

How to build RoboRoach Electrodes



Tools you will need:

- Soldering iron with a fine-point tip
- A small diameter silver solder (~0.015" dia.)
- Wire cutters (short jaw)
- Scissors
- Straight forceps tweezers
- Silly putty
- A ruler
- Sand paper (~100-150 grit)
- Safety glasses or goggles

RoboRoach electrode components:

- 0.003" bare / 0.0055" coated Silver wire
- 0.1" header male connector
- 0.1" header female connector

Note to customers: If you need help sourcing any of the tools or materials, please email us at hello@backyardbrains.com

Time required: 1 Electrode array should take about 10-15 minutes. Quality is the priority but work to be as time-efficient as possible.

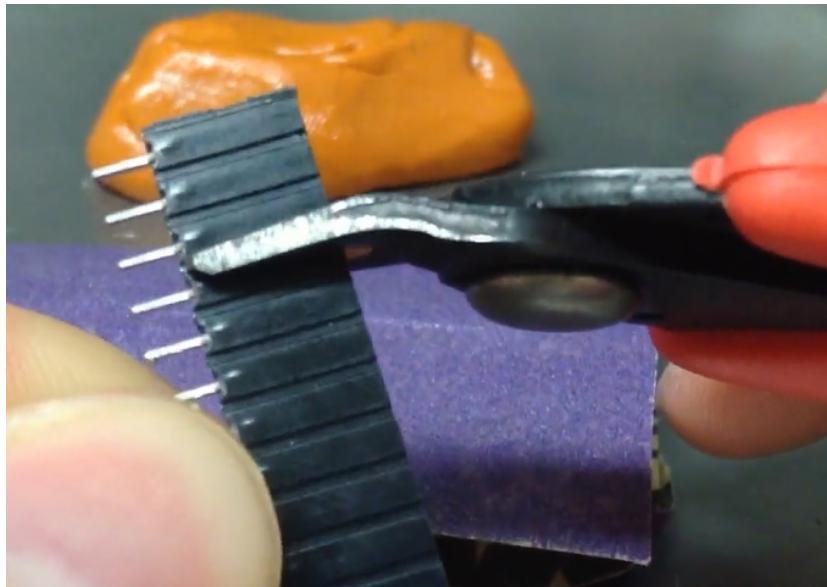
Safety required: Before you begin, you should be comfortable using the required tools of this build. Follow the safety guidelines of your equipment, such as wearing safety glasses when using the wire cutters and practicing safe soldering techniques.

Essential skills:

- Comfortable with a soldering iron
- Comfortable with fine forceps
- Comfortable with a lighter
- A steady hand
- Good eyes and/or a trusty magnifying glass
- Willingness to learn and refine techniques

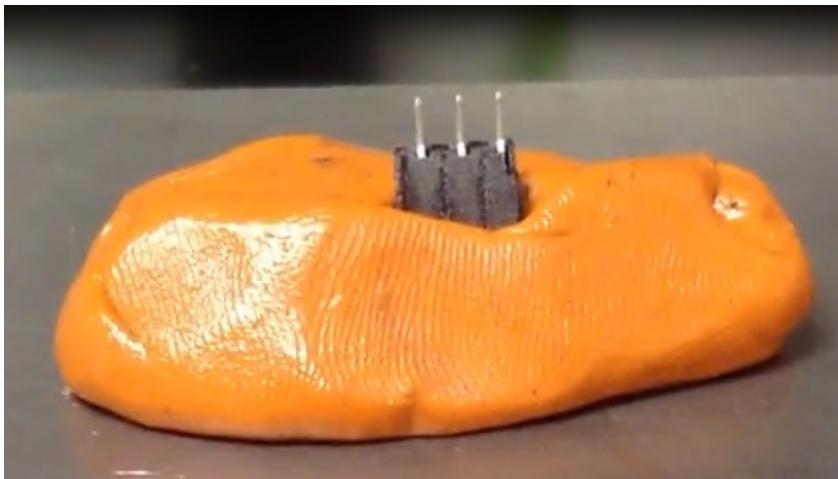
Procedure:

1. With wire cutters, cut a triplet (3-pins) female header. Wearing safety glasses for this step is recommended. There is a potential that parts or fragments become a projectile when cut free. Sticking the soon-to-be free portion in silly putty before cutting can help



prevent flying objects.

