- Passive Infrared Sensor Alarm- Perfect for Simple Detection without Loud Alarm
- Self-Contained – No Externals Needed
- Resets Automatically
- Easy to Build “dead bug” Design
- Customizable
- Runs on 9V Battery
- Dozens of Possible Uses
- Detection Range: 0 - ~25 feet
- Optional: Extra NO/NC Contacts Output

Jameco Easy PIR Alarm Kit - SKU # 2316663

Protect yourself and your property with the Jameco Electronics Easy PIR Alarm Kit!

It runs on a 9V battery - or you can add your own wall transformer to save batteries or for use in permanent installations.

The kit is fully customizable, an extra set of relay contacts are also available to connect to external circuits or alarm systems.

One can find dozens of uses like: midnight refrigerator alarm, animal or human monitoring, trespass sensor, blind-side alarm, customer entrance chime - anytime one needs low sound level alarm notification.

Time Required: ~ 1 Hour depending on experience
Experience Level: Beginner with basic soldering skills

Required Tools and Parts

The kit includes all the parts needed except hook up wire. To assemble it, you will also need:

- Soldering Iron and solder
- A knife is helpful for dressing out the holes
- A drill and bits to drill out holes
- Small Philips screwdriver for the project box screws
- Wire cutter/stripper
- Insulated wire, solid or stranded 22-24 awg
- Hot glue gun
- Dremel tool
- Small diameter heatshrink tubing (for 22-24 awg wire)

Kit Bill of Materials

Qty	Jameco SKU	Description
1	99311	12V DPDT Relay DIP type
1	2230088	PIR Sensor
1	35975	1N4001 Diode
1	72161	SPST Mini Toggle Switch
1	315660 or 315678	Momentary OFF-(ON) Push Button Switch
1	11280	9V battery clip, side exit
1	198731	9V Battery
1	138713 or 2271031	DC piezo buzzer
1	690662	150 Ohm resistor ¼watt 5%
1	38447	2N4403 PNP transistor TO-92 package
1	18922	3 x 2 x 1 Project Box
Optional	**Not Included in kit**	-
1	2205755	4-Pack Binding Posts for extra switch output
3	103684	#6 Ring crimp lug insulated
1	2275343	Barrier Terminal Block 3 Position (or use the above binding posts)

Understanding the Circuit

This alarm works by the PIR sensing movement, the white wire (output) from the sensor goes “low” once movement within the covered area is detected, the signal passes thru a 150-ohm resistor and onto the base of a PNP transistor.

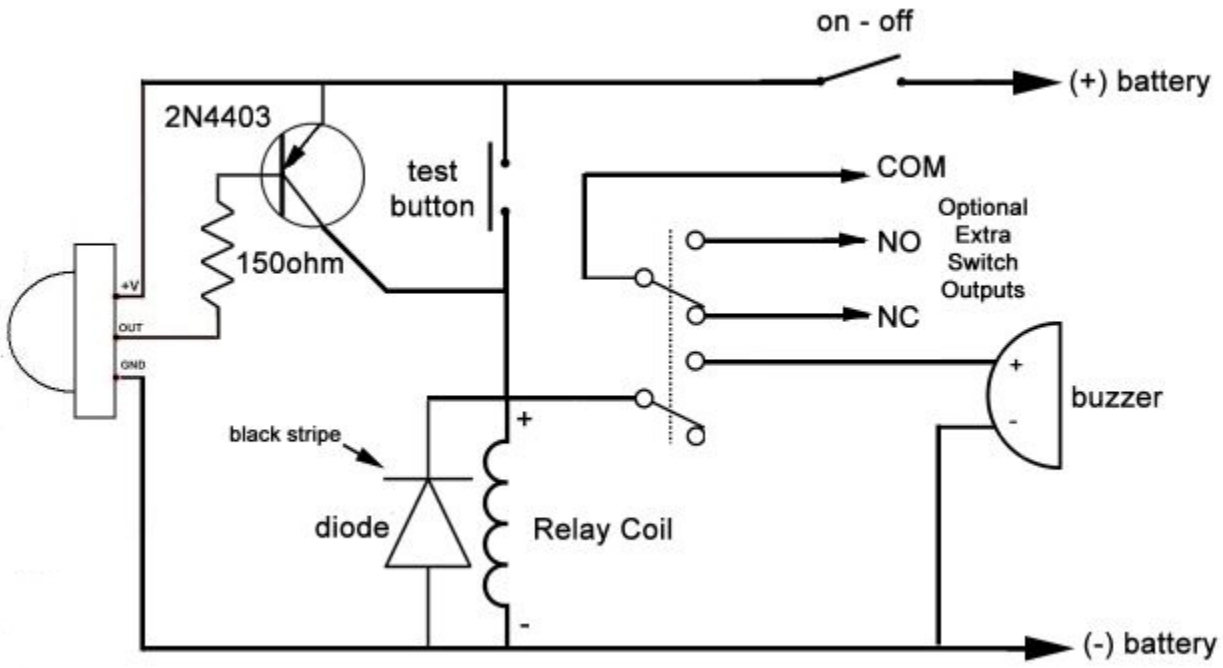
This results in the PNP sending the pulse onto the relay coil which sets off the buzzer. After up to a few seconds, the pulse is gone and the sensor resets.

