Emanate 4

4-Inch Bookshelf Speaker

Build Guide

BEFORE YOU START

You’re in the right place

Whether this is your first speaker build or you’ve made plenty before, this guide is here to keep the process clear and straightforward.

Each step is laid out in order, with the details that matter most for a clean build and a great result.

Take it one step at a time, and don’t rush the parts that set up the final fit and finish.

Build time
Around two afternoons for most builders.

Skill level
Beginner

The biggest challenge
Mounting the tweeter, this is the fiddly bit, just take your time

The end result

By the end of this build, you’ll have a finished speaker you can be proud of, and a proper piece of audio gear you made yourself.

INCLUDED IN THE KIT

What's in the box

Don't worry about checking every small component right now, just make sure the main items are here.

QTY	COMPONENT	
	Drivers	
2	SB Acoustics 4-Inch Woofer	☐
2	SB Acoustics Tweeter	☐
	Crossover Components	
2	Jantzen 39µF Capacitor	☐
2	Jantzen 20µF Capacitor	☐
2	Jantzen 6.8µF Capacitor	☐
2	Jantzen 5.1µF Capacitor	☐
2	Jantzen 1.4mH Inductor	☐
2	Jantzen 0.5mH Inductor	☐
2	Jantzen 0.1mH Inductor	☐
2	Jantzen 15Ω Resistor	☐
2	Jantzen 2.4Ω Resistor	☐
2	Jantzen 1.8Ω Resistor	☐
2	Jantzen 1.5Ω Resistor	☐
	Wiring	
4	Binding Posts	☐
3m	Speaker Wire	☐
	Hardware	
28	M4x12 Self Tapping Screw	☐
8	Rubber Feet	☐
26	Zip Ties	☐
	Other	
1	Epoxy Glue	☐
2	Rubber O-Ring	☐
25 x 100cm	350gsm Dacron Sheet	☐

Something Missing?

No worries! Just shoot us an email at help@printyourspeakers.com and we'll sort it out quickly.

TOOLS AND SUPPLIES

This page covers the tools and supplies you'll want on hand for the build.

You can begin printing as soon as your printer is ready. The remaining tools and supplies can be organised while parts are printing.

Tools You'll Need

Nothing exotic, just a few basic tools for soldering, wiring and assembly.

- **Reliable FDM 3D Printer:** Minimum build volume: **W 160 mm × D 250 mm × H 210 mm**
- **Soldering iron** (with solder)
- **Hot glue gun** (with glue sticks)
- **Allen keys:** 2.5mm, 3mm
- **Needle-nose pliers**
- **4+ woodworking clamps:** Minimum length: **250mm** (used during enclosure glue-up)

What You'll Need to Supply

- **~3.8-4kg of PLA (per pair):** This design is optimised for PLA. Other materials may work, but PLA is recommended.

That's everything, once your printer's ready, you're good to start printing.

3D PRINTING SETTINGS

These parts are designed to be 3D printed at home using common FDM printers. The settings below have been tested and are known to produce parts that fit and assemble correctly.

If you're not sure, just use these settings exactly and start printing the baffle.

Recommended Material

- **PLA** (tested and validated)

Other materials may work, but this build guide assumes PLA.

Part Orientation

- Parts are pre-oriented for printing. Do not rotate them.
- You can confirm the orientation by compairing to the examples on the next page.

Print Time

- Large enclosure parts may take 24+ hours each, this is normal.
- Small parts can print in as little as an hour.
- Load the parts in to your slicer to check the time on your printer.

Print Settings

- Nozzle Size: 0.4 mm
- Layer height: 0.2 mm
- Line Width: 0.6 mm (important for overhangs, print time, strength)
- Perimiters: 3
- Infill: 30% (Cubic)
- Top Shell Thickness: 1.5mm
- Bottom Shell Thickness: 1.5mm
- Supports: Off
- Aux Fan: Off

Larger nozzles and thicker layers may work, but the settings above are recommended.

All parts are designed to print support free.

