

Description of Pyrodetector and Testing

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Originally, the pyroelectric sensor I used came from a MainStays™ Home 110° Motion Activated Security Light which was purchased from Wal-Mart. It was extremely cheap and very easy to hack.

This is what needs to be done to hack it:

1. Unscrew the casing and cut all of the wires leading to the light fixture. The light fixture is not needed anymore and can be thrown away.
2. Remove the relay (big blue box) and diode D1 (D1 is wired across the relay's coil, to protect the driver transistor from back-EMF spikes).
3. Remove the red, black, and white wires. Solder a lower gauge wire to where the white wire was. This is your ground.
4. Solder another line to the cathode end (banded end) of where D1 was. This is your +5V input.
5. Connect a jumper wire from the “E” to the “C” terminals on Q1. This is necessary to bypass the transistor and deliver the input +5V to your circuit.
6. Install a 10KO resistor to the two pins where the relay was. These pins should be the pins that are parallel from where D1 was.
7. Install a wire from the anode end (unbanded end) of D1. This is your output signal

When the board is set to the “Test” setting, 0V will be asserted on the output wire whenever a body moves. This signal will usually stay 0V for about 4 seconds once something is detected. During steady state, the signal will have a voltage of about 2.5V.

Unfortunately, the hacked sensor didn't give accurate readings. I tested it by writing a program that counts the triggers as I walk across it. After 50 runs, only 14 spikes were generated. So, alternatively, I ordered a PIR Motion Sensor from HVW Technologies and tested that.

HVW Technologies PIR Motion Detector

This pyro is extremely simple to use and interface. There are only three lines—ground, vcc, and signal out (see wiring diagram below). The detector is completely digital which means you get 0V if nothing is detected and 5V if something is detected.

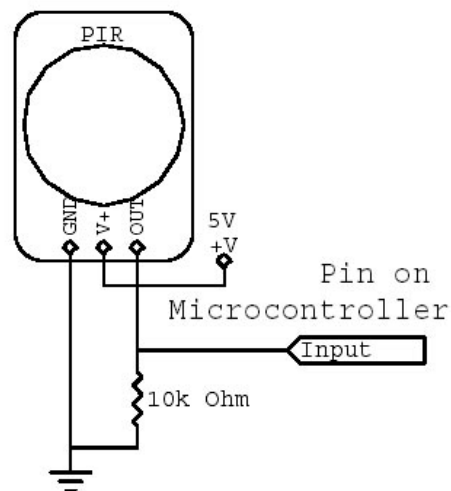


Figure 1 – PIR wiring diagram

The sensor takes about one minute, once it is first powered on, to stabilize and be able to give readings. Also, one very important thing to be aware of is that if the platform that the detector sits on moves, the PIR sensor generates unreliable readings. As shown in Figure 4, the readings from the sensor bounces from +5V to 0V many times before it settles down to give accurate readings. It seems that the pyro sensor takes no more than 5 seconds to settle once the platform stops moving. To overcome this, a wait routine of 5 seconds should be executed before polling to see if a person is detected.

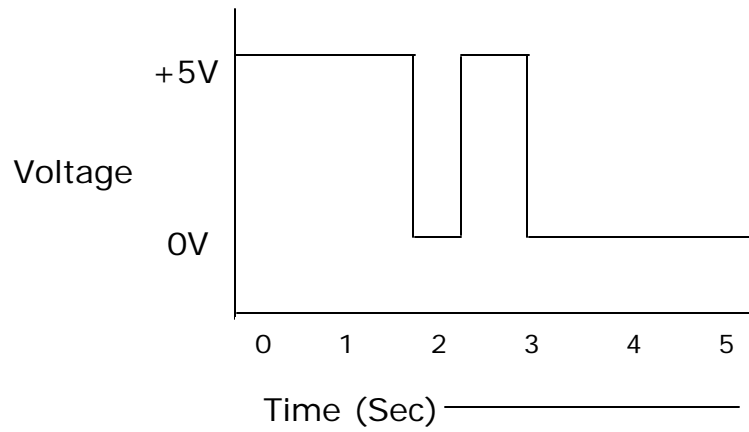


Figure 2 – Example Timing Diagram on PIR when platform moves

Once the pyro is stabilized, it gives extremely accurate readings. After 50 tests using the program created for the previous method, 50 spikes was generated.