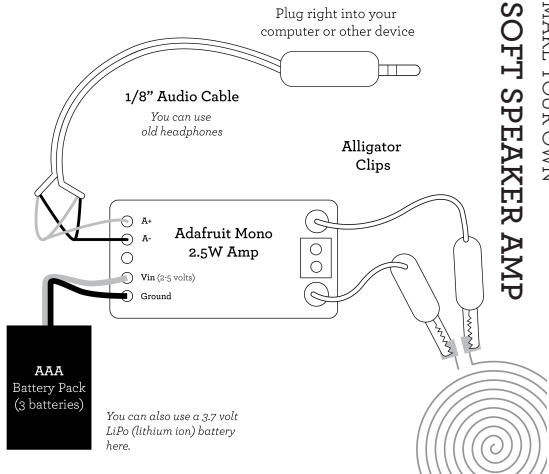


CONNECTING HEADPHONE WIRES

- Strip the wires on both cords
- Solder the ground wires (usually copper) together
- Solder the signal wires* (usually different colors) together.

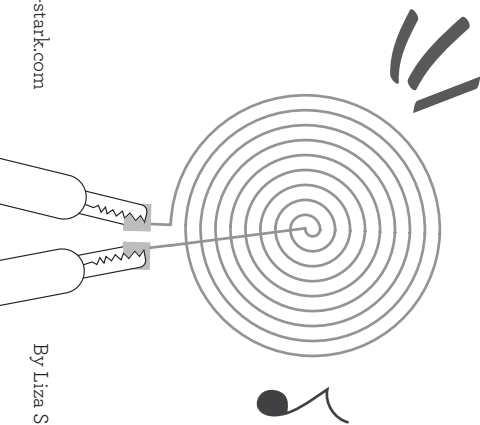
*If the wires have enamel on them, you can hold a lighter to it or run a soldering iron over it on a wooden surface slowly until the solder sticks.



MAKE YOUR OWN SOFT SPEAKER AMP

liza-stark.com

By Liza Stark



How to Make Noisy Textiles

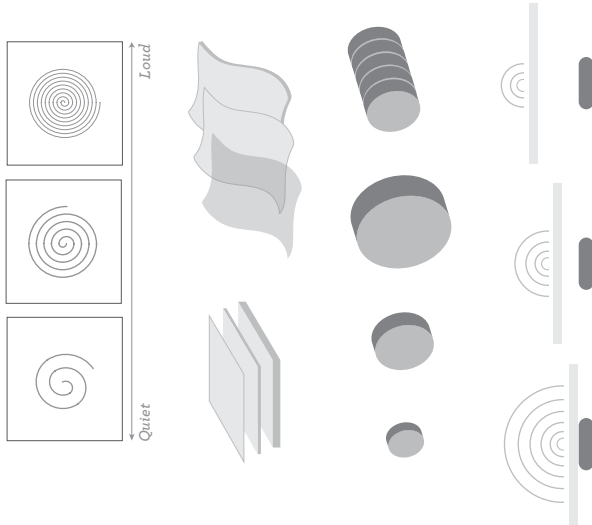
FABRIC SPEAKERS

PROPERTIES

FABRIC SPEAKERS

There are a few variables you have to consider when making a fabric or paper speaker:

- 1) COIL TIGHTNESS**
The tighter the coil, the louder. (It will be since it will have a stronger magnetic field.)
- 2) MATERIAL**
You can hear noise because the sound waves vibrate off the material. How stiff or thick the material is effects the loudness.
- 3) MAGNET SIZE**
The larger the magnet, the louder the volume. You can combine many small magnets or just get a big one BUT be careful - neodymium magnets are ****very strong****.
- 4) MAGNET PLACEMENT**
The volume will be louder the closer the magnet is to the center of the coil.



Amp
We're using a Adafruit Mono 2.5W Class D Amp with handy alligator clips, 1/8" jack, and battery pack all soldered in for easy testing. (See the back for instructions on how to make your own!)

Beeswax
Very helpful to help thread your needle.

Fabric
Cotton and felt work well, but you should experiment!

Embroidery hoop
This will keep the fabric tight as you sew.

Regular thread
These needles are a little bigger and good for embroidering.

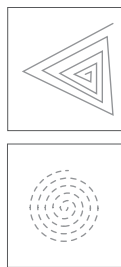
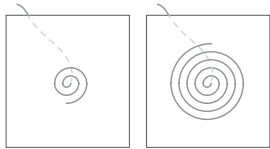
Conductive thread
We are using Karl Grimm silver-plated thread, but you can also use stainless steel conductive thread.

MEET YOUR MATERIALS

HOW TO MAKE IT

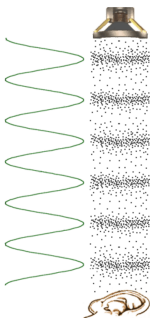
FABRIC SPEAKER

- 1) Draw a coil on your fabric. It can be any shape you like.
- 2) Thread your needle with one strand of conductive thread. You can run wax over the end to get it through the hole.
- 3) Tie a knot 5-6 inches from the end.
- 4) Come up through the center of the piece of fabric.
- 5) Stitch around the coil, making sure the conductive thread lines do not touch each other. (See inside)
- 6) Make sure the extra 5-6 inches of thread does not get sewn into the coil! We need to keep them separate.



