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Subject: Cabinet construction

Posted by [SteveBrown](#) on Thu, 17 Jul 2003 12:22:29 GMT

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I am starting to put thought into building the Theater 3pi speakers - I built Thermionic 3pi about a year ago. My reasons for doing this are three fold: 1) opportunity to hear what the better Delta woofer can do; 2) end up with a speaker that has a smaller footprint; 3) opportunity to build a nicer (waf) cabinet. Point three is where I'd like some advice from the woodworking gurus here. I really liked the beautiful speakers (Cherry Pi) done by jlharden and I'd like to do something similar (tall, and deeper rather than wide). I have a list of questions, hope I can get some of you to chime in...1. When I build w/MDF and put veneer over it, the butt joints seem to show up under the veneer after several months. It always looks great when first finished, but over time, where the veneer is over an MDF edge, the edge begins to show through. Thoughts? I normally use contact cement on top of plain MDF.2. I'd like to have solid wood edges on the front baffle so I can round them or bevel them a bit. What is the best method to join solid to the MDF+veneer and create as little seam as possible? I have regular tools, nothing fancy like a jointer. Do have a router and table saw...3. I've seen more posts lately from people using solid wood in the construction of their speakers. If I ended up with a front baffle of 42"x13.5" would that be too wide to expect a solid wood baffle to work well? I'd be building it up from narrower boards of cherry, dowled together. Would warping over time be an issue? If so, suggestions?4. On the technical side, is there an optimum distance for the space between the woofer and the floor? If so, how do you figure it?5. I've heard there may be issues with diminished bass response and narrow front baffles - is that true or myth? If true, is 14" too narrow for a 12" driver? If so, how do I compensate?Wow, lots of questions! Thanks in advance for your help!!Steve

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Subject: Boundary conditions and room interactions

Posted by [Wayne Parham](#) on Thu, 17 Jul 2003 16:45:39 GMT

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I'll let those more qualified at woodworking respond to those questions. But as for the optimum distance between woofer and floor, what you have is essentially a boundary condition that also acts as a reflector. The closer to the floor the source is, the higher frequency before the floor acts as a reflector. It will act more as a pure ground plane, or half-space and there will be less of a path length difference between reflected and direct energies. There is often a notch that forms as a result of self-interference from the floor reflection. But since you also have other reflective surfaces in your listening room, this path length issue presents itself from many other things besides just the floor. This is also the reason for the effects of baffle dimensions. The larger the baffle is, the lower the frequency where it will act as half-space. Of course, the baffle might rest on the floor or against the wall and form a more constrained space such as quarter-space or eighth-space. But the point is that even if the loudspeaker cabinet is suspended in free-space, above a certain frequency range, the baffle itself forms a half-space condition for the sound radiator. For more information on boundary conditions and room interactions, check out Augspurger's JBL Sound System Design Reference Manual.

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Subject: Re: Boundary conditions and room interactions  
Posted by [Adrian Mack](#) on Sat, 19 Jul 2003 09:48:00 GMT  
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placed against just one, like a floor but with no walls. Is this right? If larger baffles mean lower frequency until it behaves like half space placement, would it be fair to say that, for subwoofers, keeping the baffle as small as possible will mean it acts as half-space from a higher frequency, essentially giving us more of a "boost" (like room gain from placing against a wall which is half

from what is expected, and is generally worse. Is there any way to predict the effects/minimize them in a room with a raised hardwood floor? What happens if a horn, like a HF horn in a speaker cabinet is placed in a corner? As an example, the Peavy CH3, if placed in a corner, because its wide dispersion, a lot of it would be "firing into the wall" causing heaps of reflections and such? I'd think this is a bad thing, but I guess we already have a ton of reflections anyway. Time to go read JBL sound design manual :P Its a 104 pages, I'll come back in four months when I've finished reading lol. Thanks! Adrian