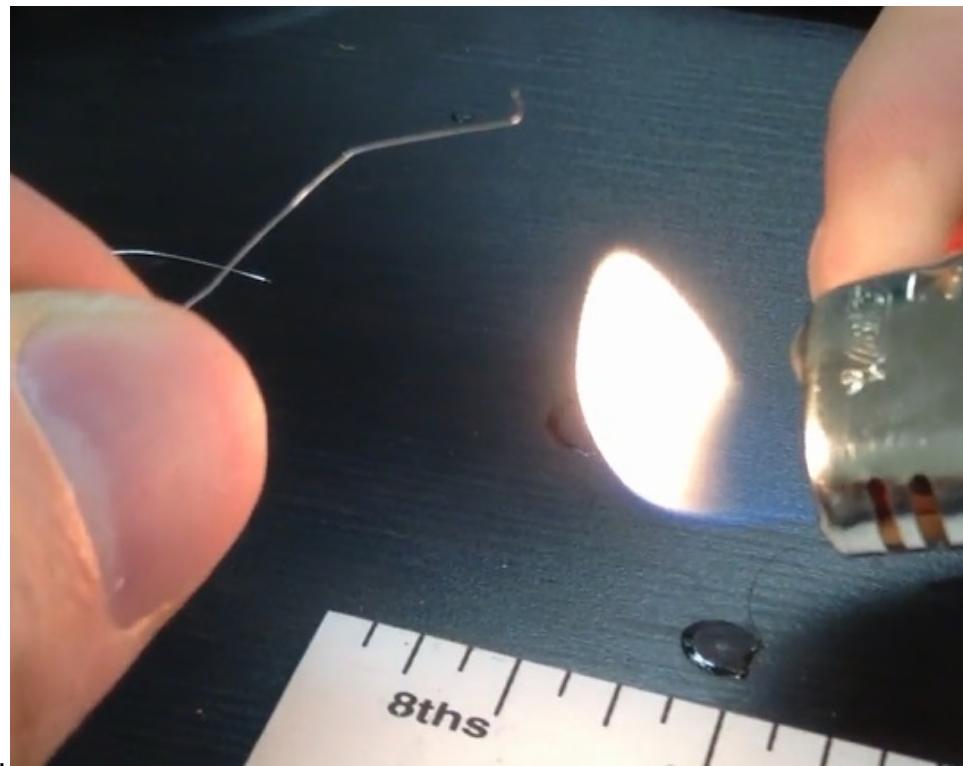
2. Insert a male header (at least 3 pins long) into the triplet female header you just cut. This prevents solder from wicking down the socket.
3. Rough up both sides of the female header with sandpaper. This will help the super glue and hot glue stick.
4. Position the header in silly putty with the pins of the female header point up.



