

Homemade Loudspeaker



As you can see on the picture, I did use a foam plate. I tried other materials and I found the best quality of the sound is produced by a lightweight material but strong enough to avoid excessive vibration. Paper plates are too soft, plastic disposable plates produces excessive vibration.

Bill of materials:

- Foam plate.
- Two strips of paper.
- Two business cards.
- Copper wire, AWG 32 (enameled)
- Tape.
- Glue. (Hot glue works great)
- Magnet.
- Audio plug.



First, roll one strip of paper over the magnet. Use tape. Do not tape the paper to the magnet.

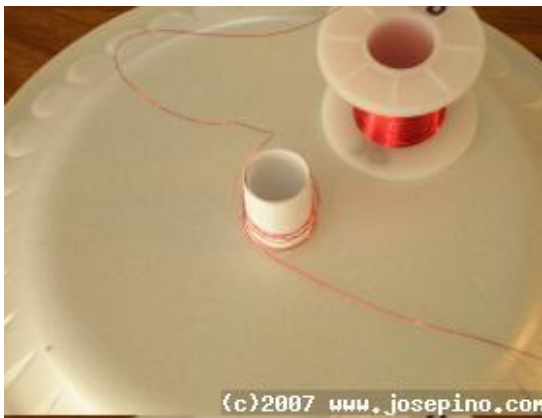


Roll the second paper strip over the first one. Do not tape the paper with the first roll.

Remove the magnet after the paper cylinder is ready.



Glue the paper cylinder to the plate; try to glue it exactly at the center of the plate.



Start making the coil, keep the magnet inside so you don't crush the paper cylinder.

Make about 50 turns of wire (AWG 32). If you don't have copper wire AWG 32, then use AWG 30 but be sure the coil has at least 7 ohms. After you finish the coil, remove the magnet and the inner paper cylinder. Discard the inner paper cylinder and try not to damage the second one. The inner cylinder is only used to create a gap between the magnet and the coil.

Measure the ohms your speaker with multimeter to make sure ohms is between 7 an 8 ohms. Write the ohms measured on the bottom of your speaker.



Fold the business cards as the picture shows.

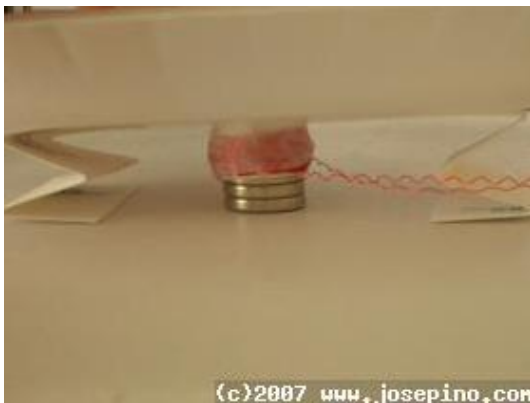
If the magnet is not high, try to make three tight folds only, so the coil stays just above the magnet. [not wide folds]



Glue the cards to the foam plate. Try to align both business cards. (Parallel)



Now, put some glue on the magnet and each business card...



Now, put the plate so the business cards and the magnet stick to the base. The "base" can be a solid cardboard or wood. Anything flat and rigid works fine. I did use a cardboard. Using wood, the sound is better as wood vibrates less than cardboard.

Check the wires, keep the wires away of the business cards or it may cause some noise and/or a rattle noise, so try to keep both wires separated.

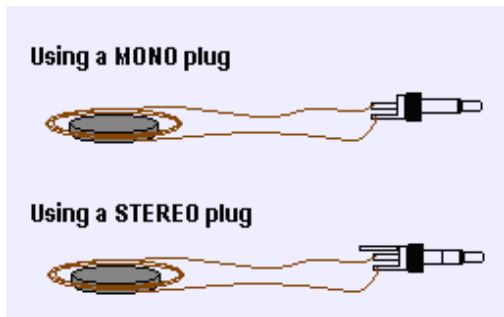


Remove the coating from the copper wire tip. Remove enamel with sand paper or scrape off with metal object. Remove about 1/2" of the enamel so the circuit will be closed when connecting the speaker wire to ipod or stereo.



Testing the speaker

This step may help you to determine if the home-built speaker is working. Just touch the sides of ANY AA or AAA battery with both ends from the speaker wire. Do not hold the wires, just touch the battery sides slightly. While doing this, the speaker should produce a noise. If there is no sound coming from the speaker that means the wire setup is not good or there is a short circuit.



This diagram shows how it is connected to the plug. Using a Mono plug, just connect one end of the wire to the center connector and the other end to the side connector of the plug.

If you are using a STEREO plug, just connect one end of the wire to the center of the plug and the other end to ANY of the side contact from the plug. Don't forget to remove the coating from the

copper wire (Yes, I told you, it should be enameled copper wire. Just bare copper wire is not going to work.

If your speaker sounds Bad, check:

- Nothing touches the wires. The wires should move freely.
- The cards are completely glued, apply glue on ALL AREAS and no corners are left unglued.
- The coil has no loose wires. Try to keep the coil tight enough and secure it with glue or tape. Loose wire may vibrate and cause distortion.
- The coil should not touch the magnet. Try to make the coil wider. Also, the coil should not touch the base of the speaker.
- If the foam plate is too soft, it may not work well. It should not be folded, bent or have cuts. Loose parts can cause distortion. If the sound is not loud enough (don't expect miracles or it to be louder than a commercial speaker)

The sound is too quiet? No sound?

- Be sure the coil have at least 50 turns or, if you have a multi-meter, more than 7 ohms.
- Adjust the height of the coil in reference to the magnet.
- Try to glue the business cards closer or farther away from the coil until find the perfect location/volume. Be sure the business cards are parallel.
- Use neodymium magnets.
- Be sure nothing touches the foam plate, only the business cards should touch it.
- Some personal or portable audio devices don't have enough power to drive a speaker. Try many audio sources if you get no sound or the volume is low.

Credit for this project is Jose Pino. His original project can be seen at http://josepino.com/other_projects/?homemade-hifi-speaker