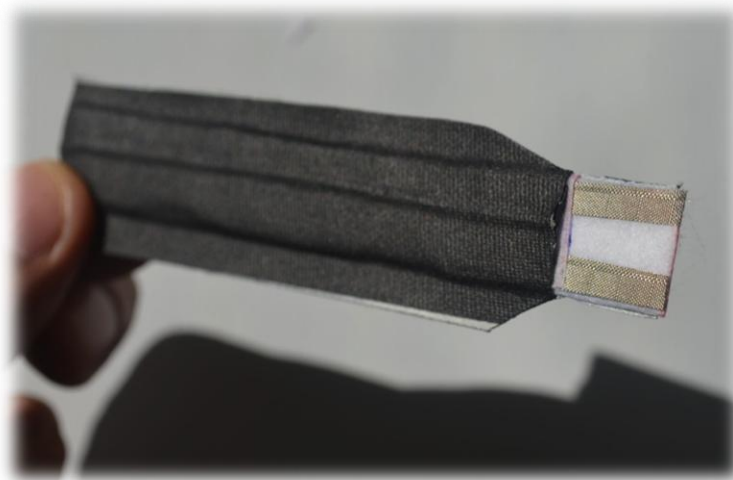




Flexi.on

Step-by-step Instructions



The Flexi.on is an Open Source Project by Open Wire Lab, LLC

www.OpenWireLab.com



Kit contents:

Carbon Polyolefin



Conductive textile



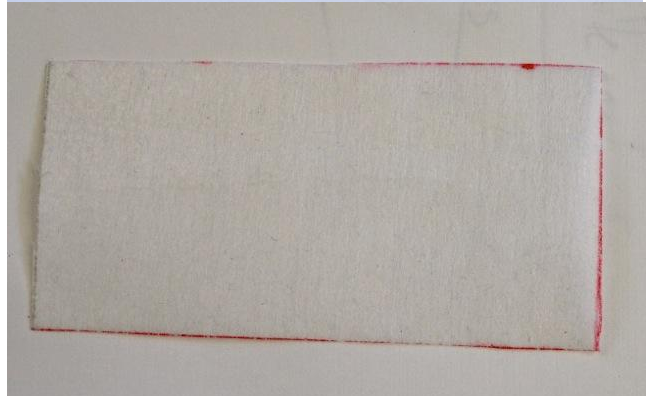
Conductive Thread



Gaff tape



Fusible Fabric



You will need:

Ruler
Pencil or pen
Tape

Scissors
Iron
Piece of cloth

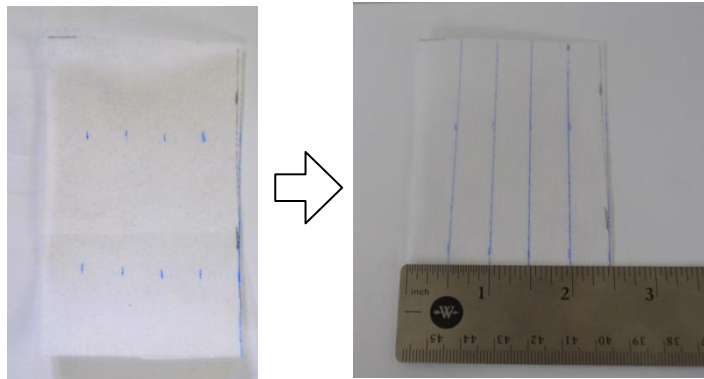


Approximate Assembly Time: 15-25 minutes



Video Tutorial: Visit www.OpenWireLab.com/kits to watch a video tutorial for this kit.

1. **Notice** that one of the Fusible Fabric's sides is shiny.
 - a. Place this fabric in a portrait position, with the shiny side down.
 - b. Mark a half an inch off from the bottom edge.
 - c. Continue to make marks every half an inch until the other bottom edge, so that you have 5 segments separated by 4 marks.
 - d. Repeat the same process towards the top edge.
 - e. Draw straight lines from each one of the top marks to the corresponding bottom marks using the ruler as a guide.

