

# Citizen Sensor: MQ-7 Carbon Monoxide Breakout Kit

by [jmsaavedra](#) on September 24, 2010

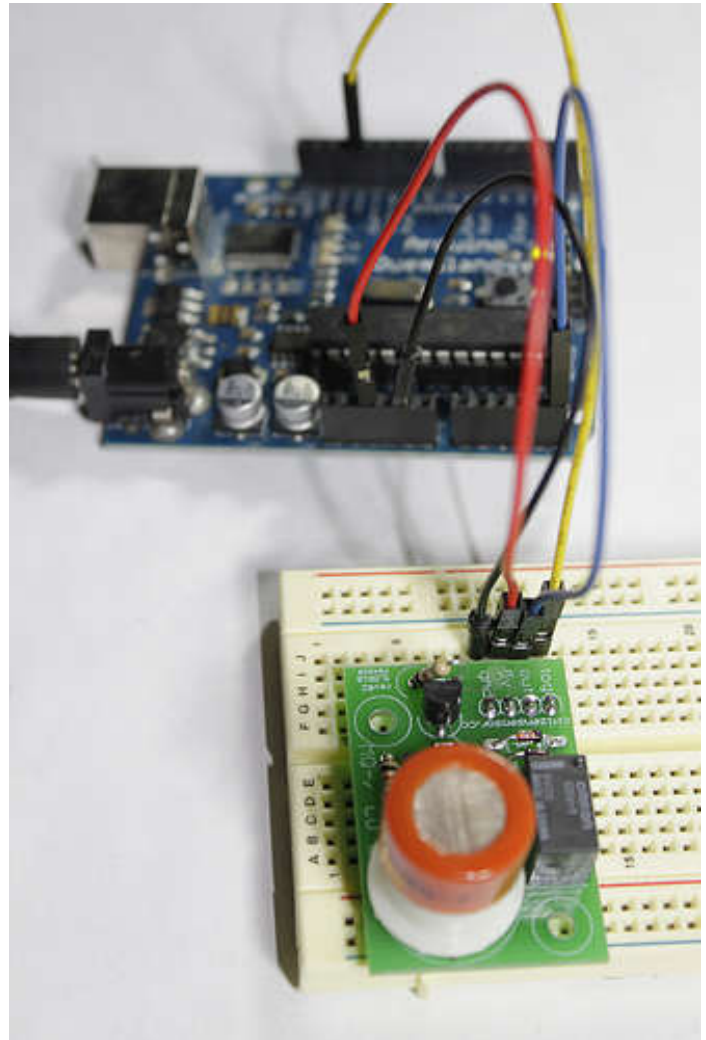
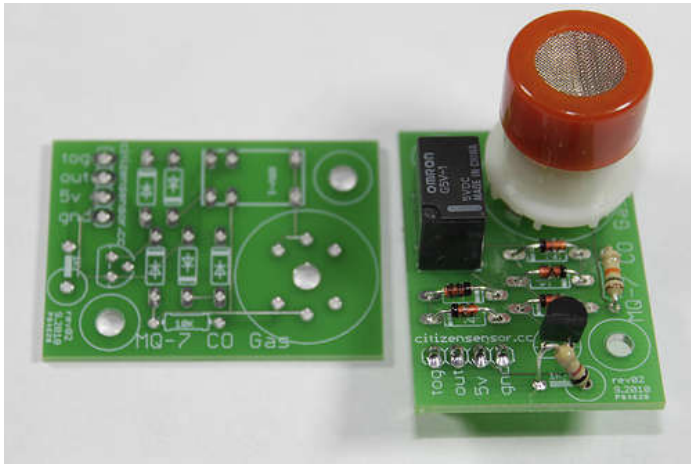
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## Intro: Citizen Sensor: MQ-7 Carbon Monoxide Breakout Kit

This Instructable will go through the steps to assemble the first Citizen Sensor kit : the MQ-7 Carbon Monoxide Gas Sensor Breakout Board.

More info at: <http://citizensensor.cc/make>



### step 1: Gather Materials and Tools

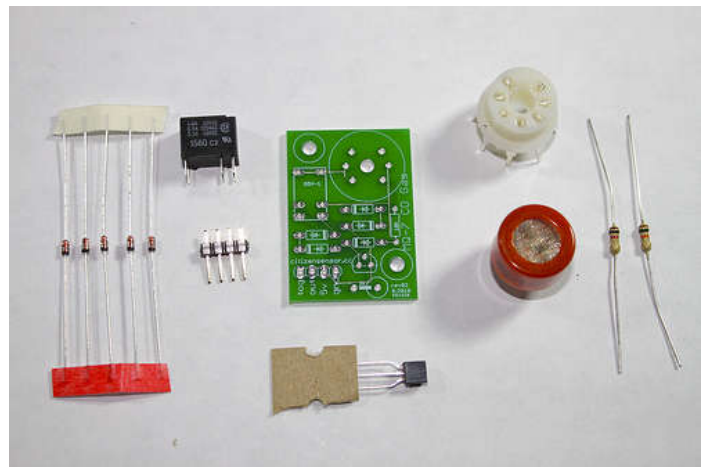
The only tools you will need are:

