

# Simple Full-range Driver Bookshelf Speakers

Simple single driver speakers with no crossover needed!



# About Full-range Drivers

Full-range drivers are individual speaker units designed to reproduce the entire audible frequency spectrum using just a single cone. Unlike traditional multi-way speakers that use crossovers to split sound between separate woofers, mid-range speakers, and tweeters, full-range drivers handle bass, mids, and treble all on their own.

## How They Work:

To handle both deep bass and high treble simultaneously, full-range drivers employ specific engineering tricks:

- **Lightweight Cones:** They typically use paper, lightweight metals, or fiber composites to move fast enough for high frequencies.
- **Whizzer Cones:** Many feature a small, secondary horn-like cone attached directly to the center to assist in dispersing high-frequency sounds.
- **Phase Plugs:** Instead of a traditional dust cap, some utilize stationary copper or aluminum plugs at the center to guide sound dispersion and reduce resonance.

## Building Your Own Full-range Speakers:

**Building a small full-range driver bookshelf speaker is one of the best first projects in DIY audio because there is no complex electrical crossover to calculate or solder.** The wire runs directly from the amplifier input terminal straight to the speaker driver. [1, 2]

The most common, beginner-friendly route is building a **ported (bass reflex) enclosure**, which allows a small speaker cone to yield surprisingly deep bass. [2, 3]

## Step 1: Gather Parts and Materials

You do not need an advanced woodshop to pull this off. [4]

- **The Drivers:** Look for 3-inch or 4-inch full-range drivers from brands like [MarkAudio](#), [Tang Band](#), or [Dayton Audio](#). In the image examples above I used a slightly larger 6.5 inch cone from [Lii-Song](#).
- **Wood:** 1/2-inch or 3/4-inch **MDF (Medium Density Fiberboard)** or high-quality **Birch Plywood**. Avoid standard construction lumber or standard drywall screws.
- **Hardware:** You need a pair of Speaker Terminal Binding Posts (to connect your speaker wire) and a [flanged plastic bass port tube](#).
- **Damping:** Polyester fiberfill (like pillow stuffing) or acoustic foam to line the inside of the box. [1, 5, 6, 7, 8]

*Pro-tip for Beginners:* If you do not want to cut wood yourself, buy a pre-cut "flat pack" or "knock-down" enclosure from a site like [Parts Express](#) or [Madisound](#). [4, 9] . In the image example above I used the [.56 cu ft here](#) from Parts Express.

## Step 2: Calculate Box Dimensions

You cannot just build a random-sized box; the internal volume must be precisely matched to the electrical parameters of your specific driver. [10]

1. Download a free program like [WinISD](#) on your computer.
2. Input your speaker driver's technical specifications (specifically Qts, Fs, and Vas) provided by the manufacturer.
3. The software will compute the exact internal cubic volume you need to build, as well as the specific diameter and length of the bass port tube needed to tune it correctly. [7, 10]

## Step 3: Enclosure Construction

1. **Cut the Panels:** Cut out the 6 sides of your bookshelf box.

2. **Cut Holes:** Use a jigsaw or a hole saw to cut the large circle in the front panel for the driver and a smaller circle for your bass port tube.
3. **Glue and Clamp:** Use standard wood glue (like Titebond) to secure the panels together. **Clamps are mandatory** to ensure air-tight seals. Do not glue the front panel on yet. [2, 11, 12]

#### **Step 4: Wire and Tune**

1. **Seal the Box:** Use wood glue or silicone caulk along every internal seam of the box. Any air leaks will destroy the bass response.
2. **Damp the Enclosure:** Line the back and side walls with your acoustic foam or loosely pack the box with a small amount of polyfill. This tricks the speaker into thinking the box is bigger than it actually is.
3. **Mount the Terminals:** Install your binding posts on the back panel.
4. **Solder the Connections:** Run a positive and negative speaker wire from the binding posts directly to the positive and negative tabs on your full-range driver.
5. **Final Assembly:** Screw the driver into the front baffle and press-fit your plastic port tube into place. Finally, glue the front baffle onto the box to close it up. [7, 8, 13, 14]

Would you like some specific **speaker driver recommendations** based on your target budget for this project?

- [1] <https://www.youtube.com>
- [2] <https://www.diyaudio.com>
- [3] <https://blog.miscospeakers.com>
- [4] <https://www.parts-express.com>
- [5] <https://www.instructables.com>
- [6] <https://www.youtube.com>
- [7] <https://www.youtube.com>
- [8] <https://www.finewoodworking.com>
- [9] <https://www.reddit.com>
- [10] <https://www.youtube.com>
- [11] <https://www.youtube.com>
- [12] <https://www.instructables.com>

[13] <https://www.instructables.com>

[14] <https://www.commonsenseaudio.com>