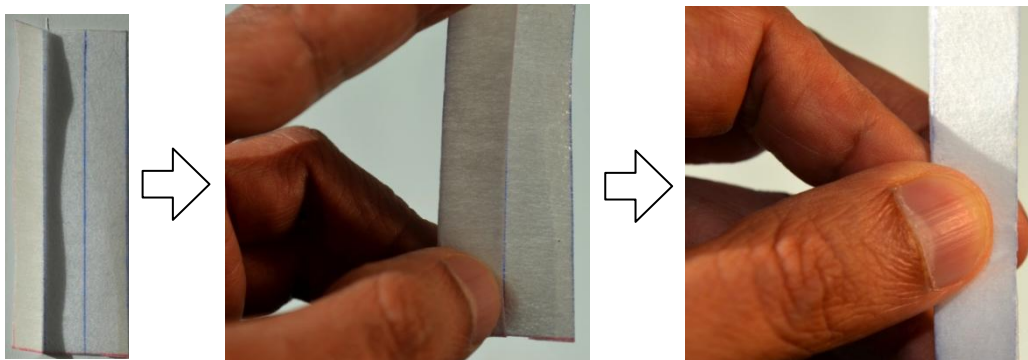


- f. Cut the fabric in two so that there is a section with 3 segments and one with 2.



Tip: At this point you should plug in your iron on the medium to high setting so that it has time to heat up.

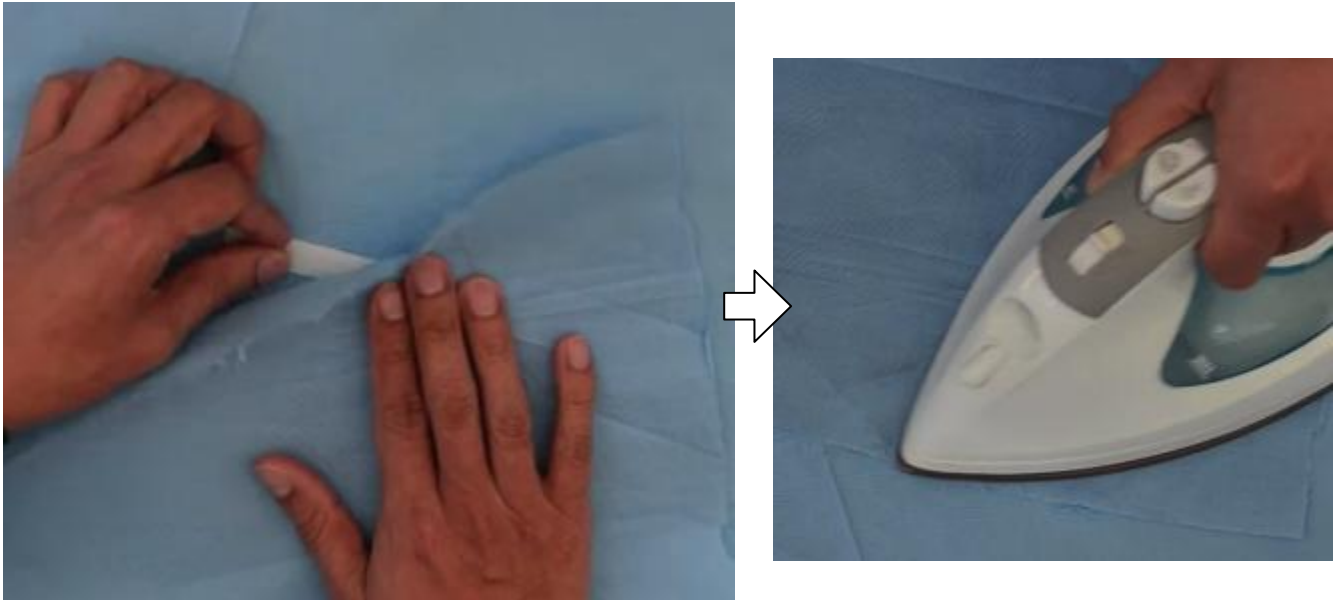
2. With the shiny side up, fold the 3 segment piece of fusible fabric so that the first segment folds over the second and then those two segments fold over the third.