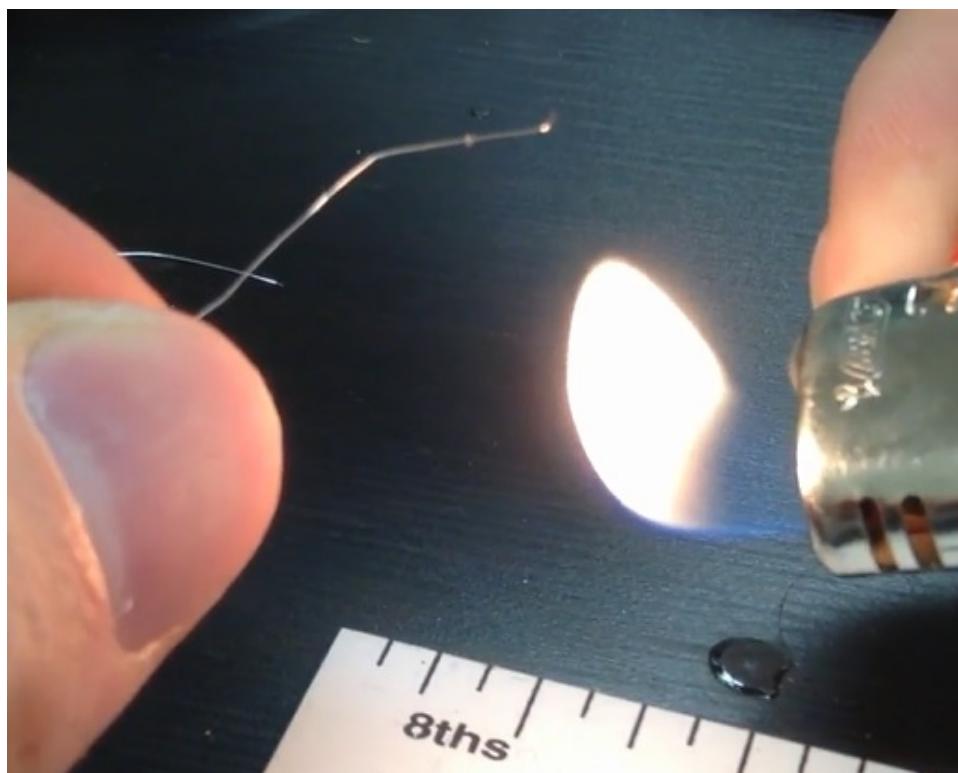
5. With scissors, cut 4 lengths of 1.5" long silver wire.



6. Using a lighter, carefully burn away $\sim\frac{1}{2}$ " of the wire's insulation. Start with the flame several inches away and slowly move closer until just the coating melts away. Don't hold the flame too close as this will also melt away the silver wire. This is made easier if you reduce nearby drafts, so that the flame doesn't flicker. Repeat this on one end of each of



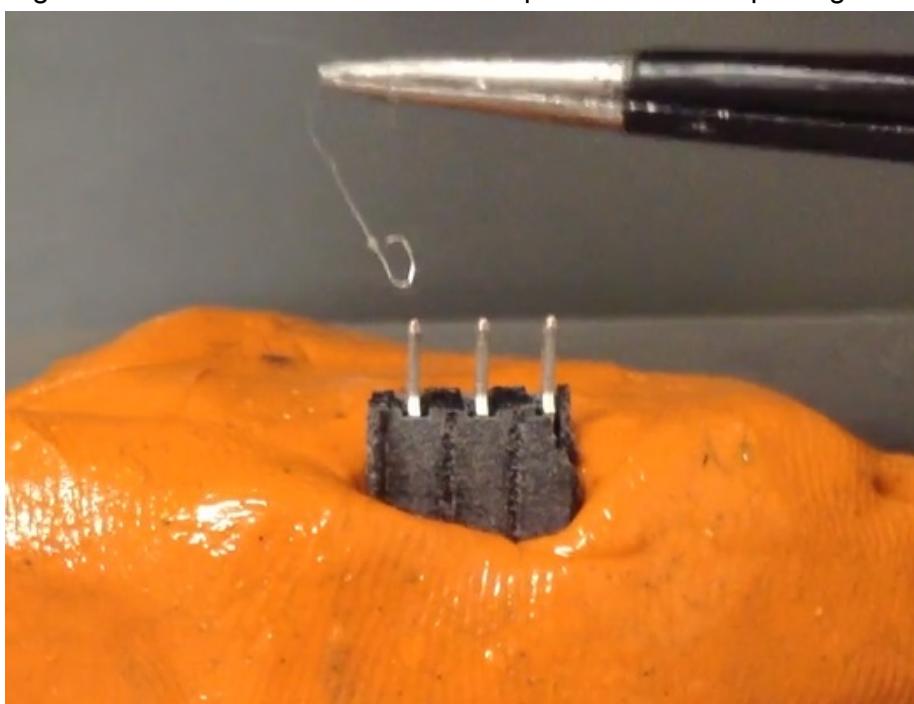
the 4 wires.