- a soldering iron
- solder
- snips

The kit includes the following parts:

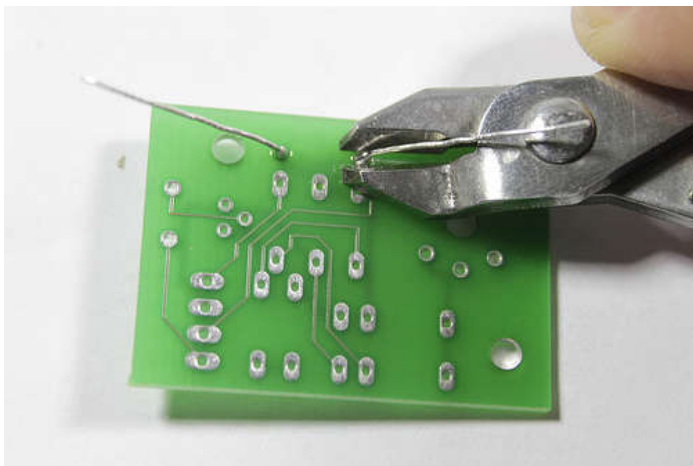
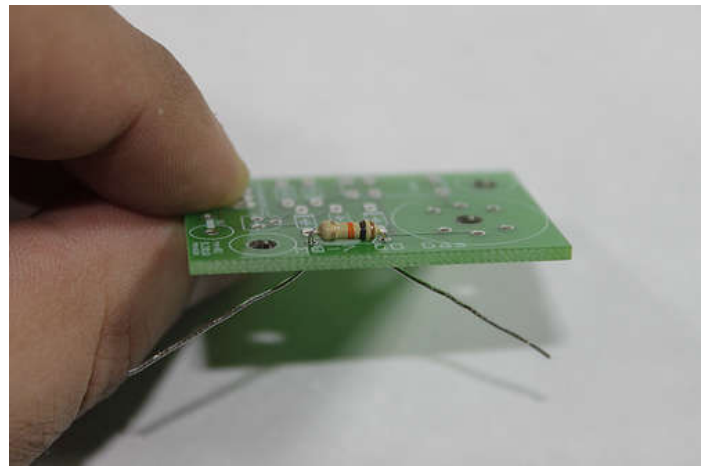
- 1 MQ-7 carbon monoxide sensor
- 5 4148 300mA diodes
- 1 5v relay
- 1 3904 transistor
- 1 1K ohm resistor
- 1 10K ohm resistor
- 1 sensor socket
- 1 straight 4-pin header
- 1 PCB

If you purchased a kit and are missing any of these parts, contact [joe at saavedra \[at\] jos \[dot\] ph](mailto:joe@saavedra.jos.ph)