Explanation: This ensures that the entire adhesive is on the inside of the fabric. You should not be able to see any of the shiny sides.

3. With the fabric folded, use the piece of cloth to cover the fabric in order to protect it from burning while you iron the cloth and, in effect, the fabric underneath it.



Tip: You should only have to iron for a couple of seconds for the adhesive to activate. The adhesive will melt and the fabric should stick together so that it appears as one, thicker segment.

4.
 - a. Take the two pieces of conductive textile and place them golden side up on to the piece of fusible fabric that you just ironed.



- b. Ensure that the textiles line up with the fabric on each edge with a space between the textiles. **These two textiles should not be touching.**

5. Again, cover the fabric and textiles with a piece of cloth and iron over it for a few seconds until the textiles are attached to the fabric. This combination will serve as the sensor's base. For now, place the base to the side.

6. Take the 2 segment piece of fusible fabric cut off at [step 1f](#) and cut it in half to separate the 2 segments into single segments. One of the segments can be put off to the side – it is an extra piece provided to you in case you make a mistake during an upcoming step.

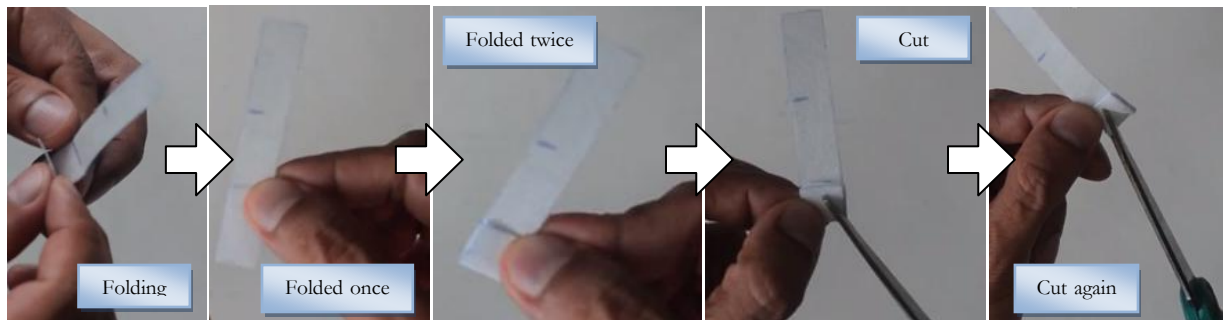


7. a. Place the remaining segment of fabric in a landscape position and mark it from one edge at each of these measurement points: 2 inches, 1 inch, and 3 inches.

