Subject: Theater 3 baffle size and driver arrangement
Posted by Chris Leger on Tue, 05 Sep 2006 14:41:39 GMT
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Hi,I was a lurker here a few years ago... went so far as to buy some 2226s and 2126s only to abort, sell the components, and stick with my old Klipsch stuff.Now I'm in a new house, and space is limited. My living room is 14'x20' with a fireplace in the middle of the wall at the end where the speakers will go. The chimney extends into the room about 2', so the result is I have 2 24"x48" "nooks" at either side of the chimney. I'm installing some custom shelves in these rectangular spaces, and once again my thoughts turn to a pair of horn-loaded cabinets.Space is at an even greater premium than the above might suggest, as there's a 46"x34" TV on one side, and I can only mount it so high, so I'm left with limited vertical space. Further, the shelves will be suspended on threaded rod that will intrude 6" or so into the shelves. Thus, the volume I have to work with is approximately 36" wide, 24" deep, and perhaps 15" or so high. Works out to about 6 cu ft of available volume, I think. Right now, I'm using a pair of JBL L100s, and I like them, but they just don't have the open sound I'm looking for. I mention the L100s because the 12" speakers in the small cabinets give some decent bass, though it doesn't extend as low as I'd like. My thinking is I'd like to stick with 12" woofers because they won't require as tall a baffle in front, and I'd rather not have to raise the TV any higher than it is. But I'm thinking with a larger (WxD) cabinet, I might get some more extension...So, I've been sitting here envisioning a cabinet with perhaps a JBL 2206 with a 2126/2070A mounted alongside. At 36" wide, The horn and woofer could be installed with a few inches of margin around each one... but I really don't understand whether this is practicable or not. I should mention that I'm running Linux, so running the PiAlign and BoxPlot programs is not trivial. I can do it, but I figured I'd jump in here first and see if you folks think what I'm contemplating seems sane so far.So, my question is, can a cabinet (e.g. Theater 3, though I don't know its true dimensions) be oriented so that the baffle is on the side of the cabinet, with the drivers I'm contemplating arranged horizontally? Will this yield decent results? I can go smaller in any dimension (36"W x 24"D x 15"H) for tuning purposes, but bigger is going to be a problem.Thanks in advance!Chris Leger

Subject: Re: Theater 3 baffle size and driver arrangement
Posted by Wayne Parham on Tue, 05 Sep 2006 16:07:31 GMT
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I paired the JBL 2206 with a Vifa tweeter. The cabinet is about 1.4ft3 and it sounds nice. I'll send plans if you're intereted.

Subject: Meant 2426, not 2126.
Posted by Chris Leger on Tue, 05 Sep 2006 16:12:40 GMT
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Thinking about it some more, given that JBL calls for a 1-to-4 cu ft cabinet for the 2206, this should be doable... I guess my real question is, will having a sort of "pizza box" (wide and flat) cabinet with a short and wide baffle introduce any sonic weirdness? Where should I be headed next? Decompiling PiAlign & BoxPlot?Oh yeah, original post should have refered to 2426 drivers not 2126(?)Thanks again!

Subject: Re: Theater 3 baffle size and driver arrangement
Posted by Chris Leger on Tue, 05 Sep 2006 16:15:30 GMT
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Thanks Wayne,Kind of have my heart set on some horns though. Maybe I need to go to 15" woofers? I'd sooner do that (and have to crane my neck to watch TV) than go to a dome tweeter. Maybe I should just work on hot-rodding these L100s...

Subject: Re: Meant 2426, not 2126.
Posted by Wayne Parham on Tue, 05 Sep 2006 16:30:19 GMT
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Yes, you can use programs that calculate T/S curves assuming the cabinet acts purely as a Helmholtz resonator. That's the way bass-reflex calculation programs work. But if the box is tall and thin, you'll want to look at the interaction of standing waves in the cabinet, so use a program like Martin King's spreadsheets. As for baffle step, I prefer to think not just in terms of the baffle but also in the brader sense of boundary interactions. If you place the cabinet in free space, baffle dimensions determine the shift between half-space and free space radiation. But in a room, this is not the case, particularly when placed near a wall or corner.

Subject: Re: Theater 3 baffle size and driver arrangement
Posted by Wayne Parham on Tue, 05 Sep 2006 16:37:46 GMT
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To be honest, the 2426 was a little strong (and large) for my tastes as a combination for the 2206. The 2406/2206 combination would be nice with a larger woofer as a three-way system, something

more of a mini-monitor configuration.