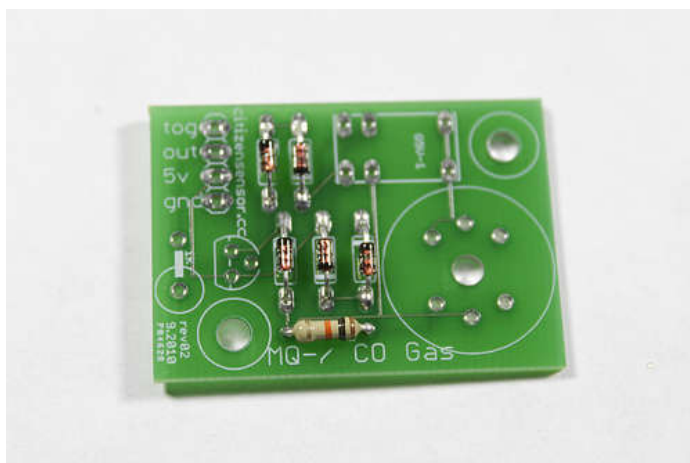
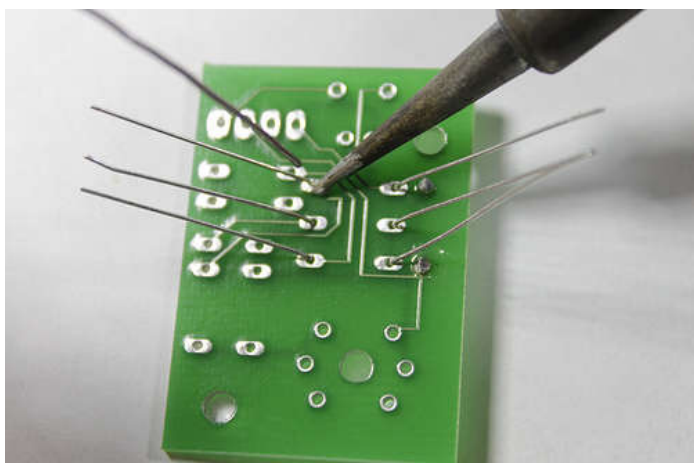
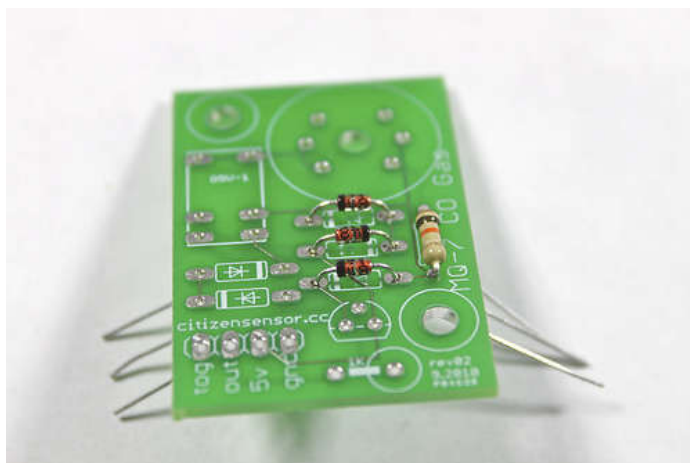
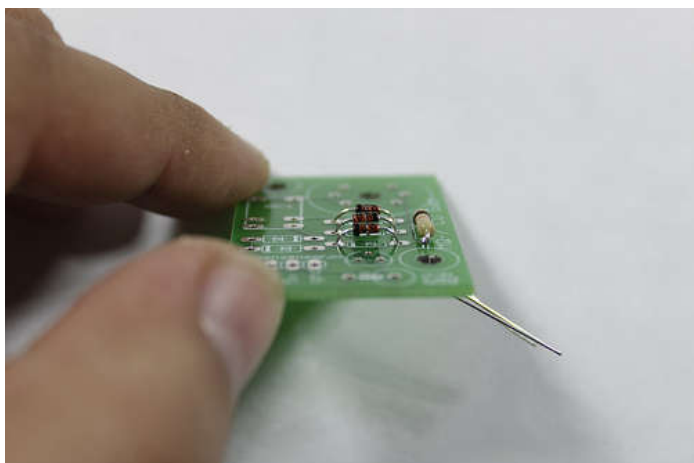
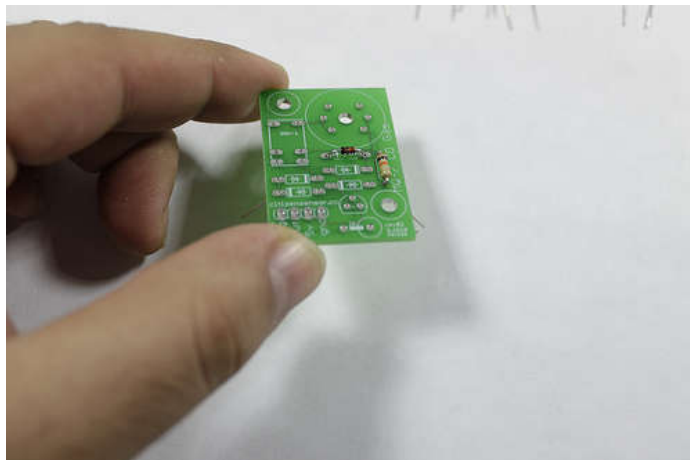
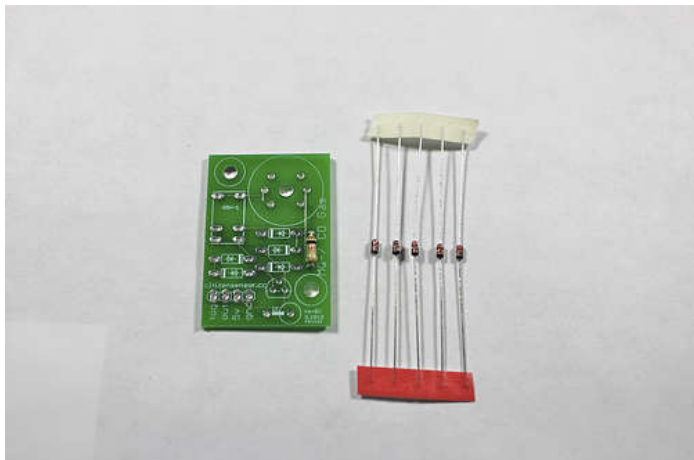
## step 2: 10k ohm resistor

