



Chris' Engineering Tech Corner

PIR Triggered Relay Circuits

by

[Chris Savage](#)

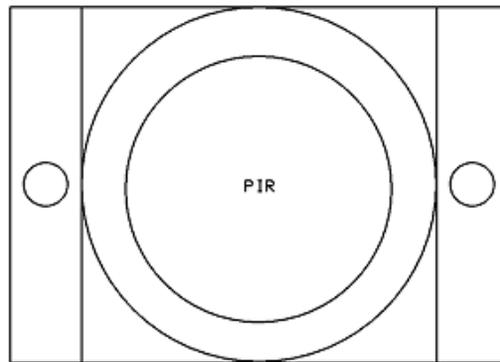
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I've had several customers call about using our PIR sensor as a motion activated light or to activate some other device when motion is detected. Sometimes we get customers that don't have any interest in microcontrollers but still need the light or device to come on for some time and then turn itself off. So for those who want the equivalent of a motion activated light using Parallax sensors and parts this Mini-Project is for you.

The circuit is built around the 555 Timer IC, undoubtedly one of the classic integrated circuits used for many years in many projects. Combined with a PIR sensor, a couple of transistors and a relay board you can easily turn on a device when motion is detected and have it turn off after a certain amount of time, set by the values of R1 and C1. With the values listed the delay time is approximately 2 minutes. This can be increased/decreased by setting R1/C1 or you could replace R1 with a 1 M potentiometer and have an adjustable delay time that is easier to set.

The delay time starts from the last trigger of the PIR. In other words, the circuit is re-triggerable. If the PIR senses motion during the delay the countdown is reset just like most commercial motion activated systems.

The entire circuit runs from a single 5V power supply and whether you use the [Single Board Relay \(#27115\)](#) or the [Dual Relay Board Kit \(#27114\)](#) you can control 120VAC lights or other devices using these relays. If you use the Dual Relay Board Kit you will also need a 12V Relay Supply.



NOTES:

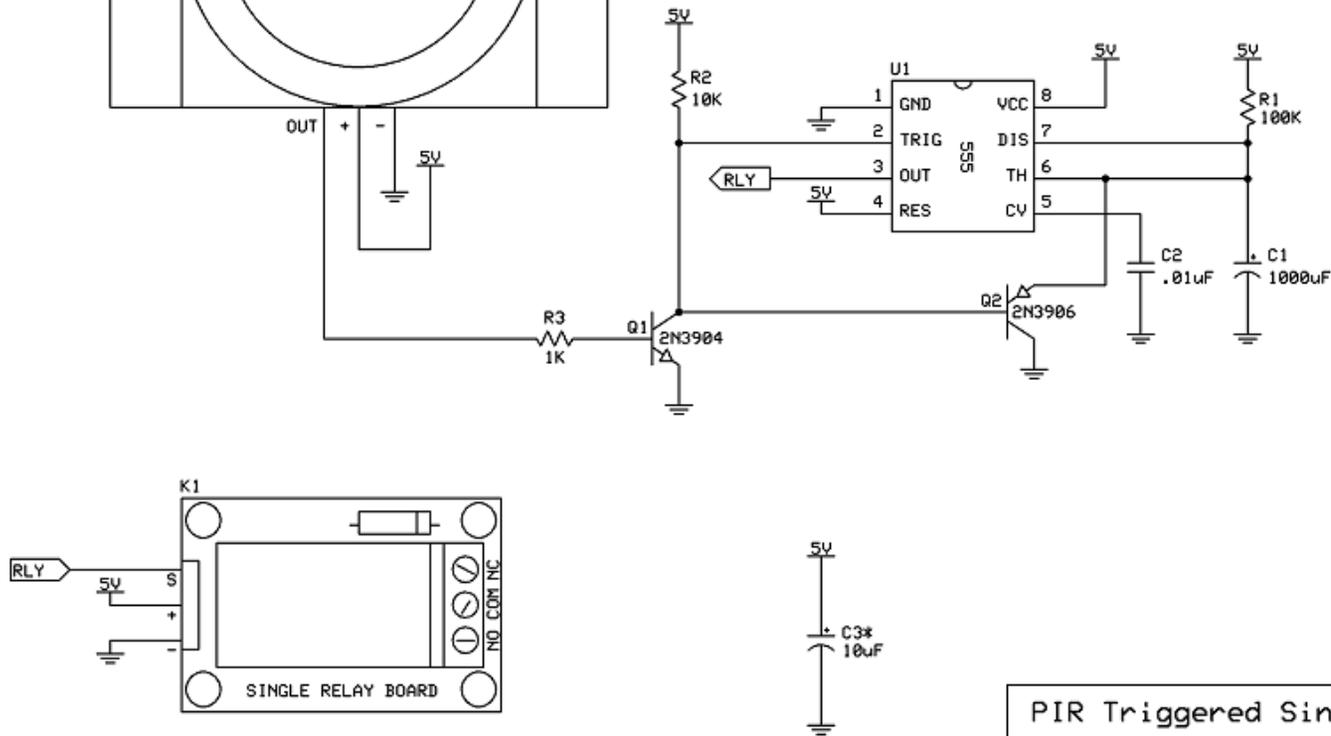
- (1) PIR - PARALLAX (#910-28027) DR (#555-28027)
- (1) U1 - CMOS TIMER IC (#604-00009)
- (2) Q1, Q3 - 2N3904 NPN TRANSISTOR (#500-00001)
- (1) Q2 - 2N3906 PNP TRANSISTOR (#500-00003)
- (1) R1 - 100K, 1/4W Resistor (#150-01040)
- (1) R2 - 10K, 1/4W Resistor (#150-01030)
- (2) R3-R4 - 1K, 1/4W Resistor (#150-01020)
- (1) C1 - 1000uF Capacitor (#201-01005)
- (1) C2 - 0.01uF Capacitor (#200-01031)
- (1) C3 - 10uF Capacitor (#201-01062)

- (1) K1 - SINGLE RELAY BOARD (#27115)

* - POWER SUPPLY FILTER CAP

R1/C1 VALUES YIELD ~2 MINUTES DELAY TIME

REPLACE R1 WITH 1M POT FOR ADJUSTABLE TIME DELAY



PIR Triggered Single Relay Board

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Theory of Operation:

When the PIR Sensor detects motion Q1's collector, which is normally pulled high by R2 is biased and pulls the 555 TRIG pin low starting the timing cycle. At the same time Q2 is biased clearing the charge on C1. C1 begins to charge via R1 until the threshold voltage is reached. Any time the PIR is re-triggered C1 is cleared again allowing the timing cycle to effectively start over. Once the timing cycle is complete the 555 OUT goes high which can be used to trigger the input on either Relay Board. This circuit works with our [PIR Sensor Rev A \(#910-28027\)](#) or [Rev B \(#555-28027\)](#).

Attached Files

-  [PIR Triggered Dual Relay Board Rev A.pdf](#) (29.8 KB, 498 views)
-  [PIR Triggered Single Relay Board Rev A.pdf](#) (28.3 KB, 528 views)