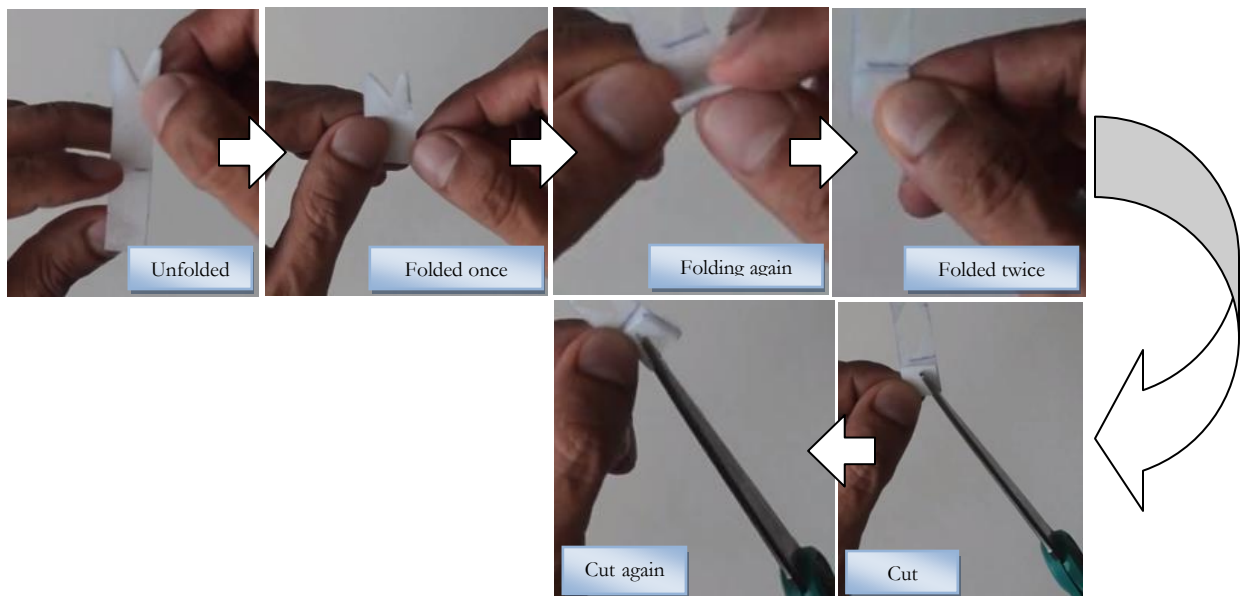


- b. Fold the fabric segment at the 3 inch mark so that the end of the fabric touches the 2 inch mark. Now fold that same piece again on top of itself to create a square that's about half an inch. (See figure below [Step 8a](#) for visuals of this process)

8. a. Cut out a triangle from the small square that was just folded. Start close to each corner and cut diagonally until a small triangle is cut out.



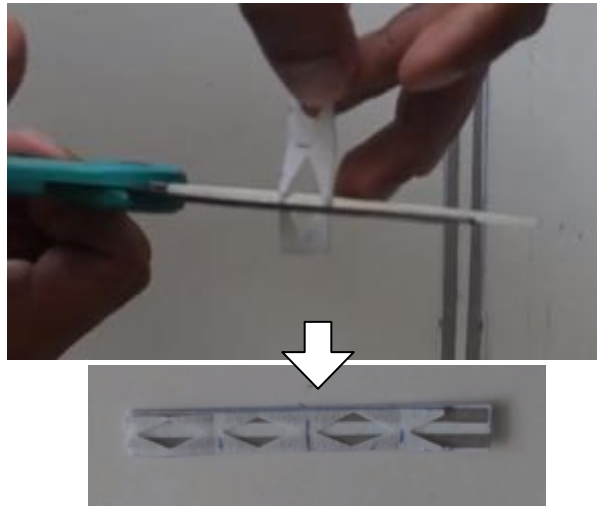
b. Follow the same process on the other side of the fabric segment. Fold the fabric segment at the 1 inch mark so that the end of the fabric touches the 2 inch mark. Now fold that same piece again on top of itself to create a square that's about half an inch. Cut out another triangle from this square.



Note: When unfolded, the fabric should have a diamond pattern. This pattern is key to the sensors quality and performance.



9. Cut off half of the first diamond. This piece is not needed. Place the fabric shiny side down onto one edge of the base.



10. Cover the base and fusible fabric with a piece of cloth and once again iron it to activate the adhesive of the two pieces of fabric. After a few seconds (depending on your iron type and setting), check to make sure the fabric is **fully attached** to the base.

11.