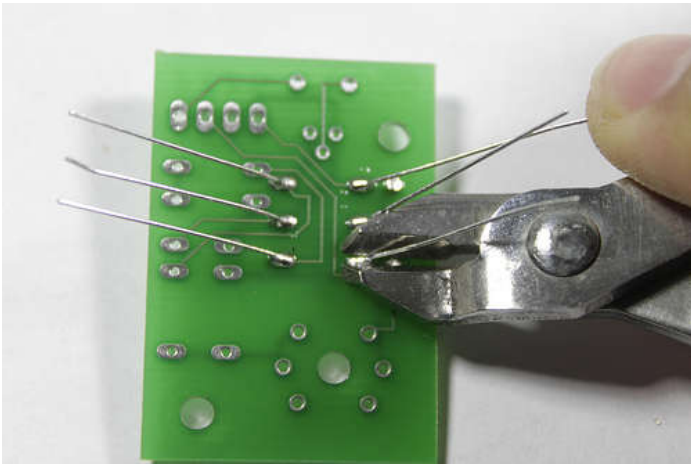
Locate the 10K-ohm resistor. This is the one who's stripes read brown - black - orange - gold. Bend both legs of the resistor down 90 degrees. Insert the resistor into the holes marked '10K'. Solder the legs in, and then trim them with the snips.



### step 3: Diodes

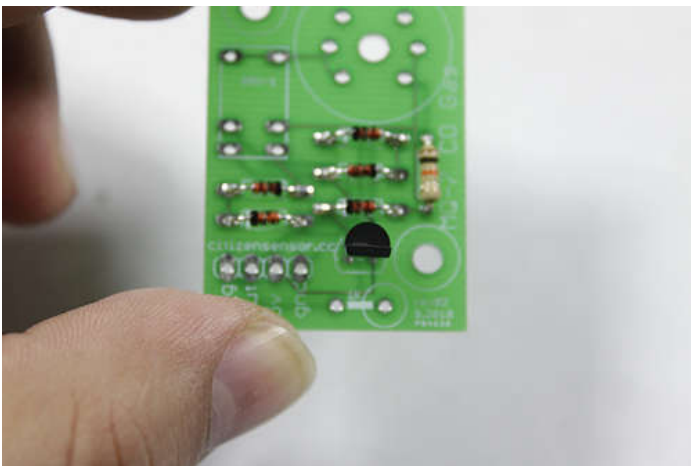
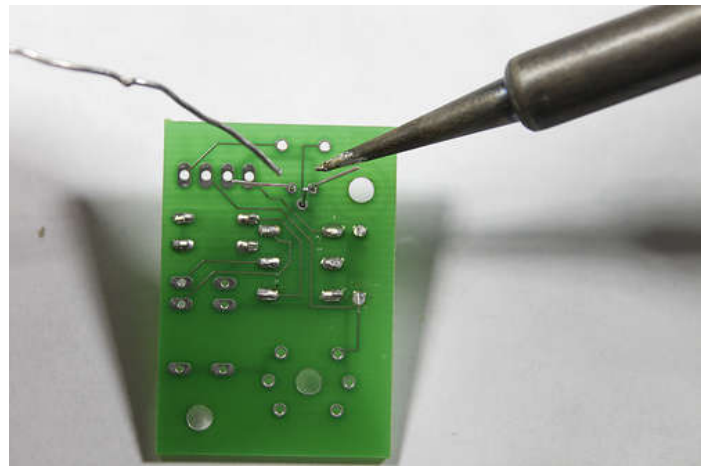
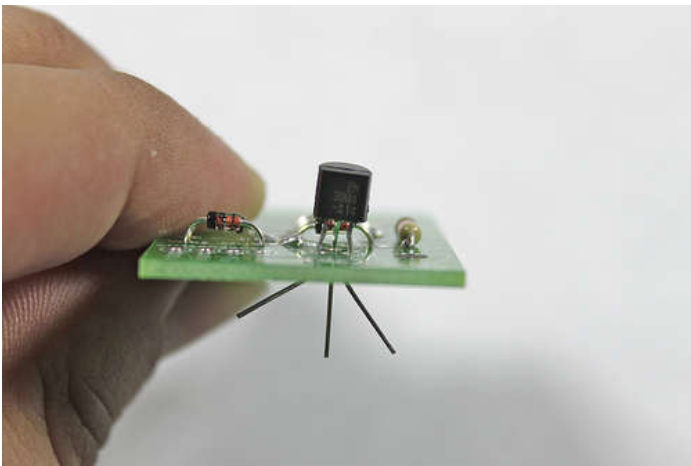
Find your 5 diodes. Bend their legs 90 degrees just as we did with the 10k resistor. Note the markings for the diodes on the board have a white stripe on one side. This stripe should match the black stripe of the diode -- this is extremely important. Look at the image for reference. Solder in the legs of all 5 diodes and trim them with the snips.