Subject: Re: Meant 2426, not 2126.
Posted by Chris Leger on Tue, 05 Sep 2006 16:43:56 GMT
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Thanks Wayne! Hmm... I was also thinking that since these cabs would be installed in these spaces as I've described, (and therefore mostly obscured) I could try designing them so they have no parallel surfaces (why, I wouldn't even need to finish anything other than the baffle!) Am I brushing up against the "standing wave" problem you've mentioned? Obviously, given the space available, there is only so much I can do...Please forgive me for being so clueless. My thinking was that I could construct a box of appropriate dimensions for the drivers chosen, proper length port, etc... but I understand that it's more complex.Best regards,Chris Leger

Subject: Re: Theater 3 baffle size and driver arrangement
Posted by Chris Leger on Tue, 05 Sep 2006 16:51:10 GMT
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Thanks again Wayne. I suspected it had something to do with the 2206 keeping up with the horn.Well, I have monitors now (L100s.) Like I said, I like them, with the exception of the LE25 tweeter. It's just dead and flat sounding to me. My reflex is to think "horns." Maybe I really do need to think about hot-rodding these monitors. I can keep my eyes peeled for some slot tweeters, I guess, and try to educate myself about crossover design. Either that, or give more consideration to a 17"-18" high cabinet with 15" woofers for my available space. 3" might not sound like a lot, but it's going to be critical for my application.Many thanks for your time and consideration.Chris Leger

Subject: Standing waves inside cabinets
Posted by Wayne Parham on Tue, 05 Sep 2006 19:40:38 GMT
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Using non-parallel walls is one way of reducing standing waves, but another is to use dimensions that break them up. Damping is yet another way of reducing standing waves.A long, thin cabinet will develop pipe resonance. That's the tuning method used in a transmission line. You don't generally want transmission line behaviour in a bass-reflex box because the tuning mechanism in a bass-reflex box is Helmholtz resonation, not pipe mode resonation.There's nothing really wrong with having both mechanisms in play - Helmholtz resonantion and pipe mode resonation. You could design something that used both, but it is harder to model and usually the designer expects one mode or the other. In his models, he usually doesn't even consider the unwanted mode, and uses damping or position or geometry to get the desired results.In the case of a bass-reflex box, a long thin box may create standing wave modes that aren't expected. If they aren't damped with stuffing, there will be peaks and dips in response that aren't shown in Helmholtz models. That's why, if making the box tall and thin, I suggest analyzing the system from a standing wave point of

view in addition to Helmholtz, so you can see what it is doing. If standing waves are present in the bass range, they may work in your favor, or they may hurt you. Either way, if the box is tall and thin, you won't know about them from a bass-reflex modeling program alone.

Subject: Re: Standing waves inside cabinets
Posted by Chris Leger on Tue, 05 Sep 2006 20:16:18 GMT
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Thanks for hanging in there with me on this, Wayne. Spent idle time time today going back-and-forth between tweeter upgrades for the L100s or else replacing with L112s, and figuring I need to build some horn-loaded speakers becasue I'm never going to be happy with these monitors.Stuffing/damping shouldn't pose much of a problem... I am going to take a look at Martin King's spreadsheet as you suggested.Maybe this is a no-no, but what about putting an l-pad on the horn, in concert with the 2206?

Subject: Crossover Information
Posted by Wayne Parham on Tue, 05 Sep 2006 20:38:51 GMT
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I pad the horn on all speakers that also contain direct radiators. The difference in SPL is about 10dB, so padding is a requirement. It has the additional benefit of providing electrical damping, which is a good thing, since horns have a peculiar (peaky) impedance curve. Electrical damping smooths impedance a great deal.

Useful documents:Speaker Crossover Document
"Crossover Electronics 101" Seminar Handout

Subject: Re: Theater 3 baffle size and driver arrangement
Posted by GarMan on Tue, 05 Sep 2006 20:50:24 GMT
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Chris,If you arrange the woofer and tweeter side-by-side, instead of one on top of the other, you'll have to live with poor horizontal off-axis response.With traditional vertical stake, it assumes you're head will be at a certain height, but allows you to move side to side with little change in response. Putting the drivers side-by-side will allow you to stand-up or lie-down on the floor to listen, but limit your side to side listening position.