Farther quicker movements give a smaller pulse while continuous or very up-close movement tends to extend the length of the alarm pulse.

The PIR sensor requires to be connected to power constantly while the relay switches the piezo buzzer on and off.

When on and during standby, the PIR draws ~ 17mA and during alarm on condition it draws ~30mA.

We added a momentary push button switch as a battery level and function check.



Step 1 - Review Components

First, check that you have all your parts and tools. The only part that is not included is the hook up wire.

You may already have some 22 or 24 awg wire around or some pre-made jumpers made for breadboarding. If not, a small spool our part number 2152905 is recommended.

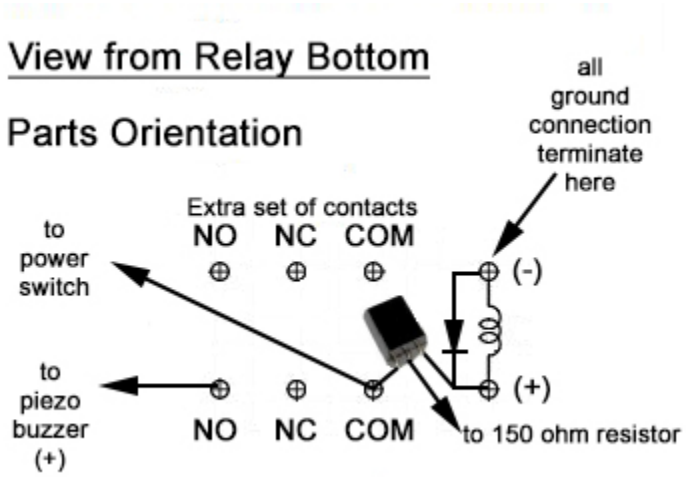
The tools you will need include a soldering iron, a knife, a drill and bits to drill out the holes, a small Philips screwdriver to close the project box, a Dremel tool and a hot glue gun to secure the buzzer and relay.

Step 2 - Build your dead bug circuit

Reference the schematic above and the photos below while you assemble to be sure you are on point.

First, use your 9V battery and find out which pin on the relay is the positive, put a mark on the side of the relay body to indicate which pin is (+) positive.

In the image below, you will see we used a red felt tip marker and put a dot on the relay body. Next, fashion the leads on the 1N4001 diode so that they can terminate on the relay coil plus and minus pins then continue the lead for the minus and make a loop at the end.



That loop at the end, will hold all the negative wires that will need to be joined: from the sensor, the battery and the piezo buzzer.

The side of the diode that has the stripe is the lead that goes to the plus side of the relay.