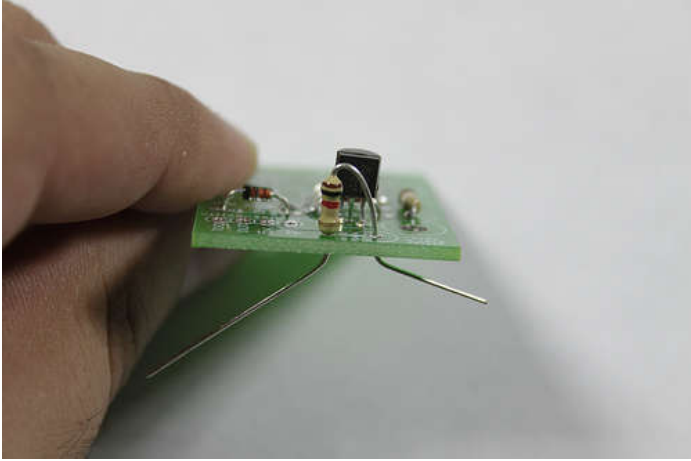
#### step 4: 3904 NPN Transistor

Line the shape of the transistor with the drawing on the PCB. you will have to bend the middle leg a bit out of the way in order to get all three through the PCB. Once the legs are through, bend them out so the transistor will stay in place. Solder all legs and then trim with the snips.



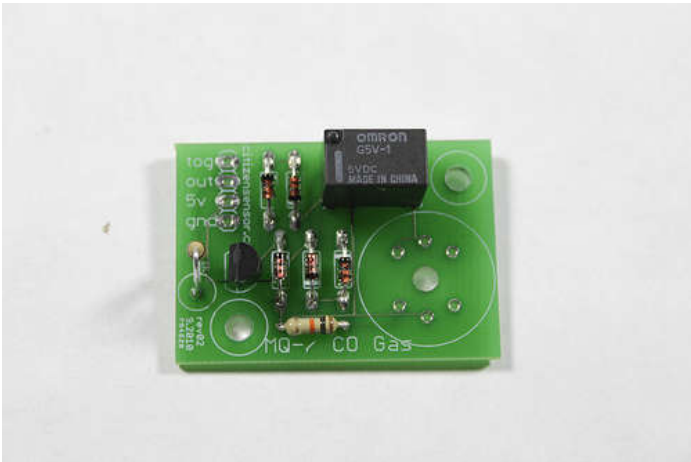
### step 5: 1K-ohm resistor

The 1K-ohm resistor has stripes who's colors read brown - black - red - gold. Bend one of the legs 180 degrees as you see in the picture. Insert into the holes marked 1k on the board. Solder into place and trim with snips.



### step 6: 5v Relay

The 5v relay is very obvious and does not require any trimming. It only fits in one way. Solder it up! We're almost there.

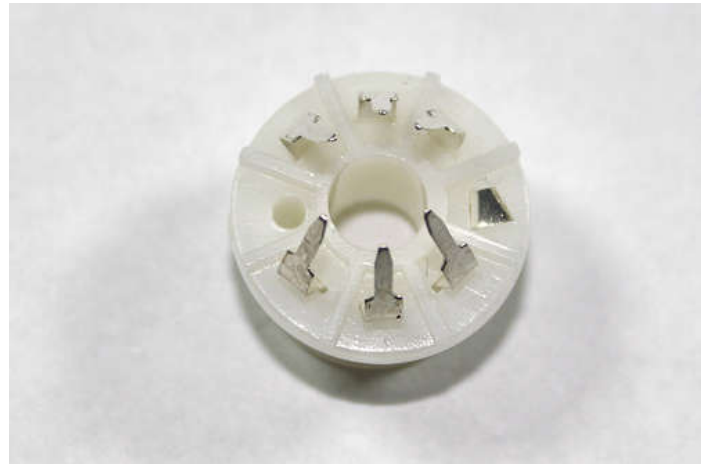
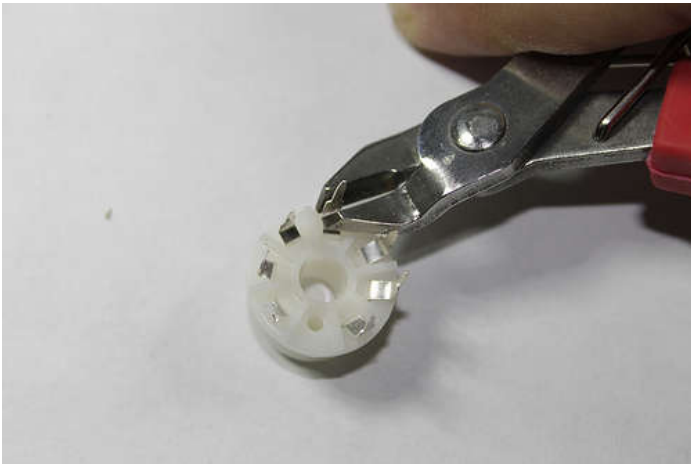


