

ing of the midrange boxes was a welcome option because they are hidden from view and because it preserved their internal volume.

Midrange systems lead a very demanding life and are difficult to get transparent sound out of, as is well known in the audio industry. There is no such thing as a simple, high-resolution midrange system. More elaborate designs are seen in references 4 and 5 for this reason.

I extended the woofer cabinets downward to make up for the increased midrange box volume, and installed new stiffeners as well.

Finally, I protected the tweeters from woofer cabinet pressure by mounting small wooden boxes on the rear face of the front panel. I ultimately mounted the tweeters on neoprene, just like the midrange drivers, with positive results.

FRAMES

Photo 3 shows a simple internal frame as you might find inside a woofer cabinet. Several are required in a large design. It is useful to have cross ties there as well, and I have even indicated a blob of damping material where the cross ties pass each other, an ideal place for such a feature.

Frames like this are easy to install piecemeal into a five-sided cabinet that is already assembled—this means no exact fits are required—you can clamp each new piece to a previous piece where they intersect.

I don't use frames cut from plywood with circular openings in them because of the precise fit required, and because most material is located where it does the least good—in the corners rather than mid-way across the panel.

HIGH-PERFORMANCE FRAMES

Photo 4 is a model of a very efficient, lightweight frame element. By using a thin web separating the upper (hardwood) cap from the cabinet wall, I increased the stiffness of the assembly enormously with very little added



PHOTO 3: Simple internal frame.

weight. You could cut the webs (with lightening holes) from 3/8" marine or Baltic birch plywood—this thickness provides a generous glue line. And then you could assemble manageable woofer cabinets from 3/4" particleboard

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