

GEAR has in inventory some Sharp brand IR distance sensors. In this short lesson you will learn how to connect a sensor to Arduino and send distance measurements via the serial port. These are analog sensors and cannot be connected to the digital GPIO pins of a Raspberry Pi. You could interface the sensor to RPi with an A/D (analog to digital) chip. However, since we have Arduinos to work with, why not use an Arduino, which has built-in A/D electronics?

Connect the white signal wire of the sensor to analog pin A0 of the Arduino. The sensor red wire connects to +5 volts on Arduino and the black wire to ground on the Arduino. Open the Arduino IDE on your Raspberry Pi and enter the code below. Verify the code and upload to the Arduino. Then open the Serial Monitor in the Arduino IDE software. Place your hand near the sensor and vary the distance between your hand and sensor. You should see a distance read out on the monitor in centimeters.

Once you are able to receive distance measurements on the Serial Monitor, you should try to write a Python program that receives the distance data sent by the Arduino. A distance sensor could be incorporated into your entry for NRC.

```
// Sharp IR GP2Y0A21YK0F Distance Test
#define sensor A0 // Sharp IR GP2Y0A21YK0F (10-80cm, analog) connect to analog pin A0
void setup() {
  Serial.begin(9600); // start the serial port
}
void loop() {
  float volts = analogRead(sensor); // value from sensor
  int distance = (6762/(volts - 9)) -4; // got this equation from:
  // http://instructables.com/id/Get-started-with-distance-sensors-and-arduino

  delay(1000); // slow down serial port
  if (distance <= 80 && distance >= 10){
```

```
    Serial.println(distance);    // print the distance
}
else {
    Serial.write("distance out of range of sensor");
    Serial.write("\n");
}
}
```