### step 7: Sensor Socket - Prepare Legs

The socket is going to be the trickiest part of our assembly. The first thing to do is remove one of the legs. The one to remove is the 4th leg in with the snips, counting from either side. After removing the leg, you'll be left with 3 legs on either side of the circle - vertically symmetrical.

Next, bend all of the legs towards the middle. To get an idea of how far in, look at the footprint on the board. The legs will all be going into the 6 holes in a circle in the footprint of the sensor.

The reason we need to use the socket is because if we solder the sensor itself, we can damage it. The extreme heat from the soldering iron will destroy the filament inside of the sensor which will ruin sensitivity to anything. All MQ sensors are like this and should be used with a socket.

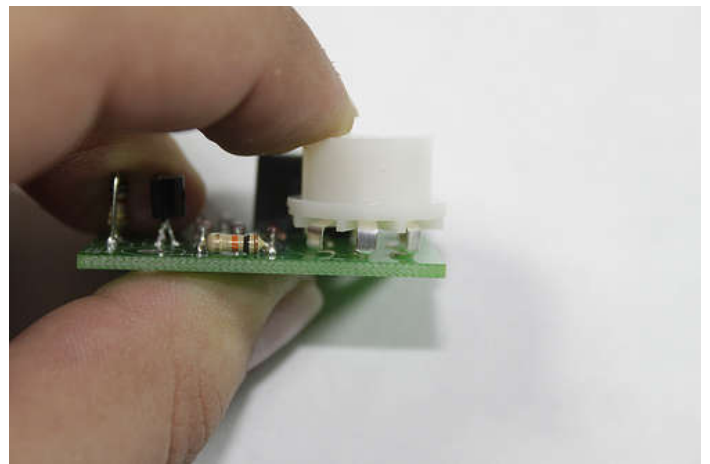
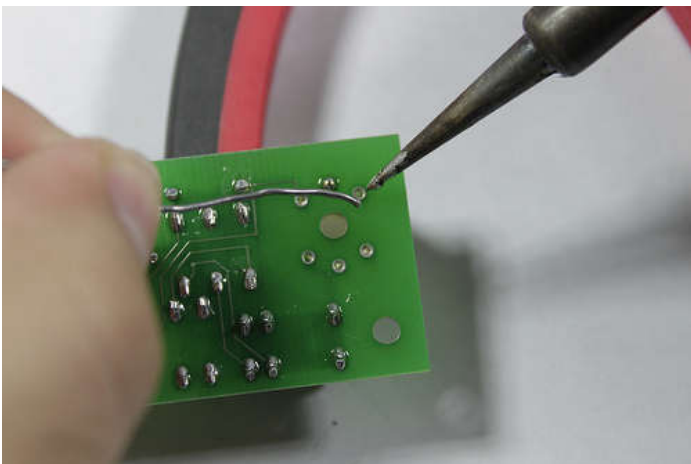
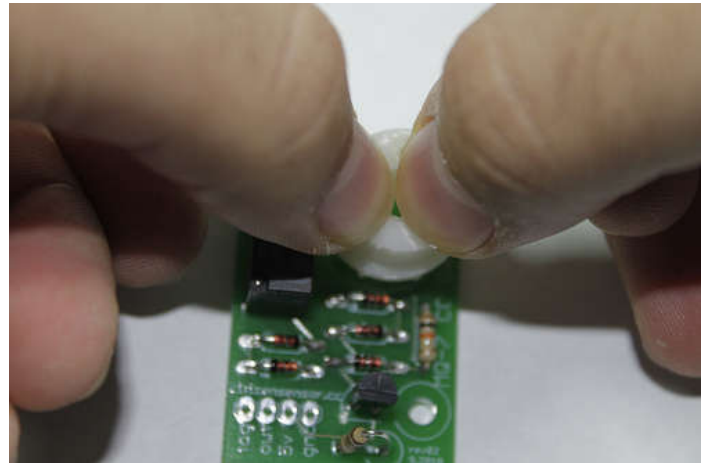
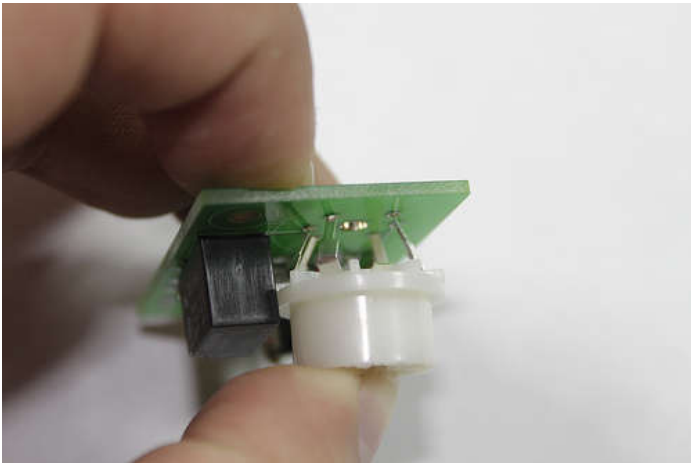