Common Mistakes

- Increasing infill 'just to be safe'
- Adding supports
- Printing in an incorrect orientation

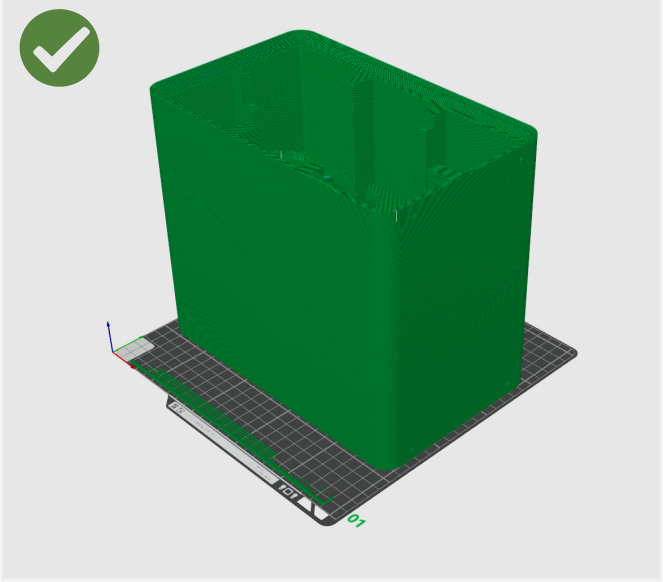
Start with the baffle to confirm your settings before moving on to larger parts.

ORIENTATION EXAMPLES

Print all parts exactly as shown below

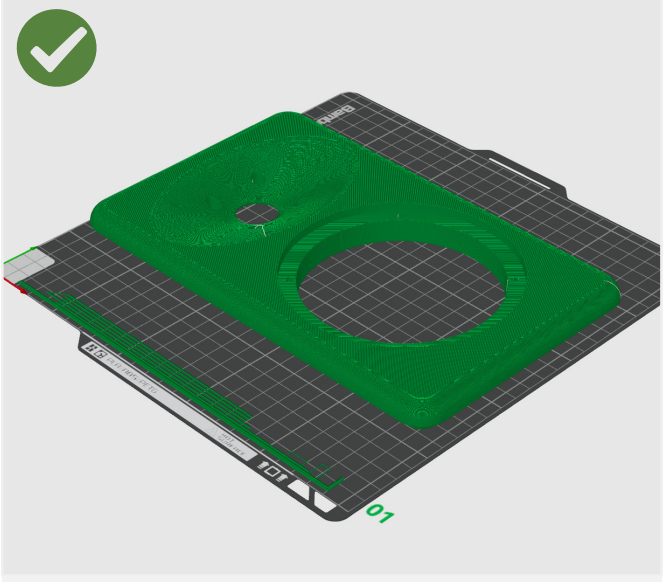
Parts will import in the correct orientation by default.

Main Enclosure Section



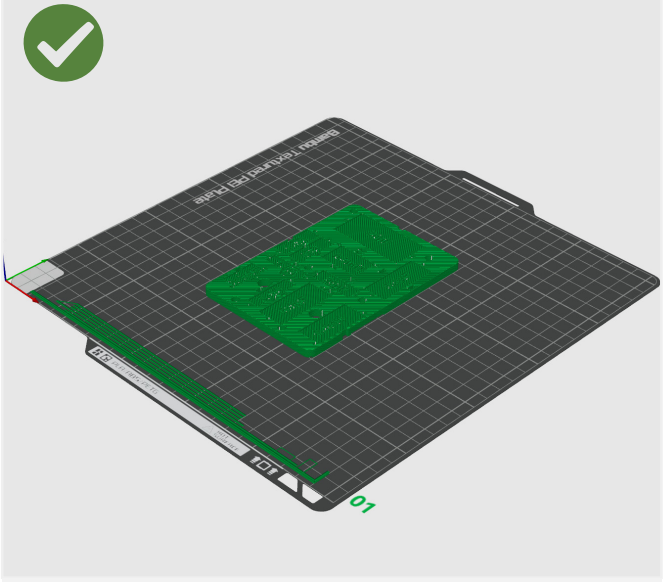
Print with the back face on the build plate

