Subject: what design can i throw 8 jbl 2206J's in?
Posted by Vincent Molino on Tue, 07 Aug 2007 15:58:01 GMT
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im gonna get the 12pi as soon as i sell my 2 srx728s's on ebay but i need a good mid bass folded horn....that puts out about 60-300 hertx. Which pi design can i put these in and can u give me a spl chart...thanks.

Posted by Wayne Parham on Wed, 08 Aug 2007 14:24:32 GMT
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a 16" long straight-sided horn with 18"x18" mouth, 4.5"x4.5" throat, 33in3 front chamber and 80in3 rear chamber. It might be worth seeing if the JBL 2206 will work with this horn. Perhaps it can be modified to suit; Try Hornresp and see.

32" long horn having 28"x28" mouth, 7.5"x7.5" throat, 800in3 front chamber and 1200in3 rear chamber.

Posted by Vincent Molino on Wed, 08 Aug 2007 14:27:02 GMT
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ok ill look into hornresp....so mid bass kick horns dont have to be long, huh?

Posted by Wayne Parham on Wed, 08 Aug 2007 14:40:07 GMT
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see from the Hornresp model, that's where it starts to roll off.

Posted by Vincent Molino on Wed, 08 Aug 2007 14:45:29 GMT
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ok thanks for putting the numbers in for me...i will be using 4 per side.....and i would love for them to be long because they will be acting as bases for my heavy mid-high boxes. It would be nice if they went a lil lower......i would like my 12pi to only put out 30 hertz to 60-70. Thanks!!!

Posted by Vincent Molino on Wed, 08 Aug 2007 14:47:23 GMT
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man it would be awesome if there was a scaled down version of the 12pi for midbass....i love the push pull config for accuracy/less ditoration.

Subject: Push-pull versus shorting rings
Posted by Wayne Parham on Wed, 08 Aug 2007 15:08:22 GMT
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I like the push-pull configuration too. But shorting rings work very well at midbass frequencies up. Push-pull works best as frequency drops, at least the version I'm talking about, which is a pneumatic/acoustic implementation where two drivers are mounted physically opposite and driven opposite in order to cancel mechanical asymmetry.

The reason for the shorting ring's "preference" to higher frequency is that it is an electro-magnetic device. Just like coils have to be large to work at low frequency, so do shorting rings, which are essentially single-turn coils.

Mechanical push-pull works best as frequency drops. This is because it is summing acoustically, in the air. So the drivers have to couple together, and this gets increasingly harder as frequency goes up. The drivers just aren't coupled together as well at higher frequencies because they grow further apart in phase. The lower the frequency, the closer in phase the two drivers are.

fine if you use a truck with a ramp, because it is designed to fit right on it. But if you have to carry

complementary pairs. It incorporates push-pull drive when used in compementary pairs as designed, but the trade-off is that it may not receive as much distortion reduction from push-pull

the throat. I expect distortion reduction to be good at very low frequencies but that it becomes less effective as frequency rises. We'll be able to quantify this more definitely after measuring the prototype.

Subject: Re: Push-pull versus shorting rings
Posted by Vincent Molino on Wed, 08 Aug 2007 15:16:24 GMT
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ok cool. Im gonna stick with 12 pi...i dont care about wieght....im a big guy, 250 pounds, lol....number 1 priroty is sound quality. I dont do sound for a living....i do it for fun...only like 750 person DJ/edm shows.

What exatcly is a shorting ring?

Subject: Re: Push-pull versus shorting rings
Posted by Wayne Parham on Wed, 08 Aug 2007 17:14:00 GMT
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To understand how either push-pull drive or shorting rings work, you have to understand what they're trying to fix.

Basically, the problem is that the force that moves the cone is not perfectly linear, and its back and forth motion is not perfectly symmetrical. This is because the magnetic field generated by the voice coil deforms the magnetic field of the fixed magnet. This causes eddy currents in the magnetic circuit, literally modulating the flux. Further, the magnetic circuit is made of several parts, the center pole, top plate and back plate, in addition to the magnet itself. These may saturate at different levels, which will also cause force asymmetry. These are the primary causes of distortion in a loudspeaker.