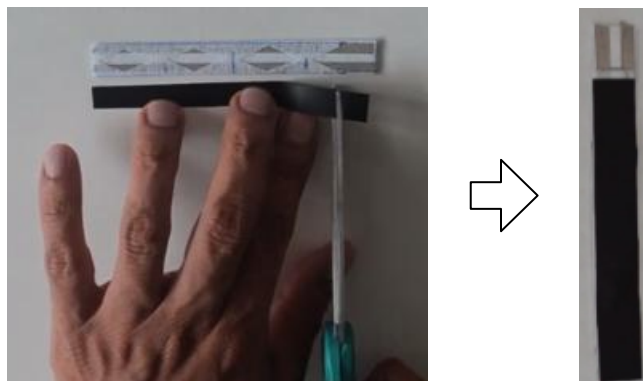
Tip: You can use the edge of a table or your hand to hold the pieces of tape while you are working.

- a. Cut two pieces of standard tape (not the Gaff tape), about $\frac{1}{4}$ inch each.

- b. Place the Carbon Polyolefin next to the base starting from the edge that has the fusible fabric, not the edge that has only the golden conductive textile.

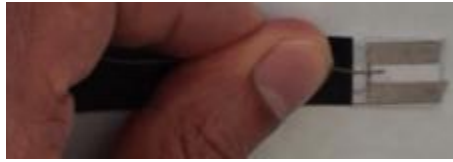


- c. If the Carbon Polyolefin runs over the last piece of fusible fabric that is attached to the base, you may need to cut off a bit (usually $\frac{1}{4}$ inch or less) so that you can see just a little bit of the fabric. Place the carbon polyolefin on top of the base so that it covers the fabric. Make sure that the golden contacts are visible.



12.

- a. Place the conductive thread in the center of the base going from one edge to the other, starting from about an inch above the fusible fabric.



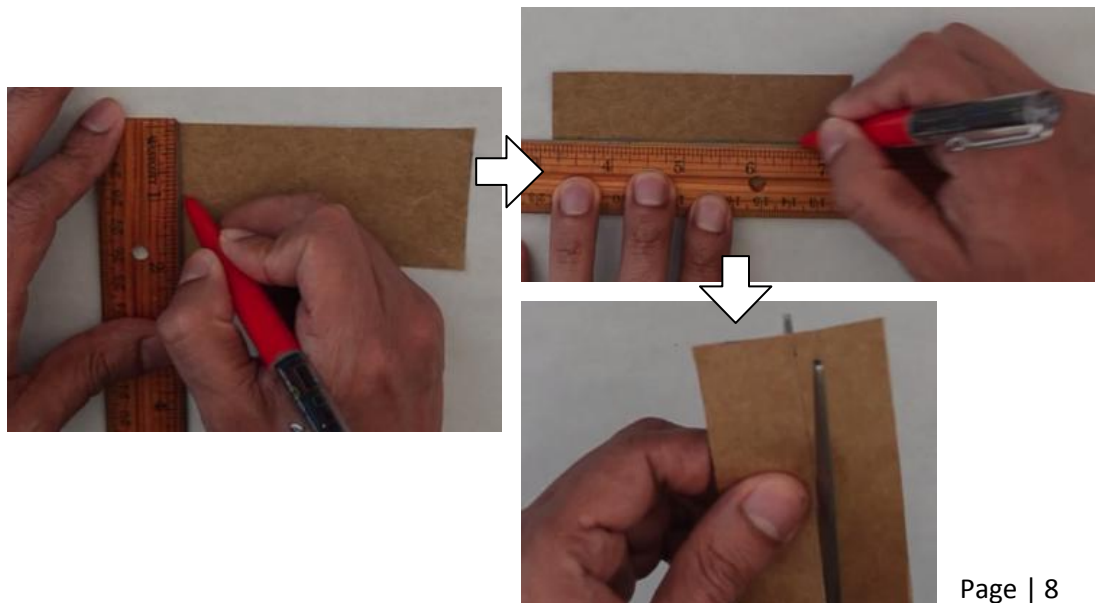
Note: It's OK if the thread runs longer than the bottom edge of the base. But make sure that the beginning of the thread is **between the two golden conductive textiles**. You want the thread to be as centered as possible.