### step 8: Sensor Socket - Solder in

Line the legs up with the holes on the board. It might take a little bit of bending, but you need to be sure that all legs are inside the holes. They won't go **through** the board, but you'll definitely be able to tell they all have their tips inside the holes.

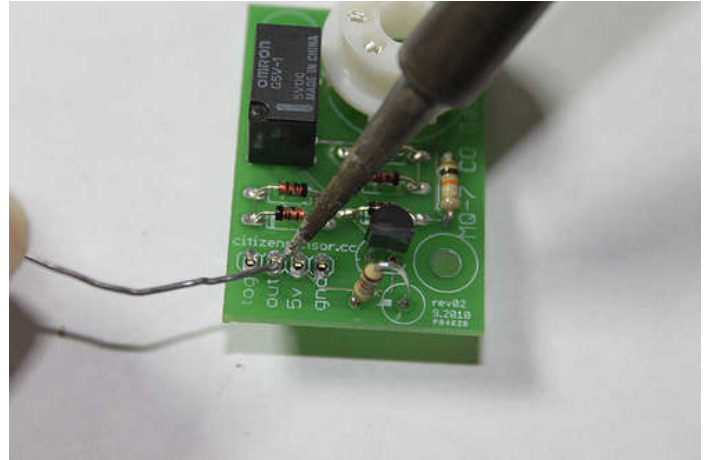
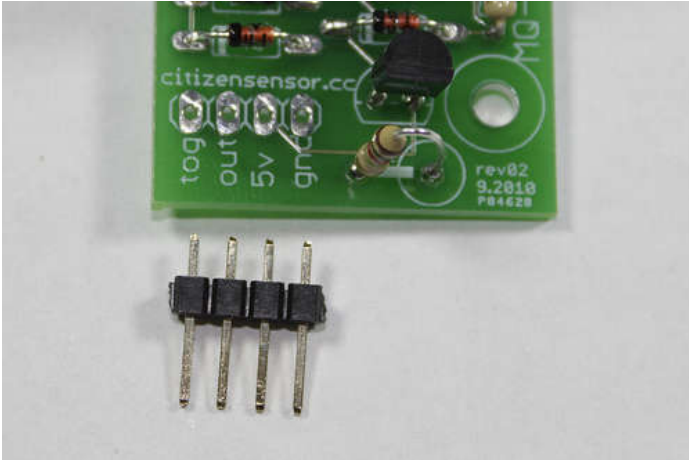
Be sure that all legs are inside the holes at least a tiny bit. Then, apply force with two thumbs to the top of the socket. Press hard. The legs will collapse, bending in two places. If done correctly, you'll see all tips have bent inside the hole and the legs have also bent close to the white plastic. Now, will keeping the socket in place ( you can use tape ) solder all the legs in from the other side of the board. You will want to let the solder drip all the way through the hole to get a good connection with the legs. If you mess up, it's ok - pull on the white plastic and use needle nose pliers to bend legs to the hole. You can even add solder from the top of the board while the socket is pulled up.

Make sure all legs are connected to the board! Use a multimeter to check continuity between the top of the socket and the back of the board.



### step 9: Header Pins

Take the header pins and solder them into place. This will let you breadboard the breakout. If you know where this is going to be used, you can use wire here instead. No trimming with snips needed here!



### step 10: Insert the Sensor and Hook up!

The sensor can be inserted in 2 ways, as it is a symmetrical circle of pins. Either way is fine, they are the same.

Press the sensor all the way into the socket. You are ready to go!!