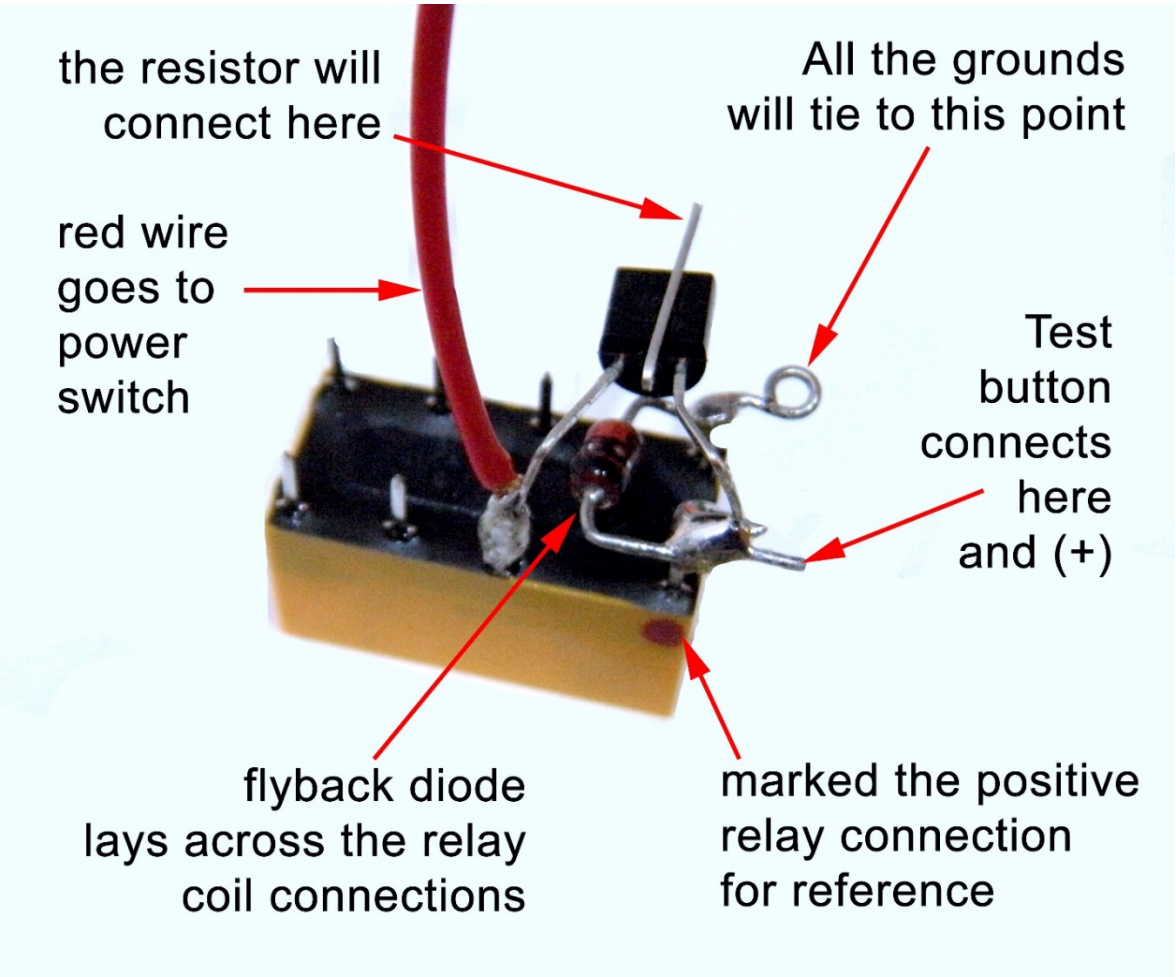
Extend the plus diode wire a little away from the relay so that one of the test button leads can connect there later.

Next, fashion the PNP transistor leads so that the right most lead (with the flat side facing you) is connected to the positive lead on the relay coil and the left most lead connects to the common pin of the relay contacts you decided to use.

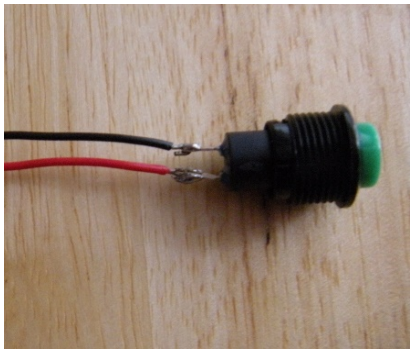
Strip and tin a wire and position it so that the relay pin, the transistor and your wire can be soldered together onto the common lead relay pin.

Bend the center lead of the transistor up and away so that you can connect the 150-ohm resistor.

When all soldered together, it should look like this or similar:



Step 3 – Mount Reset Switch and Drilling Holes

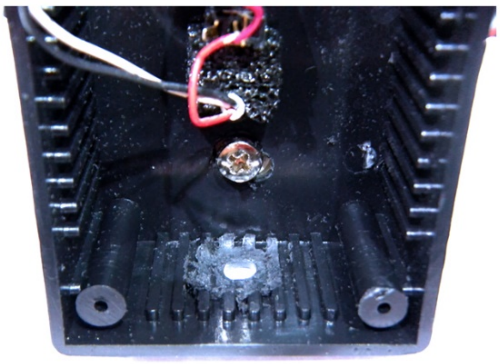


Attach two pieces of wire to the button and solder them into place. Strip the ends about 2-3mm long and tin them with solder.