Push-pull drive is pretty simple to implement, from an engineering perspective. All you have to do is take two identical motors and run them in opposite directions. Position them so that the drive force combines in an additive fashion, and voila! You have push-pull drive. Any asymmetries in an individual drive unit will cancel by using complementary pairs. Essentially you have a strong motor and a weak motor on each half cycle. On each contiguous half cycle, the strong one and the weak one flip.

This can be as simple as taking two identical loudspeakers and running one backwards on the baffle. You have to also reverse polarity on the reverse-mounted driver so their acoustic outputs are in phase. Best results are obtained when the drivers are matched.

You can also take two identical motors run in opposite directions and physically connect them to a common point on a diaphragm. This is another approach that does the same thing. In either case, the solution is essentially mechanical, using two drive units. Each one alternates between being slightly stronger and slightly weaker on each half cycle. The net force is equalized by having them work as a complementary pair.

Shorting rings work a different way. The idea with them is to correct the drive force, itself. To do this, a shorting ring is installed so that the electromagnetic field generated from the voice coil induces a current within the shorting ring. The current flowing through the shorting ring creates its own magnetic field. If the shorting ring is properly sized and placed, it will create a force that is equal and opposite to the difference. The idea is to counteract flux modulation, so that the force in both directions is the same.

A shorting ring is more difficult to do from an engineering perspective. It also requires more machining in the motor core. The size, position and conducting material of the ring contribute to the force it generates, and it must be made to precisely counteract the effects of flux modulation. This is not trivial, and different manufacturers have had varying degrees of success implementing shorting rings. In other words, not all speakers with shorting rings are equal.

Posted by Vincent Molino on Sun, 19 Aug 2007 23:30:24 GMT
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so Wayne...can i make the mouth's 1/4 the size since im putting 4 together on each side...for wieght i can make 2 - doule 12's that strap together.....or maybe a big quad box?im having the hardest time deciding what to biuld. Do i really need to enclose these in horns at all for small-mid size indoor venues?also if you stick a DR box in a corner....and a folded horn in a corner.....will thier be that muck of a differenced...thanks for your help so far.

Subject: Horns in groups, radiating into constrained space and room modes
Posted by Wayne Parham on Mon, 20 Aug 2007 14:18:52 GMT
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You can certainly make horns smaller that will be used in groups or boundary loaded. Making them smaller on this assumption makes stand-alone use not an option though.

Have you played around with Hornresp yet? It looks a little bit intimidating at first, but once you've modeled a horn with it, it becomes very easy to use. You'll appreciate using it to test your ideas before making a prototype. Helps to narrow down your choices with it.

The difference between a folded horn placed in a trihedral corner and a direct radiator placed in a corner depends entirely on the characteristics of each. However, assuming both are placed within

Corner loading for basshorns acts something like a mouth extension. Response is made smoother and on-axis sensitivity is increased, at least at low frequencies. Horns usually provide directional control, but to what extent depends on the horn's size and shape. At low frequencies, the horn usually isn't big enough to provide any directional control but at higher frequencies, it is. So the corner provides directional control at the lowest frequencies where the basshorn can't.

The net result is on-axis sensitivity is increased 9dB at very low frequencies, but less as frequency rises. This is because the horn is acoustically small at deep bass frequencies but it becomes acoustically large at some point higher in frequency. At the lowest frequencies, the corner is providing directional control, narrowing the radiating angle and increasing on-axis sensitivity as a result. Higher up, the horn is providing directional control and the corner has less influence, if any at all.

corner raises its on-axis sensitivity. The alignment of the cabinet should be slightly overdamped because this will work best for corner loading. What you get is 9dB sensitivity increase. The corner provides directional control for the direct radiator the same way it does for the basshorn. At very low frequencies, the corner is probably the only feature acoustically large, so it is the only thing that has any effect.

