Styrofoam Plate Speaker

Written By: Jose Pino

TOOLS:

- Ruler (1)
- Scissors (1)
- Wire cutter/stripper (1)

PARTS:

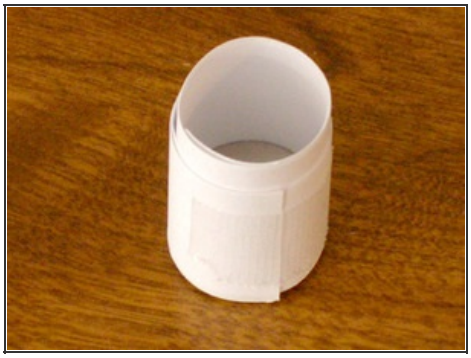
- Foam plate (1)
- Bond paper (1 sheet)
- Business cards (2)
- Copper wire (1)
- Tape (1)
- Glue (1)
  Hot glue works great.
- Neodymium magnets (1)
  You can use just 1 if it's tall enough, but I used 3 thin ones stacked together.
- Wood (1)
  or cardboard; should be larger than the plate. I used cardboard, but wood damps vibrations better.
- Audio plug (1)

SUMMARY

I've built homemade speakers using various materials for the cone. This design is the best.

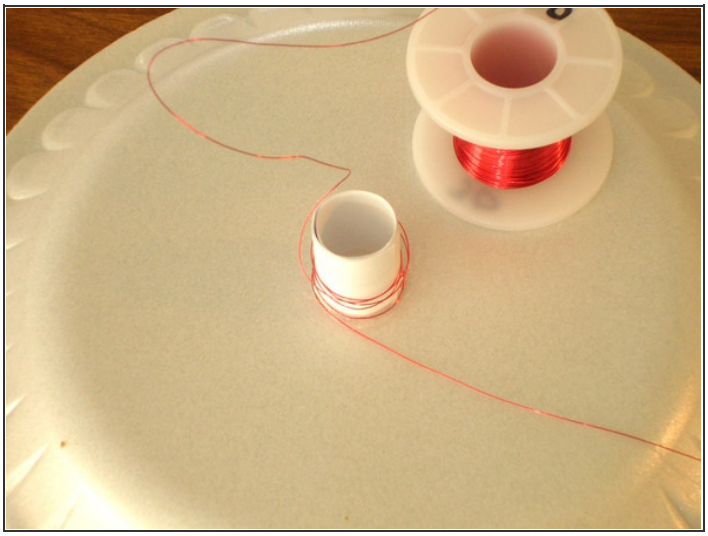
Paper plates are too soft, and disposable plastic cups vibrate too much, but stiff, lightweight styrofoam produces sound quality that competes with commercial speakers. I really mean it — you will be surprised!

Step 1 — Styrofoam Plate Speaker

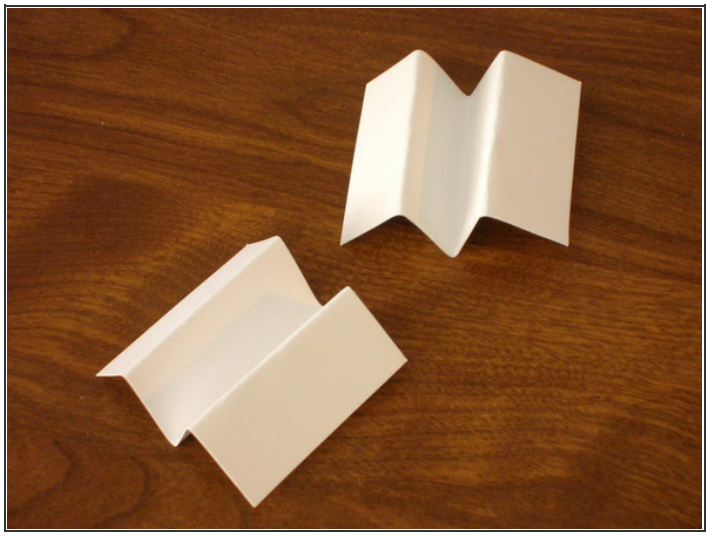
- Cut 2 strips of paper, ½"x11" each. Coil one strip lengthwise around the magnet and tape it closed, but don't tape the paper to the magnet.
- Roll the other strip around the first one and tape it closed as well, but don't tape it to the first roll.
- Remove the magnet.