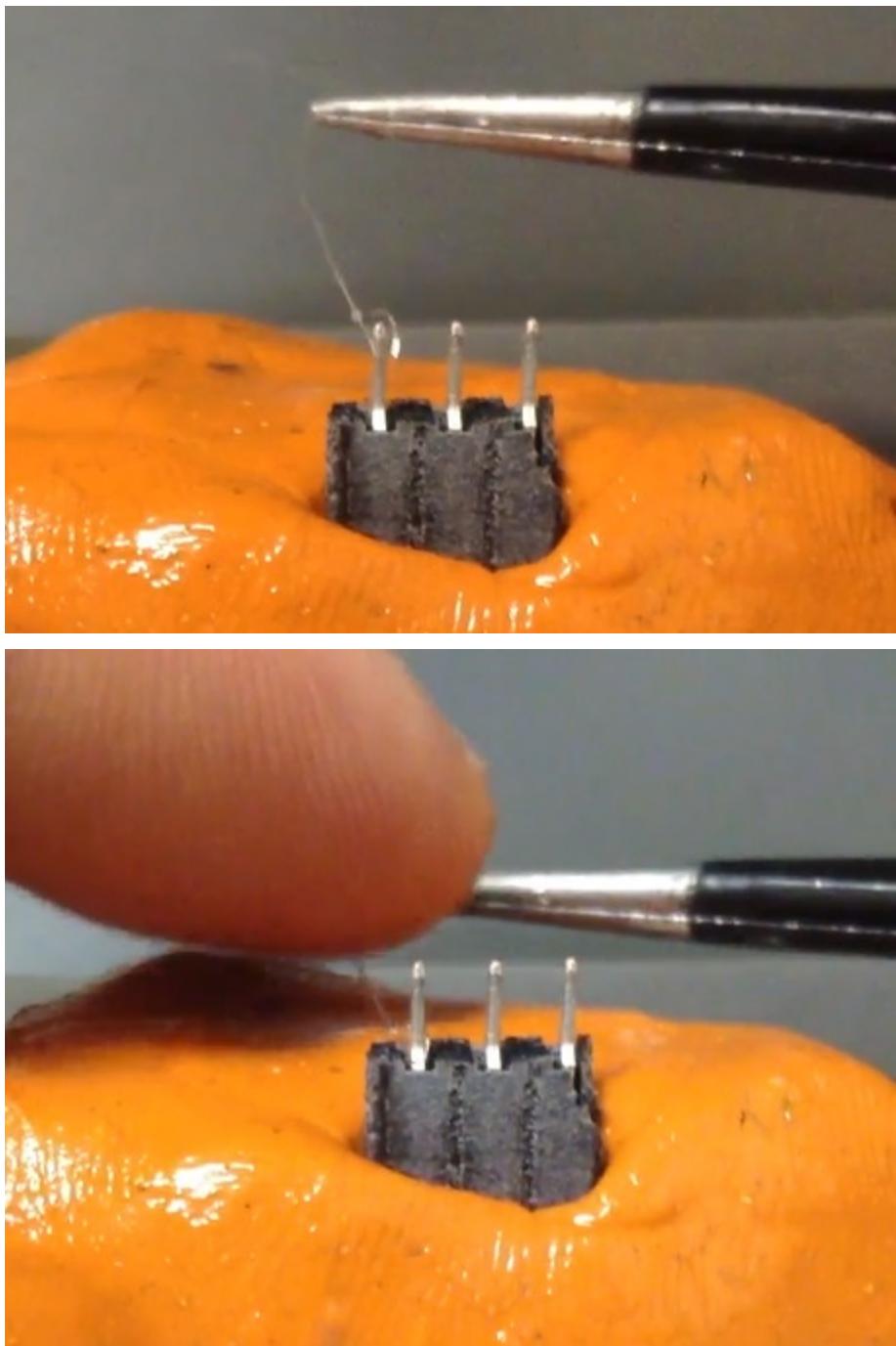


7. Using your tweezer (forceps), make a small hook with the uncoated end of the silver wire that you just exposed.

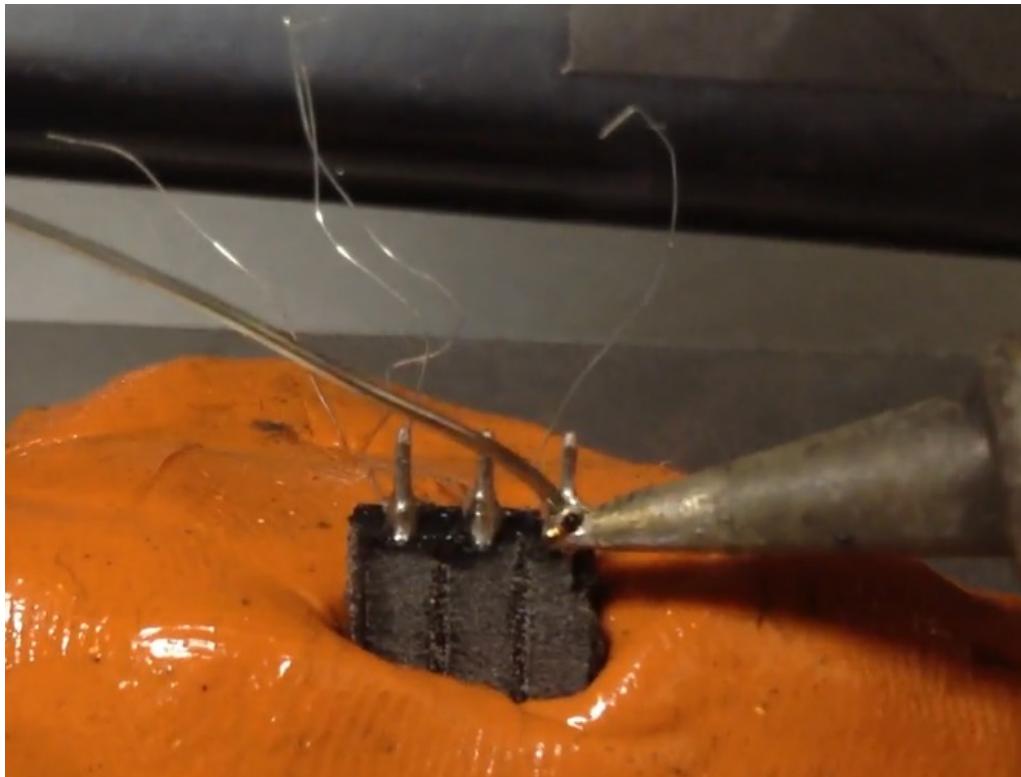


8. Place the “hook” around a header pin. Tamping down the wire into the silly putty with a finger will ensure that the wire holds its placement when placing the others.