Whether a horn or a direct radiator is corner loaded, the room has other features that setup standing waves inside of it. If the trihedral corner were open, you could expect it to provide perfect pattern control down to the deepest frequencies. But the opposing walls create reflections and standing waves are a result. This creates nodes of high and low energy spots within the room. No matter where you place a woofer, this is true. But the point I want to make is that radiating from a trihedral angle provides a specific coverage pattern but room modes modify that a great deal. You can use a program like CARA to model room modes.

Subject: Re: Horns in groups, radiating into constrained space and room modes
Posted by Vincent Molino on Mon, 20 Aug 2007 14:21:56 GMT
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honestly Wayne its gonna be so much work to make the 8 boxes and paint...id feel a lot better if i could pay you to design them...i allready spent 40 grand on my system.i believe the mid bass is the MOST important part of any system

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Subject: Re: Horns in groups, radiating into constrained space and room modes
Posted by Vincent Molino on Mon, 20 Aug 2007 14:31:44 GMT
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i dont care about wieght or size..i want them to sound the best they can

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Subject: Using Hornresp to model a midbass horn
Posted by Wayne Parham on Mon, 20 Aug 2007 15:15:41 GMT
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starting point, and modify values as needed to reflect what your horn will look like.

angle for total coverage angle of 40°. The length is 32", mouth dimensions are 28" x 28", throat is 7.5" x 7.5", front chamber is 800in3 and rear chamber is 1200in3. It was designed to operate in free space.

Now then, for your horn, you'll want to modify the electro-mechanical parameters at the lower section of the input screen. Those shown are for the JBL 2226 and you'll want to enter values for your 2206. It's pretty easy to do.

Enter the surface area of the cone in Sd. Enter the DC resistance of the voice coil in Re and the voice coil inductance in Le. Le is actually non-linear and so a single figure doesn't really mean much but that's another story. It won't matter much for what we're doing here. Both Re and Le are listed on the product spec sheet so just enter those values.

Double click on Cms and it will ask for Vas. Double click on Rms and it will ask for Fts and Qms. Double click on Mmd and it will ask for Fts. Double click on Bl and it will ask for Fts and Qes. Do each of these in order.

Once you've done that, you've entered the electro-mechanical parameters for your woofer.

Now the fun starts. Play around with the throat area, front chamber volume and rear chamber volume first. Throat area is S1, front chamber volume is Vtc and rear chamber volume is Vrc. Vrc has to be entered in liters and Vtc has to be entered in cubic centimeters. So pay attention to that when entering. Also, pay attention to the Atc and Lrc values. Atc is the average cross-section area of the front chamber in cm2 and Lrc is the average length of the rear chamber in centimeters. Just pick values that are reasonable. They don't usually matter unless you pick something that's way out of whack.

You can also play around with the size and shape of the horn. Make the mouth area smaller, if you like, by changing the value of S2. You can change horn length by changing the value of CON You can add another section if you like, perhaps widening the flare near the mouth. Enter values for S3 and L23 to do that. Consult the "help" section in Hornresp if you need more information about it.

After you've started getting a hang of this, change the radiating angle from freespace to something a little more constrained, to see how that affects response. Try halfspace, quarter space and free

The more constrained you make the radiating angle, the smoother the response becomes. An infinite horn is a good approximation of what happens when you have a large number of horns used together. It's like a limit, or what response will approach for a given horn in best case environment.

It's really not that hard to model a basshorn or midbass horn like this. They're typically pretty simple, made from one or more straight sections which are accurately and easily entered into Hornresp. It does a good job of predicting response of basshorns, so you can trust it to tell you what you want to know.

Subject: Re: Using Hornresp to model a midbass horn
Posted by Vincent Molino on Mon, 20 Aug 2007 15:20:37 GMT
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thank you so much..ur the man!!!ill try it tonight after work.dam you know your s*%#@!!!
