



Introduction

Designing an approximately eight-liter speaker using a midwoofer with an effective diameter of just 105 mm is a classic approach in loudspeaker manufacturing worldwide. However, far from being a simple task, it requires certain design choices that may seem unconventional. Many manufacturers opt for bass reflex tuning that prioritizes low-frequency extension, often at the expense of power handling and, more importantly, damping.

Our approach, instead, focuses on achieving a good balance: providing reasonable low-end extension along with effective damping, without resorting to extreme midwoofer parameters that would ultimately compromise power handling.

The cabinet

For the design of this loudspeaker, we started by ensuring that any coloration caused by vibrations was minimized as much as possible. We used a 4-centimeter-thick front panel and carefully chose the proportions of the cabinet to reduce internal reflections. Given the

dimensions, these reflections fall within the midrange frequencies—an especially sensitive part of the audio spectrum. Minimizing all forms of coloration to negligible levels enhances the clarity of subtle signals, improving the sense of ambiance and the accuracy of the reproduced soundstage.

The small size reflex port is positioned at the rear, so the speaker should be placed at least 20 centimeters away from the back wall when in use.

The speakers

Our collaboration with Scan-Speak allowed us to design a midwoofer with customized parameters, enabling a highly damped tuning. The size of the voice coil and the linear excursion of the diaphragm contribute to impressive power handling, even at low frequencies. The choice of an aluminum diaphragm results in a low moving mass and avoids the prominent high-frequency break-ups that would have complicated crossover design.

The tweeter is based on a standard model from the Danish manufacturer, but with a significantly reinforced motor structure to ensure better frequency handling, especially in the midrange. A well-balanced force factor and tailored compliance have led to an exceptionally fast transient response, further enhanced by a carefully designed acoustic phase behavior that emphasizes attack dynamics.

The crossover filter

The crossover network, refined after finalizing the cabinet dimensions and minimizing internal standing waves, is relatively simple in design. It was developed with careful attention to both the acoustic response of the individual filter sections and the phase alignment of each driver, optimized on and off axis. This ensures a soundstage that accurately preserves spatial cues and the depth of the original recording when reproduced in a real listening environment.

The inductors are air-wound using thick-gauge copper wire to minimize series resistance, while the damping resistors are carefully selected to optimize both frequency response and acoustic phase behavior.

Conclusion

At the end of the optimization process, we achieved a loudspeaker that is slim yet robust, with a frequency response that goes beyond being merely flat on-axis and instead delivers impressive real-world performance in-room. Its compact size, ability to be placed close to the rear wall, and particularly enjoyable vocal range make it a true benchmark in both balance and acoustic performance.

Technical specification

Mezza V2	
Type	Two-way Bass-Reflex Bookshelf Speaker
Drivers	Tw 26 mm Soft Dome Tweeter Double Ferrite Magnet, Alu Front plate Mid/Woofers 150mm Black anodized Alu Cone Ferrite Magnet
Sensitivity (2.83V/1m)	88 dB
Frequency response (-3 dB)	55Hz - 28000Hz
Nominal impedance	4 Ohms
Minimum impedance	3.5 Ohms
Maximum power:	100 W without clipping
Recommended amplifier power	25-100 W
Crossover frequency	2200 Hz
Dimension	Cabinet only: 203x382x372mm (l x h x d) Loudspeaker with stand: 312x1116x439mm (l x h x d)
Net Weight	12 Kg