression systems can be activated. There are multiple ways to detect a fire, like detecting temperature change, smoke detection, etc. In all of these, detecting temperature change would be more accurate, since some fires won't even have detectable smoke. Even the temperature measurement is not too dependable since sometimes it's too late when the change is detected. To overcome this, we can detect the thermal radiation instead of the temperature variation. The easiest and cheapest way to detect thermal radiation is to use a flame sensor. In this tutorial, we will see how we can interface a flame sensor module with Arduino.

Flame Sensor Module Pinout

The flame sensor module has a total of 4 pins. Two power pins and two signal pins. The **pinout of a flame sensor module** is as follows:



VCC Provides power for the module, Connect to the 5V pin of the Arduino.

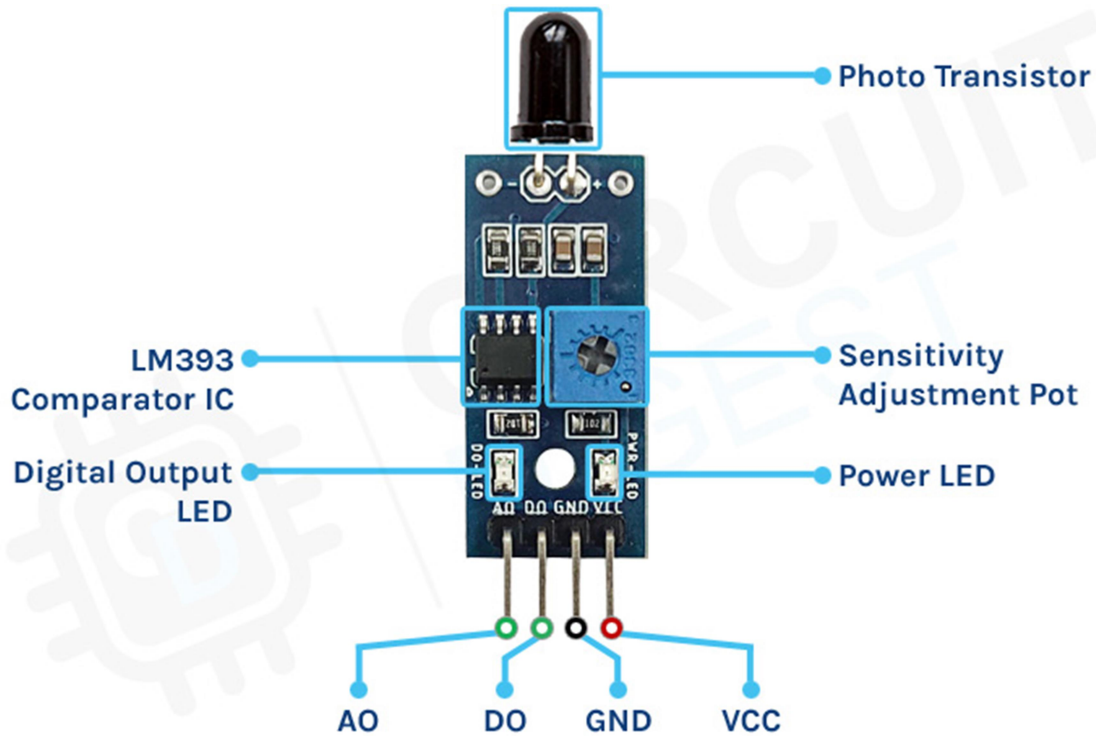
GND Ground Connected to Ground pin of the Arduino.

DO Digital Output Pin.

AO Analog Output Pin.

Flame Sensor Module Parts

The flame sensor module has only very few components, which include an IR photodiode, an LM393 comparator IC, and some complimentary passive components. The power LED will light up when the module is powered and the D0 LED will turn off, when a flame is detected. The sensitivity can be adjusted with the trimmer resistor onboard.



How does a flame sensor work?

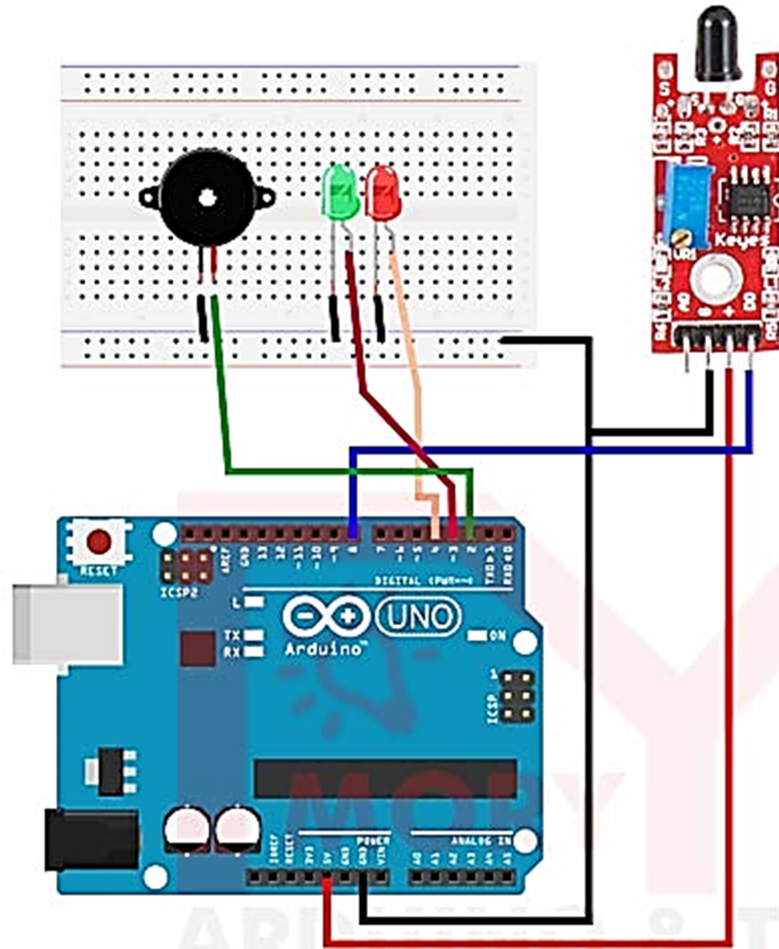
The flame sensor works based on infrared radiation. The IR photodiode will detect the IR radiation from any hot body. This value is then compared with a set value. Once the radiation reaches the threshold value, the sensor will change its output accordingly.

What does the flame sensor detect?

This type of flame sensor detects Infrared radiation.

Where are flame sensors used?

The flame sensors are used where ever there is a chance for a fire. Especially in industrial areas.



```
const int buzzerPin = 2;  
const int flamePin = 8;  
int Flame = HIGH;  
int greenled = 3;  
int redled = 4;  
void setup()  
{  
  pinMode(buzzerPin, OUTPUT);  
  pinMode(redled, OUTPUT);
```

```
pinMode(greenled, OUTPUT);  
pinMode(flamePin, INPUT);  
Serial.begin(9600);  
}  
void loop()  
{  
Flame = digitalRead(flamePin);  
if (Flame== LOW)  
{  
digitalWrite(buzzerPin, HIGH);  
digitalWrite(redled, HIGH);  
digitalWrite(greenled, LOW);  
}  
else  
{  
digitalWrite(buzzerPin, LOW);  
digitalWrite(greenled, HIGH);  
digitalWrite(redled, LOW);  
}  
}
```