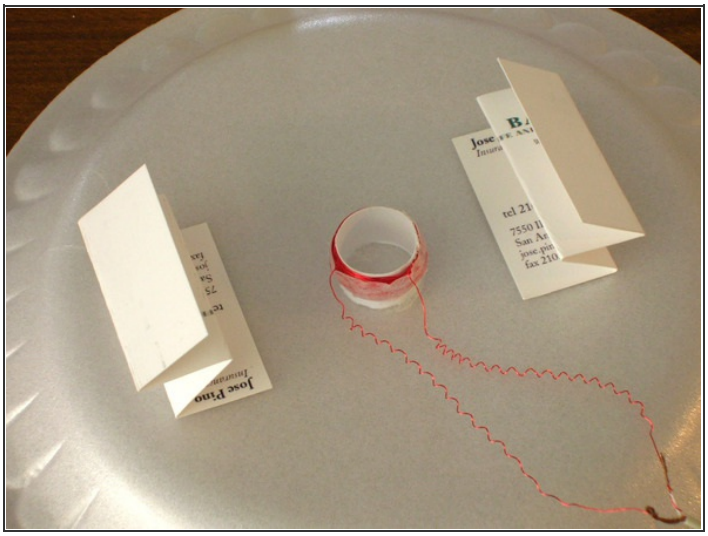
Step 2



- Glue the paper cylinders to the back of the plate. Try to position them at the exact center.
- Put the magnet back inside the cylinders, and then wind the wire around them, about 50 turns. The coil should have more than 7 ohms of impedance.
- Leave some extra wire length at each end, and after you finish winding, secure the coil with tape.

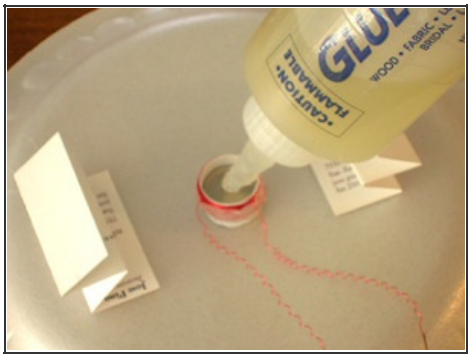
Step 3

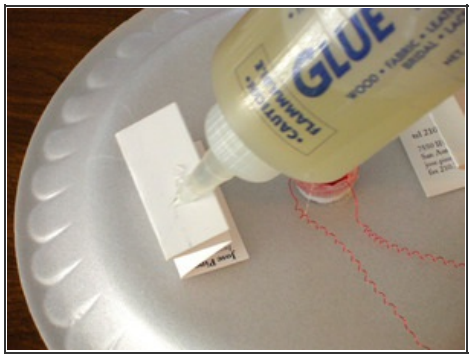


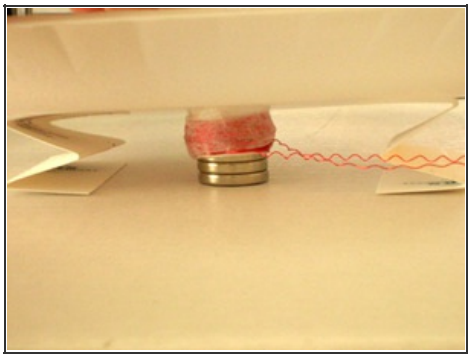


- Remove the magnet and then remove the inner cylinder. It's OK to tear it, but try not to damage the outer cylinder.
- Accordion-fold the 2 business cards widthwise into W shapes.
- Then glue 1 end of each to the back of the plate, so the cards are parallel and stick up symmetrically on either side of the cylinder.

Step 4







- Replace the magnet in the cylinder. Put some glue on the free ends of each business card, and a little bit on the magnet, but not enough to squeeze away and touch the inside of the cylinder.
- Position your piece of cardboard or wood on top, with the plate centered underneath — this will be the speaker's base.
- Flip everything over so the base is on the bottom and the plate faces up. The magnet should fall down and glue itself onto the base, with the business cards glued symmetrically on either side. The cylinder should hover around the top of the magnet.

Step 5

- Make sure that the coil wires are separated and aren't touching anything.
- Cut and strip the wires from the audio plug and connect them to the coil. Allow glue to dry.
- Your homemade speaker is ready! I plugged mine into my computer. The volume was good, and the sound quality was really good. I can listen to music across the room.

Step 6 — Troubleshooting

- Make sure the business cards are parallel, and try gluing them closer to or farther away from the coil, until you find the distance that produces the most and best sound.
- If your speaker sounds horrible, check that the coil is tight and secure, with nothing loose, and that all other wires move freely, without anything touching them. Make sure the business cards are completely glued and that they're the only things that touch the foam plate. The coil should not touch the magnet or the base of the speaker. If it does, make the coil wider or don't fold the cards as tightly.

This project originally appeared in MAKE Magazine Volume 12.

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