Front Baffle



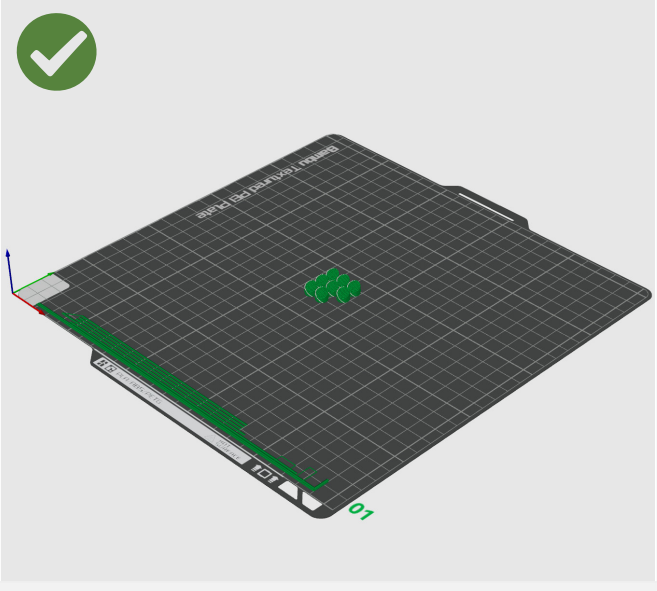
Print with the outside face facing up

Crossover Board



Print with the component side facing up

Tweeter Screw Covers

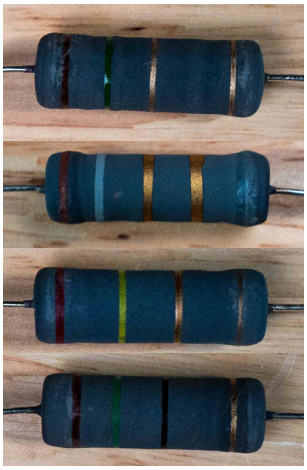


Print on the flat surface (4 per speaker)

Do not rotate or re-orient these parts. They will require supports and may fail.

