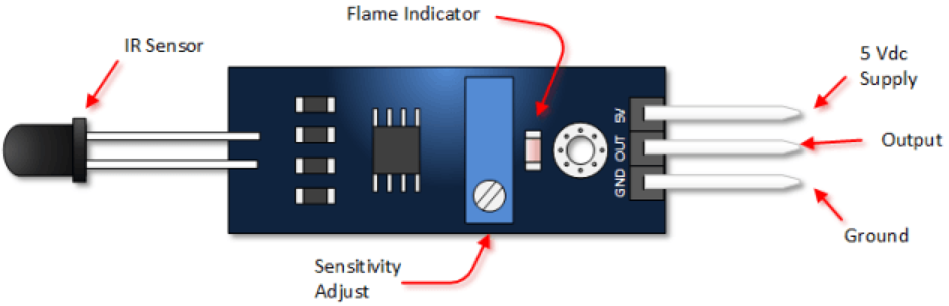
Flame Sensor

The Flame Detector module is representative of the many similar devices that are designed to interface with micro-controllers. This particular device consists of an IR detector, op amp circuitry, sensitivity adjustment and an LED indicator.

The IR detector is sensitive to light wavelengths typical of flames. When a flame is present, the module will turn on its red LED and it will set its output low.

Flame Sensor Module Pin Out

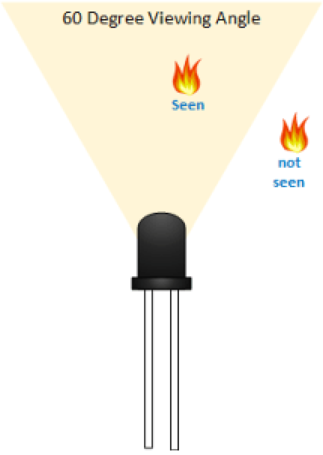
Only three connections are required to allow this device to work with your Arduino. The following picture and table describe these pins.



Pin	Function
5V	5 Vdc supply Input
Out	Goes low when flame is detected
GND	Ground input
Flame Indicator	Illuminates when flame is sensed
Sensitivity Adjust	CW is more sensitive
IR Detector	60° view angle and is sensitive to the wavelengths typical of flames

Application Considerations

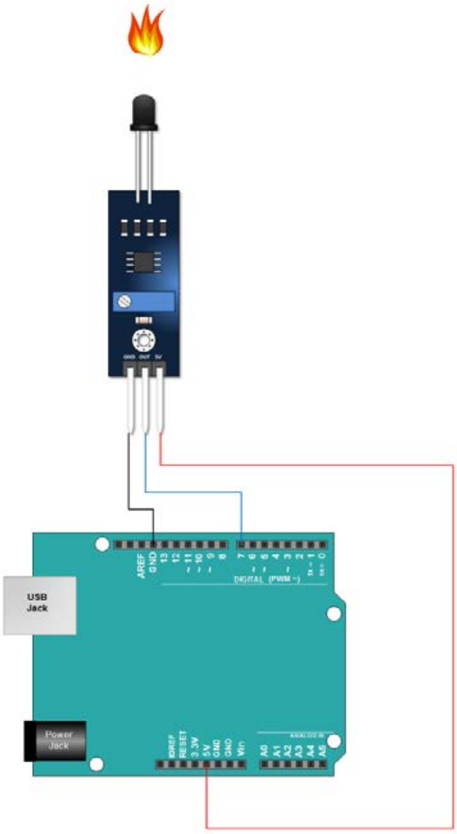
As previously mentioned, the viewing angle is at sixty degrees. Thus the sensor view is incredibly important as you design your projects.



The flame sensor module detects wavelengths from 760nm-1100nm. There are other sources of heat that will also detect this wavelength. It is therefore important that you ensure that the only source of this particular range will be the flame that you want to detect. Otherwise, your project may be riddled with false measurements.

During the course of testing this device, I used a defective lighter. It took several attempts to see a flame. However, each time I tried the sparks from lighter caused the LED to flash.