- b. Use the two pieces of tape to hold the thread down to the base. This is temporary.



13.

- a. To prepare the Gaff Tape, lay it down in front of you black side down in landscape position.
- b. Mark 1 inch on each edge (left and right).
- c. Use a ruler to draw a straight line between the marks.
- d. Cut the tape in two following the line.



e. Take one of the halves, peel off the back, and place it black side down.

14. Place the base (with the thread facing up) in the center of the tape, allowing it to stick.



Tip: You may have to firmly press it down to ensure that the base is attached to the tape.

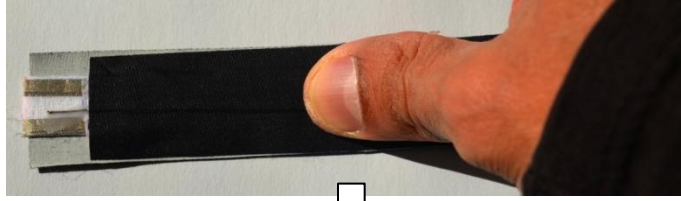
15.

- a. Place the other half of the tape in a landscape position in front of you.
- b. Mark half an inch from the left edge of the tape.



- c. Cut the tape at the mark.
- d. Peel off the backing and apply the tape ensuring that you match the edge of the tape to the edge of the fusible fabric where the golden conductive textile is no longer visible.
- e. Using your thumb, slide across the tape to press it down against the base and the other piece of tape beneath the base (the outline of the thread should be visible at this point).
- f. Use your fingernail or a coin to outline the base on the inside.



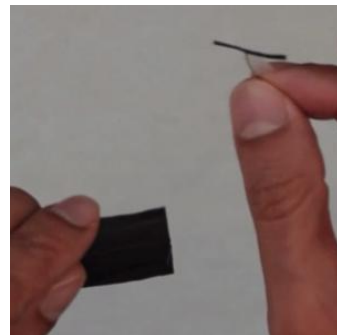


- g. Cut off any excess tape around the golden conductive textile and the sensor's edges.

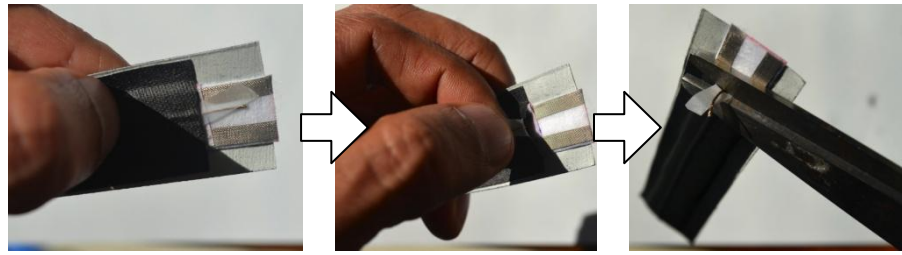


16.

- a. Remove the thread tail that is sticking out of the bottom end of the sensor by cutting off about 1/8 inch of the sensor from the end.



- b. Remove the thread tail from the top part of the sensor by peeling off some of the tape and cutting this off.



The Flexi.on is complete!

Testing and Repair:

If desired, you may test the sensor using a multimeter. It doesn't matter which wire, red or black, is on each of the golden conductive textile contacts.

As you bend the sensor the resistance changes.

After some use, the sensor may not be as accurate as when you first made it. To fix this, OWL developed a technique that will reset the sensor to original working condition. All you need is a tongue depressor. Just lift up a piece of the Gaff tape near the golden contacts and slide the tongue depressor inside the sensor until it hits the bottom of the sensor. Then slide it back out. Gently run your thumb over the sensor to close the gap created by the tongue depressor. Your sensor should be back to original working condition. To see a demonstration of this step, watch the end of the Flexi.on Tutorial Video mentioned on the [third page](#).

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