CROSSOVER

1A Identify the Resistors



Brown / Green / Gold / Gold
1.5Ω

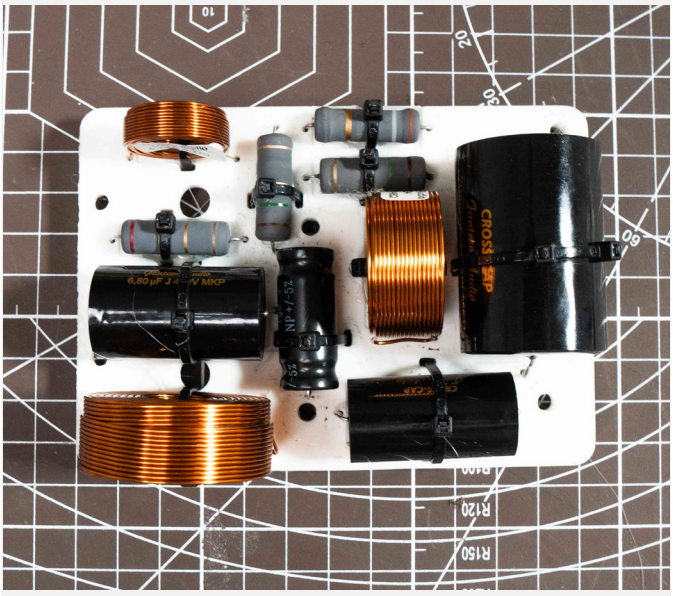
Brown / Grey / Gold / Gold
1.8Ω

Red / Yellow / Gold / Gold
2.4Ω

Brown / Green / Black / Gold
15Ω

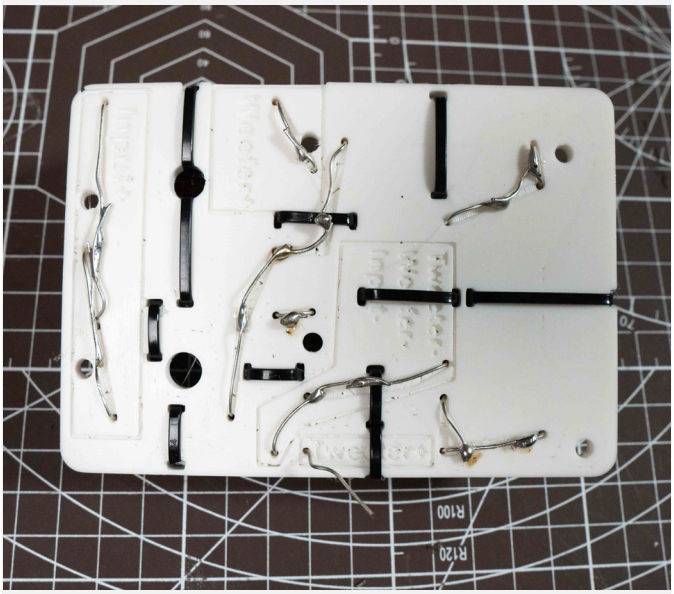
Before laying out the crossover, identify the resistors. Match the colour bands to the values shown above.

1B Lay out the Components



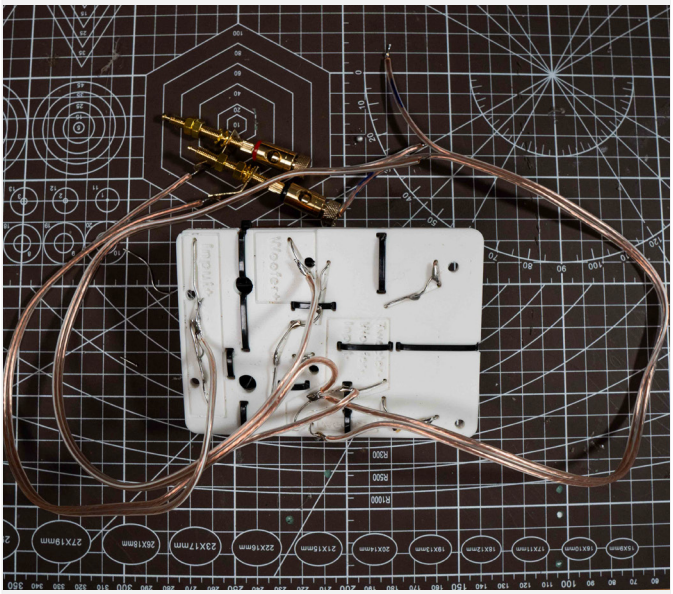
Place the components on the crossover board, following the printed labels. Use hot glue and zip ties to secure the parts and prevent rattles.

1C Solder the Components



On the underside of the board, solder the matching component leads together. Follow the printed paths on the board for correct wiring.

1D Solder the Wires



Cut three 40 cm speaker wires. Solder them to the **Tweeter, Woofer**, and **Input** points. Solder the Input wires to the binding posts, matching + and –. Mark the tweeter wire with a permanent marker.

Triple-check the tweeter, woofer and input polarity before moving on. If + and – are swapped, the speaker may still play, but it will not sound right.

PREPPING THE ENCLOSURE

2A Remove the Supports

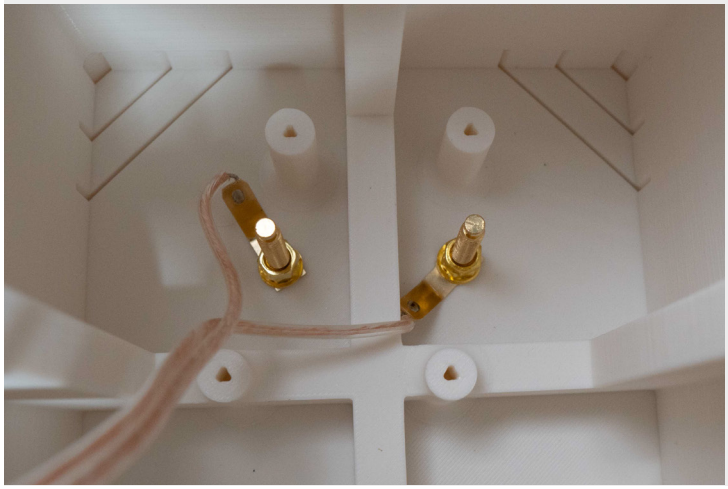
Remove all support panels from inside the enclosure. Some may be tight; gently knock them out with the handle of a screwdriver.