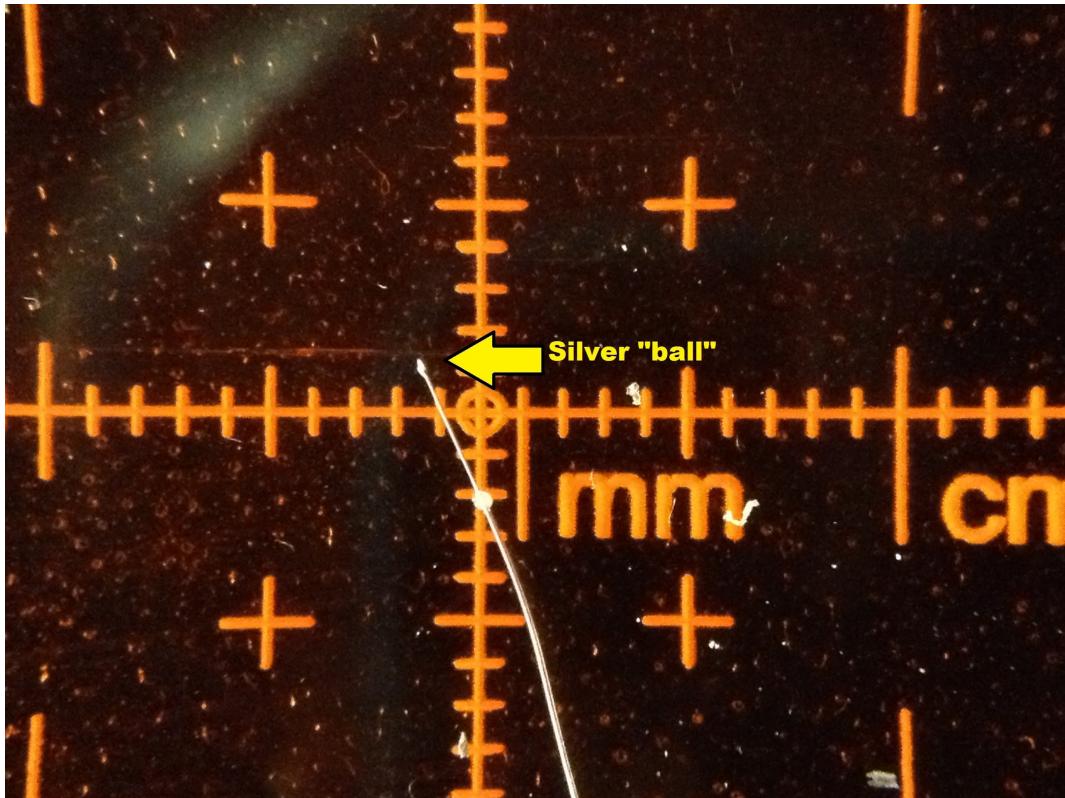




9. Perform steps 6, 7, and 8 once for each pin and twice for the center pin.
10. Solder the wires to the 3 pins of the header. Best to use a small-diameter solder and a fine-point soldering iron to be precise. If you overheat the pin or touch the exposed silver directly, it will melt and you will have to redo that wire from step 6.



11. Now you should have two solo wires on the left and right pins; one pair of wires on the center pin. One at a time, with a light tugging force, pull the left and right wires and bend them off to the sides. A light tug is to test for a reliably strong solder joint and bending them out will get them out of the way for the next step.
12. Take the center pair, pinch it with one hand, and twist the header with your other hand. The goal here is to make the wires twist around each other neatly.
13. Next, using your lighter again, burn off $\frac{1}{8}$ " of insulation from the free ends of all three wires. Notice a "ball" of silver on the end of some of the wires.



14. Using your scissors, carefully snip the ends of the wires to remove the small balls. This will make it easier when implanting the electrodes during the RoboRoach surgery. The ends should be trimmed flush and look nice. It is important that each wire has ~ $\frac{1}{8}$ " of insulation exposed when all finished.

Testing:

1. Give light tug to each electrode to make sure it is secure.
2. Double check that the electrode wires are flush relative to each other, are 1 - 1.25 inches long and have $\frac{1}{8}$ " exposed silver at the end.
3. Double check that all silver beads on the tip of the electrode has been removed.
4. Make sure the twisted pair in the center is sufficiently wrapped so it will not unravel easily.
5. Use a multimeter to verify your solder joint.