Connect the Flame Sensor Module to Arduino



Use the schematic to connect your micro-controller to the flame detector.

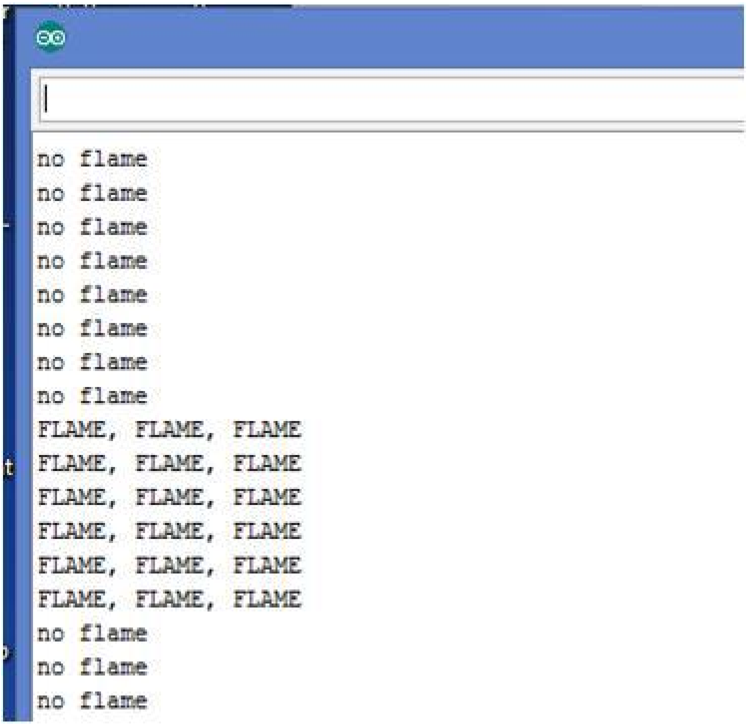
Copy, Paste and Upload the Arduino Flame Detector Module Sketch

The sketch below is pretty straight forward. It uses the LED connected to Pin 13 of serial monitor of your Arduino IDE to see the output.

```
int LED = 13; // Use the onboard Uno LED
int isFlamePin = 7;  // This is our input pin
int isFlame = HIGH;  // HIGH MEANS NO FLAME

void setup() {
  pinMode(LED, OUTPUT);
  pinMode(isFlamePin, INPUT);
  Serial.begin(9600);

}

void loop() {
  isFlame = digitalRead(isFlamePin);
  if (isFlame== LOW)
  {
    Serial.println("FLAME, FLAME, FLAME");
    digitalWrite(LED, HIGH);
  }
  else
  {
    Serial.println("no flame");
    digitalWrite(LED, LOW);
  }
}
```

Verify Operation of the Flame Detector and Adjust Sensitivity

Open the Serial Monitor on your Arduino program. Move a flame in and out of the viewing angle of the sensor. You should see an output that looks something like the picture below. You should also see the red LED illuminate on your module and you should see also see the module LED connected to pin 13 of your Arduino light up.



```
no flame
no flame
no flame
no flame
no flame
no flame
no flame
no flame
FLAME, FLAME, FLAME
FLAME, FLAME, FLAME
FLAME, FLAME, FLAME
FLAME, FLAME, FLAME
FLAME, FLAME, FLAME
FLAME, FLAME, FLAME
no flame
no flame
no flame
```

Project Ideas

The temptation with a flame detector is the temptation to design it in as a safety device. That's fine. However, it should never be relied upon as the sole means of protection, particularly at a DIY project or experimental level.

- **Turn off Power If Flame** – You could turn power off to device in the presence of a flame. Turning off ventilation fans if flame were detected comes to mind.
- **Close a Valve if there is no Flame** – You could turn off an automated valve carrying gas if there were an absence of a flame.
- **Spark Detection** – Discovering the device responds to sparks gives a whole new range of ideas. You could set a flag if sparks were detected inside an electrical enclosure, or you could detect if a device designed to produce a spark is failing.