2B Knock in the Binding Posts

Unscrew the nuts and remove the washers and spade connectors from the binding posts. Gently tap the binding posts into the holes with a hammer.

⚠ **Be gentle. Too much force may split the enclosure.**

2C Wire up the binding posts

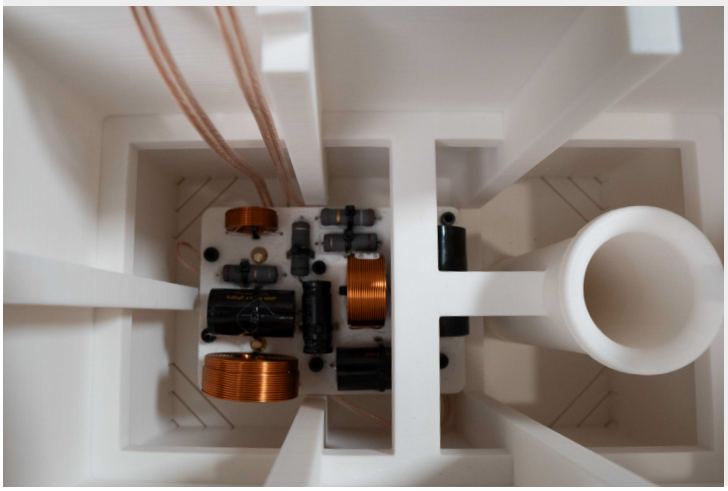


Slide the spades back onto the binding posts, then reinstall the washers and nuts. Tighten them using the 3D-printed binding-post hex driver included in the project files.

Next, we'll install the crossover board.

MOUNT THE CROSSOVER

3A Mount the Crossover



Check that no wires are blocking the screw holes or mounting area. Make sure the speaker wires are labelled and out of the way.

Screw the crossover board into place using M4 self-tapping screws.

3B Apply the Dacron

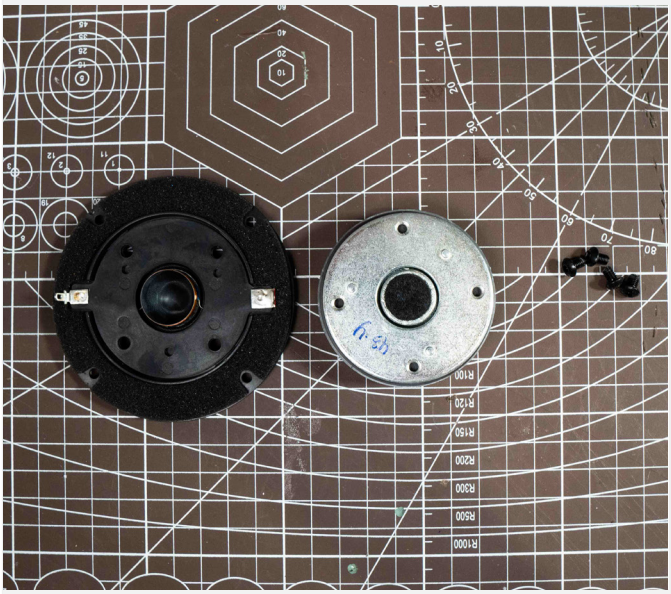
Apply the supplied Dacron to the inside of the enclosure. Cover the back wall and side walls, but keep the port opening completely clear.

Fix the Dacron in place with hot glue.

On the next page, we'll mount the tweeter.