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Subject: Re: Boundary conditions and room interactions  
Posted by [Wayne Parham](#) on Sat, 19 Jul 2003 14:22:30 GMT  
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constrained than eighth space, any angle more narrow than a trihedral corner. The more confined the radiating angle, the higher the directivity of the wavefront. In a sense, the boundary conditions act like a waveguide, defining the radiating angle. However, this is only true if the sound source is omnidirectional to begin with, the hypothetical pulsating sphere. In practice, sound sources are not that way, and have complex directional characteristics of their own. If the sound source is already more directional than the boundary conditions it is radiating into, then it might as well be operating in freespace.

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Subject: Re: Cabinet construction

Posted by [Bill Martinelli](#) on Sun, 20 Jul 2003 03:28:26 GMT

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Hi Steve,"1. When I build w/MDF and put veneer over it, the butt joints seem to show up under the veneer after several months. It always looks great when first finished, but over time, where the veneer is over an MDF edge, the edge begins to show through. Thoughts? I normally use contact cement on top of plain MDF."I don't know how to say this in a nice way but the problem has a lot to do with the contact cement. Contact cement is called glue in a loose term as I see it. It's rubber cement, won't form a rigid glue line, sun light can loosen the bond. So those are the bad things and people have written small novels on why not to use it. So get yourself some veneer glue from [www.veneersystems.com](http://www.veneersystems.com) or another commercial supplier. After your MDF box is all put together. The outside should be sanded down with 80 grit to break the surface glaze and level everything. If you have a belt sander that will work very nice with a little practice. The idea is to level the surface smooth. Hold the sander at a 45 degree angle across the panel. move from left to right and shift down 3" with each pass. when you complete the whole panel. Hold the sander at -45degrees and repeat the process. Do this 4 or 6 times with very light pressure. You don't want to remove a lot of material at any one time. Just take down high spots and maintain (or create) surface uniformity. When all done you should have a nice criss cross pattern for the glue line. Random orbit sanders are no good for doing this. A stroke sander or thickness sander is great and a sharp plane and a sanding block is your low budget option."2. I'd like to have solid wood edges on the front baffle so I can round them or bevel them a bit. What is the best method to join solid to the MDF+veneer and create as little seam as possible? I have regular tools, nothing fancy like a jointer. Do have a router and table saw..."Make your solid wood edges with your table saw and your router. build yourself a router table if you haven't already. Veneer the entire cabinet and have it all but the last stage of sanded and ready to finish. Apply your solid wood edges directly to the veneer. If you have lots of clamps, that would be the best, most traditional and most time consuming method. You can use a few nails to hold on the wood until the glue dries and then fill them. You use masking tape to hold on the wood until the glue dries. Space the 1" tape with 1" spaces, that will be enough pressure for any PVA."3. I've seen more posts lately from people using solid wood in the construction of their speakers. If I ended up with a front baffle of 42"x13.5" would that be too wide to expect a solid wood baffle to work well? I'd be building it up from narrower boards of cherry, dowled together. Would warping over time be an issue? If so, suggestions?"For solid wood carcass construction there are more tips and tricks than there are cabinet makers. Pre-dress the wood. take it close to thickness but not at finished thickness. let it stand where it will be assembled for 4 weeks. Sticker board and use a small fan for circulation. No funny business like building in a damp basement then put your finished work in a dry house all air conditioned and dehumidified. It gets ugly. the horror. After your wood is all acclimated finish machining it to dimension for glue up. Follow the growth ring rules of engagement for edge gluing or face the circular consequences. 13.5" is not so wide for a face on a cabinet that cubed out, meaning it's attached on all sides and is not a door hanging and swinging in the air just waiting for nature to throw it a curve. cross ribs won't do you much good because they grow with the panel and in a few years won't be holding it anymore. there are tricks with screws but don't bother. The big key is stable wood. If you really want to do something, finish the inside of the cabinet too. good luck and happy building Bill