As you can see wire up the pins as you see in the picture:

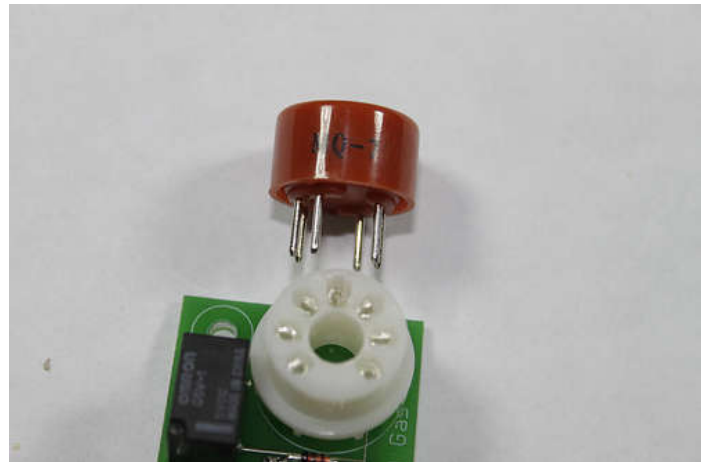
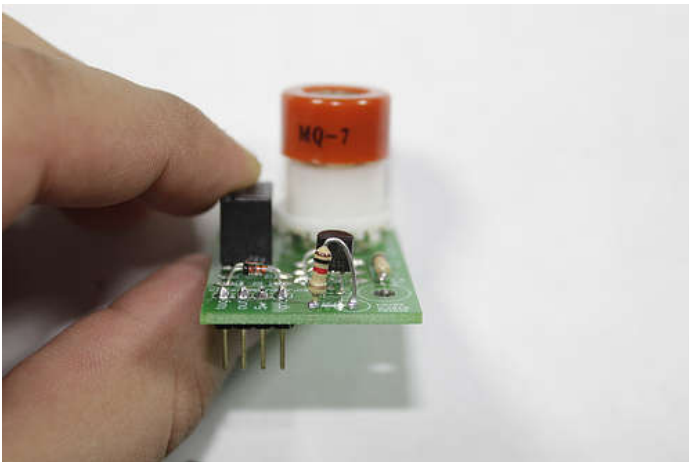
5v -> 5v on your microcontroller

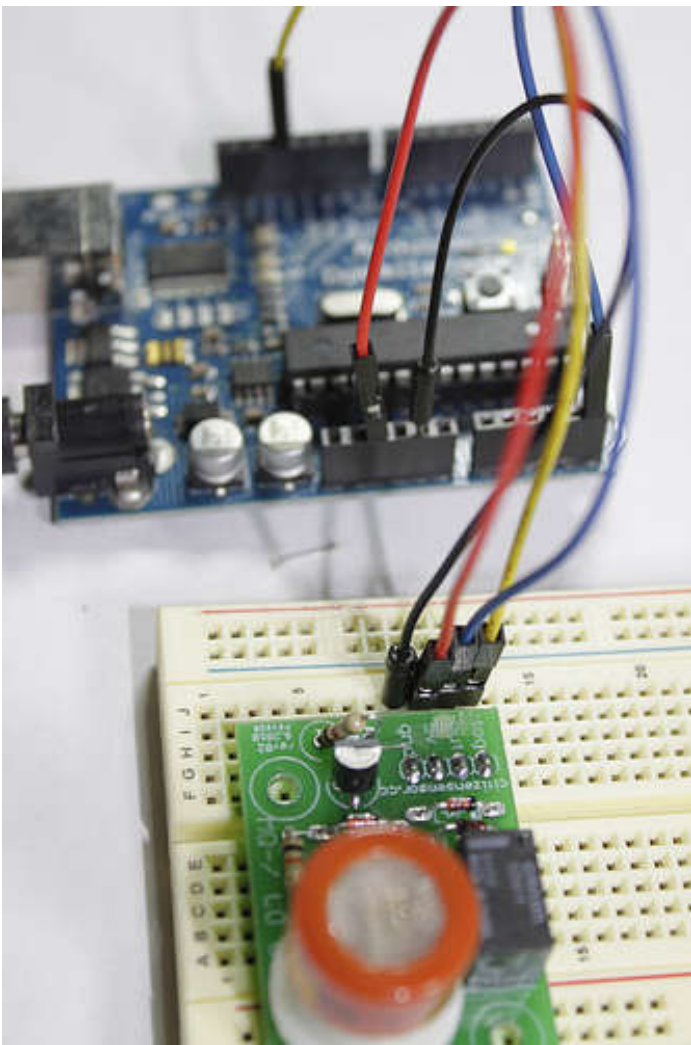
gnd -> ground on your microcontroller

tog -> a digital pin to pull HIGH or LOW (toggles 5v or 1.4v)

out -> analog input on your microcontroller. The board outputs a variable voltage dependent on CO exposure.

Good luck collecting data!!





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