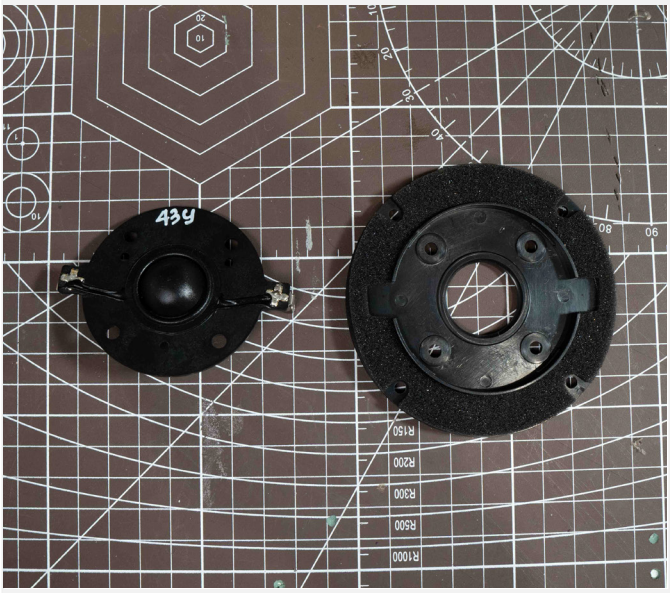
PREP THE TWEETER

4A Remove the Faceplate



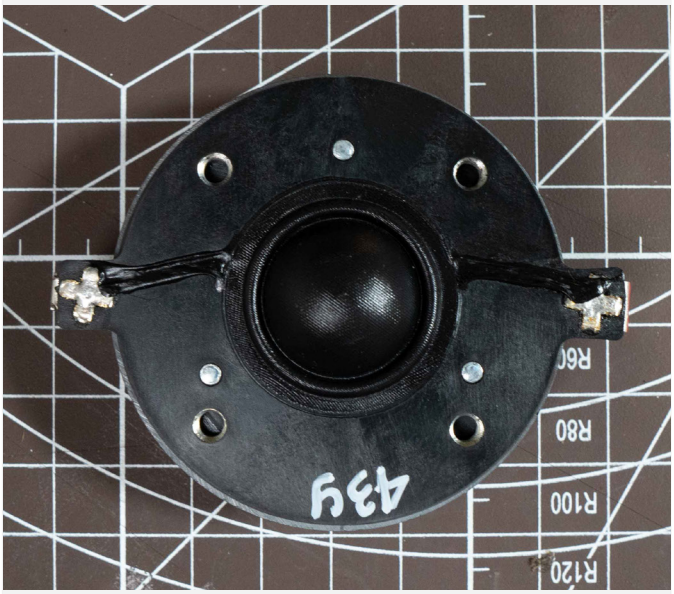
Unscrew the four screws from the tweeter faceplate, then separate the faceplate from the rear magnet assembly.

4B Seperate the Dome



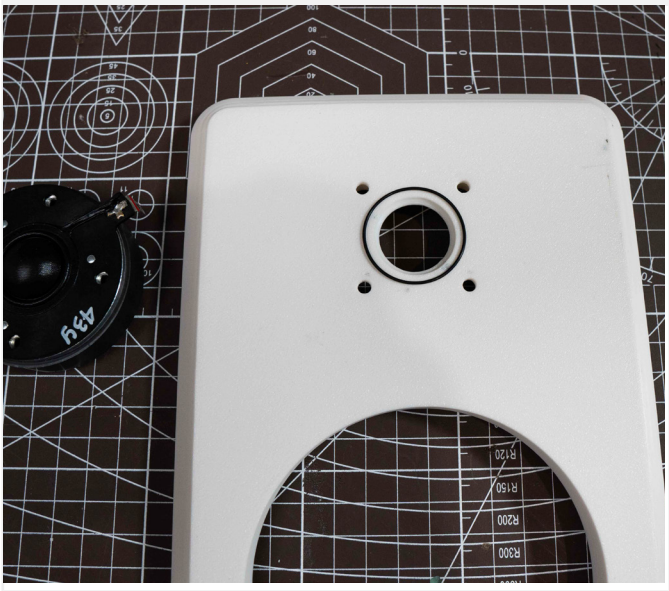
Gently pry the dome assembly away from the faceplate. It is press-fit, so take your time and work carefully around the edge.

4C Position the Dome



Carefully align the voice coil and three pins with the holes in the baffle. Once aligned, the dome should drop into place without force.