Next, do the same thing for the piezo buzzer and use heat shrink tubing on the leads if desired.

One installs shrink tubing on the button and on the piezo leads to prevent them from touching the circuit.

Drill the two holes for the sensor on top of the box, one hole for the screw mount and the other hole to pass the sensor wire into the box. Drill additional holes for the power switch, the buzzer (where to sound will come out) and the test button.



Use a dremel tool to make beeper lay flat

You are free to place the push button wherever you'd like on the box but be careful that the body of the switch when mounted is not going to get in the way of the 9V battery or the ability to close the box cover. Then, use your knife to chamfer the holes and smooth them out.

Next, use your Dremel tool to take down the internal plastic ribs that are preventing the buzzer from mounting flush like shown at right.

Next, we can position the power switch so that one of the terminals holds all the positive terminations for the kit: the sensor, the wire to the relay and the wire to the test button.

Optionally, you can mount a DC power jack if you wanted to use a wall wart power supply. Our part number 281851 is the perfect DC power jack while our part number 2236498 DC power supply would work well as an alternative to using battery power.

Step 4 - Fitting the Components and Testing

Once all holes are placed and drilled, you can physically mount all the components that attach to the box: the sensor, the power switch, the test push button switch and the piezo buzzer.

First, remove the chrome sensor bracket. Cut off the sensor connectors and strip the jacket off and pass the wires through into the box.
Cut the red wire from the sensor just long enough to reach the mounted power switch.

The one wire from the relay, the one from the sensor and the one wire from the test push button switch will all attach to one leg on the power switch.

The other leg of the power switch has only the one red wire from the battery clip soldered to it.

Trim and solder the white sensor wire to fit with the resistor and the center pin of the transistor.

Solder the plus wire from the buzzer to the relay contact on the corner two pins down from the positive coil pin.

Solder all the ground wires into the loop made off the negative coil post.

View the schematic and check to see if all connections are made and finished.

IMPORTANT - Test your circuit NOW before applying any hot glue to your project as hot glue is hard to remove from components and wires.

Only hot glue the relay into the project box when it is known that the circuit works 100%.

If all connections have been made, install the battery and turn on the power switch and press the test button.

When pressed, the relay should click and the buzzer should sound, if it does not, go back and check your work.

If the test works, then wait 10 or 15 seconds while the sensor “learns” the surrounding environment. After that, any movement within the range will trigger the alarm.

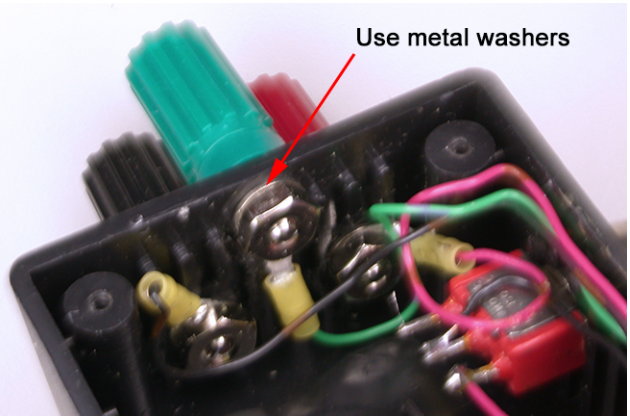
Step 5 - Finishing up

Install the lid of your project box and you're done!

Extra Switch Output Option

The relay has another set of normally open and normally closed contacts that can be brought outside the box that can be used to concurrently connect to other circuits or alarm systems.

Basically, one would install binding posts or barrier strip on the back or top of the unit and run the wires to the unused relay contacts, like this:

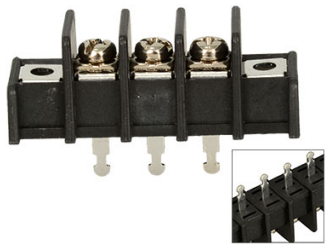


Note that we threw away the plastic washers and used metal washers instead so that the ring terminals were properly seated and connected.

Tips

To make your project work with a security system, simply remove the 9V buzzer and just use the relay alone. The relay contacts could then connect to an established alarm system.

Screwing on a terminal block to the enclosure would facilitate a connection for most all security systems, something like our part number 2275343 below and pass the terminals into the box and connect them to the relay contacts:



Suggestions

How about mounting more than one sensor and 150-ohm resistor tied to the transistor base - one could then monitor a wider area - but maybe at the expense of a little shorter battery life.

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