You can use any shape or stitch

When these waves of vibrating particles reach your ears, it causes the hair in your ears to vibrate, which your brain reads as sound. Sound waves keep going until the energy dissipates or it is absorbed by another object.



Sound is a type of energy made when something vibrates.
If you hit a drum (or any other object), the air particles around it vibrate. The air carries this energy in all directions in the form of sound waves.



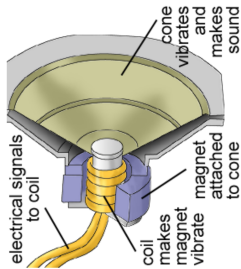
WHAT IS SOUND?

GOOD VIBRATIONS

HOW IT WORKS SPEAKERS

Have you ever broken open a speaker?

This is what a speaker looks like on the inside:



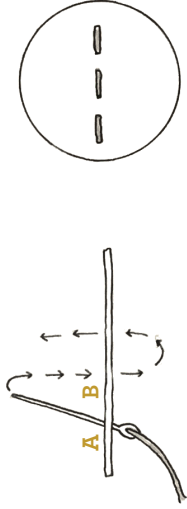
When the audio signal is connected to either end of your electromagnet (the coil), a fluctuating magnetic field forms around the coil.

It vibrates, repelling and attracting the membrane to the magnet.

The membrane moves the air around it, translating electrical frequencies into audible waves that we can hear.

STITCH 1

RUNNING STITCH

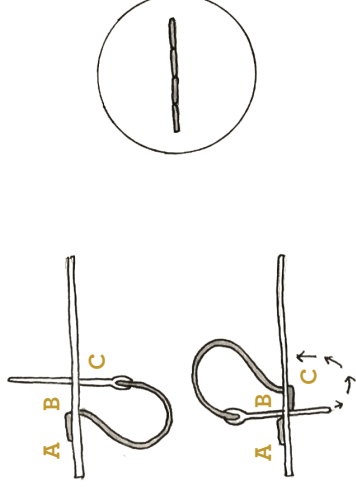


This is the most basic stitch - you just go over and under the fabric. It's great for sewing quick traces with conductive thread.

With your needle on the back side of the fabric, bring your needle up through point A and pull the thread through. Put your needle through point B a short distance away from point A. Repeat.

STITCH 2

BACK STITCH

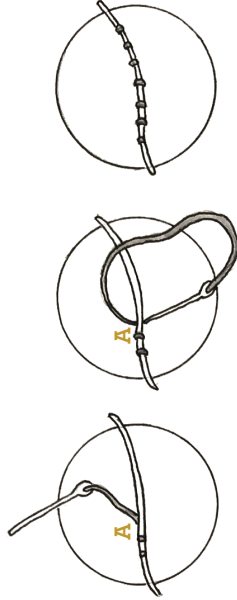


The back stitch creates the effect of a single line.

Bring your needle up through point A and down through point B. Next, bring your needle up through point C and pull the thread through. Now, put your needle *back through* point B and pull your thread through. Repeat.

STITCH 3

COUCH STITCH

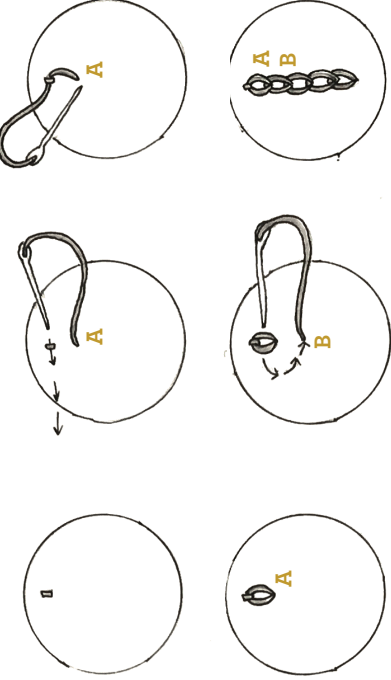


Couching is a great stitch for conductive thread because you don't have to sew with it. The conductive thread lies on top while you sew around it to create any design you like.

With your needle on the back side of the fabric, bring your needle up through point A and pull the thread through. Go over the conductive thread and place your needle back down through point A (or as close as you can get.). Repeat.

STITCH 4

CHAIN STITCH



The chain stitch is a little tricky at first, but once you get the hang of it, it's easy and a beautiful decorative stitch.

Create a small stitch where you want to start. With your needle on the back side of the fabric, bring your needle up through point A and pull the thread through. Insert your needle through the small stitch and pull. Insert your needle back into point A. Next, come up through point B. Insert your needle underneath the threads of the first chain and pull the thread through. Insert your needle back through point B. Repeat.

EMBROIDERY 101

These are four basic embroidery stitches you can use with regular or conductive thread.