4D Install the O-Ring

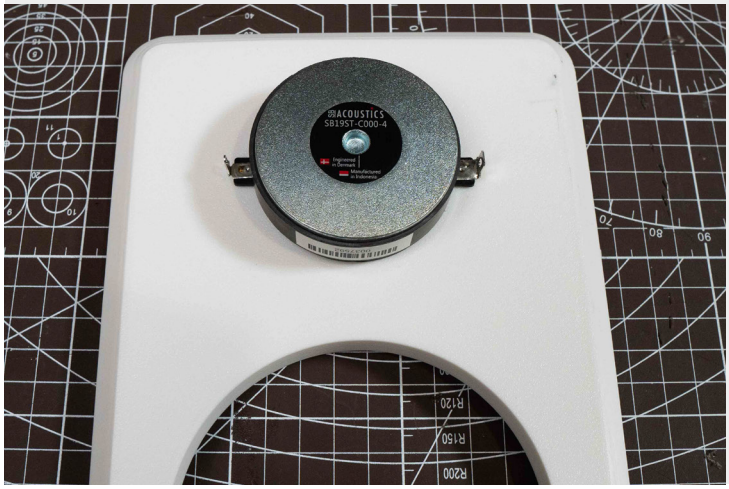


Place one rubber O-ring into the groove on the back of the baffle.

Go slowly here. These parts are delicate, they do not need to be forced. If something feels stuck, stop and check the alignment before continuing.

MOUNT THE TWEETER

5A Place the Tweeter



Hold the dome assembly in place, then gently place the tweeter assembly onto the back of the baffle. Align the dome with the opening.

5B Screw the Tweeter in Place

Hold the tweeter in place with your fingers, then flip the baffle over and screw the tweeter in place with the screws you removed in **step 4A.**

The dome and screw holes **may not line up** perfectly at first. This is normal. Gently slide the tweeter until the holes align, then screw it in place.

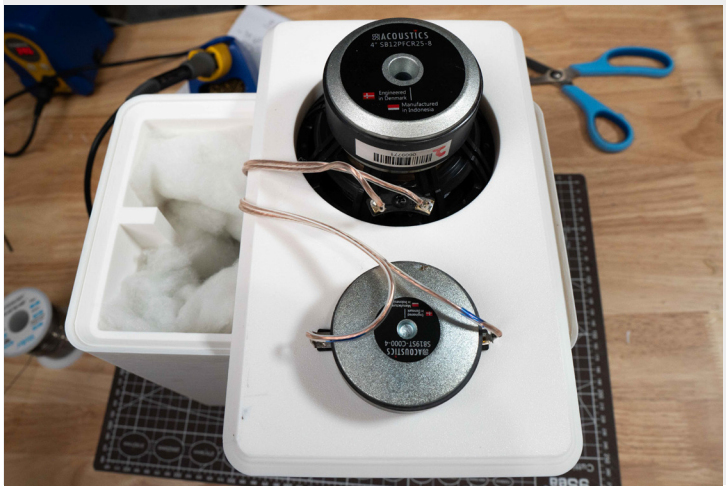
With the tweeter mounted, we'll mount the woofer on the next page.

FINISH UP THE BAFFLE

6A Mount the Woofer

Using M4 self-tapping screws, screw the woofer in place.

6B Solder the Woofer and Tweeter



Solder the woofer and tweeter wires to the driver terminals. Make sure the wires marked earlier are connected to the tweeter.

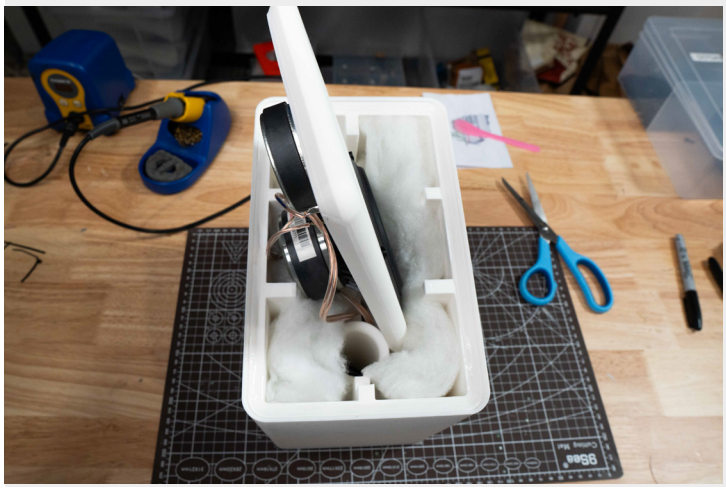
Getting polarity right is critical for good sound.

Before gluing the baffle in place, run a quick sound test. Connect an amplifier to the binding posts and check that both drivers are working. On the next page, we'll glue the baffle in place.

GLUE THE ENCLOSURE

Before gluing, check inside the enclosure one last time. Make sure the wiring is correct, the Dacron is clear of the port, and nothing is loose.

7A Apply glue to the enclosure



Apply a continuous bead of epoxy around the joining edge of the enclosure, to the inside of the groove. Do not fill the groove. The groove is there to catch excess glue when the parts are clamped together.

Use enough glue to create an airtight seal, but avoid excessive squeeze-out.

⚠ **Always test fit before gluing.**

7B Clamp the Enclosure Together

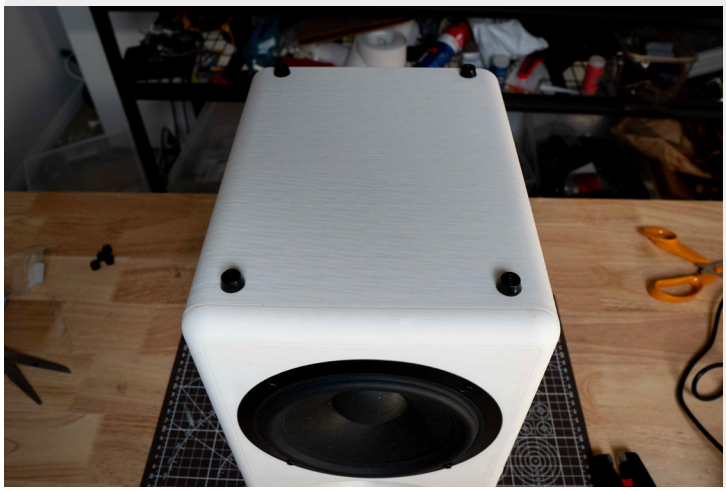
Press the enclosure sections together, then clamp them in place with four clamps.

Almost there!

FINISHING TOUCHES

Don’t skip these steps, they both affect the sound!

8A Attach the feet



Flip the speaker over and attach the feet using the M4 × 12 mm self-tapping screws.

8B Fill the waveguide holes

Carefully align each waveguide screw plug, then press it into place.

Tolerances vary from printer to printer. If a cover is loose, add a tiny dab of hot glue behind it to hold it in place.

Don’t pry a misaligned plug.
You may damage the waveguide. Use a 2 mm drill bit to carefully drill it out and print another plug.

Done!

YOU BUILT THE EMANATE 4

Not just assembled. Built.

You printed the parts, wired the crossover, mounted the drivers, glued the enclosure, and turned a pile of components into a real bookshelf speaker.

That's worth feeling pretty good about.

Help us spread the word

If you enjoyed the build and would like to help us out, share a photo of your finished speakers online.

It helps a small project like this reach more builders — and your speakers might inspire someone else to start their own.

TROUBLESHOOTING COMMON ISSUES

Having trouble? Start here

- **No sound from either speaker:**
  Check your connections at the crossover and binding posts.
- **Only one driver is working:**
  Ensure all crossover connections are correct and secure.
- **Crackling, buzzing or distortion:**
  Tighten all connections and check for any loose solder joints.
- **Amplifier shuts down or won't power on:**
  Inspect for any shorts in the wiring, particularly around the crossover and binding posts.
- **Weak bass or strange sound:**
  Verify polarity at all connections, check your wiring against the wiring diagram and ensure the port is unobstructed.

Still stuck? Email us at help@printyourspeakers.com and we'll help you sort it out.

We Value Your Feedback!

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Got more to say? Email us at feedback@printyourspeakers.com.