Subject: progess pics
Posted by Adrian Mack on Mon, 22 Dec 2003 08:30:35 GMT
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Just a quick progress report, have attached front baffles and divider between HF and MF horns and done a hell of a lot of sanding getting the side surface smooth so veneered panel could be attached. Then I proceeded to attach the veneered side panel. I needed something heavy as the clamps could only hold the edges. I couldn't find anything of good weight, then I remembered...Cheers - Adrian

Subject: Re: progess pics
Posted by buster on Mon, 22 Dec 2003 11:12:11 GMT
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Gday Adrian Is the weight just for christmas or new year as well either way you would have earned it by the time you finish

Subject: Re: progess pics
Posted by Wayne Parham on Mon, 22 Dec 2003 11:49:14 GMT
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Those are really coming along nicely. You're going to be very proud of those when you're done!

Subject: what kind of tweeter horn?
Posted by stupid newbie on Tue, 23 Dec 2003 04:20:07 GMT
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Adrian(or any of you other speaker gurus), I'm building a similiar project(built around a similiar midrange anyway, Im going to use an old magnavox 15" Alnico woofer for a while in an OB 'tll I build my bass horns),I was wondering what kind of tweeter are you going to use? I really wanted to build A conical tweeter with the same radiation pattern, but I've never seen a conical tweeter used. I do have a set of Coral tweeters that use a semiconical horn, but the mouth is rounded over(they reside in another speaker now). Currently I'm using some exponential magnavox horns with a 3"X9" mouth and alnico magnets. I damped the metal lens and it sounds pretty good(need some serious crossover work though--and I don't want to put the time into it if there is a better design out there that I can afford), but I really like the sound of the Corals and my midranges better. I don't know if its the shape of the lens, or the quality of the drivers. Do you think conicals

would be worth the try? Thanks in advance for any input, I appreciate it.

Subject: Re: what kind of tweeter horn?
Posted by Adrian Mack on Wed, 24 Dec 2003 00:56:06 GMT
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Hey "stupid newbie" (haha, well thats the nickname ya used!). I'm using a horn based tweeter, JBL 2370 horn flares with P.Audio PA-D45 comp drivers attached and Waynes crossover network will be used on them. The flares are Bi-Radial type, having a radial design in both vertical and horizontal planes, unlike a normal radial flare where the vertical is actually exponential, only the horizontal is radial. Are you having a midrange horn too? Or just direct radiator midrange? Is it two way or 3 way system? You could do a conical horn flare for the tweeter if you wanted. Remember though the conical has a negative slope, so use it in a Hybrid form to make the slope closer to zero. The conical flare has reduced phase distortion. See Waynes post "Characteristics of various horn flares" at http://www.AudioRoundTable.com/PiSpeakers/messages/1623.html for details on Hybrid forms, etc. What sort of dispersion do your Corals have? So do you actually plan on building some conical HF horns by yourself? I built some midrange conical horn flares that I modelled in Hornresp, but I don't think you could model a compression driver in there (mostly due to lack of information). If you really wanted to, you could build a flare that gives you the dispersion you want etc, and then build the Hybrid section and attach the comp driver with a mounting flange like the ones Bill Martinelli uses on his woodhorns. Then keep taking freq response measurements with speakerworkshop and changing the expo/hyperbolic "hybrid" section until you get the response curve you want. Its quite a lot of work though. I did a lot of this measurement stuff and experimenting with the midrange horns I built. For a HF horn, I would rather just buy a ready made one as theirs some very good ones out there. But if your up for it, give it a shot!
Adrian

Subject: Re: what kind of tweeter horn?
Posted by stupid newbie on Wed, 24 Dec 2003 05:42:50 GMT
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Wow! Bill Martinelli builds beautiful horns!! I thought that mine were coming along rather well 'till loking at those. Theory is one thing, but craftsmanship is an art. An equation may be worth a thousand pictures, but those pictures(of Bill's horns) are priceless. I almost wish I could just buy some, but I'd still be disappointed in myself for not building some so, here I go. Thanks for your ideas. My Corals seem to have approx 45 deg round flare. They sound really good, but I had to use them to replace blown tweeters in some cabinets my uncle left me in his will, and those things fit perfectly and sound better than the originals. Right now I'm using some magnavox horns on the upper end of these, but they're way too loud and not very extended on the upper end. I don't really want to use any resistors in my tweeter crossover. I'm such an idealist, I hate to comprimise. Unfortunately that's all speaker building is--choosing your comprimises. so I think I'll

just stick with my Magnavoxs for now anyway untill I get the rest of the bugs worked out of my system. Then I'll probably just buy what I'm looking for. I'll post some pictures as soon as I figure out how to. Thanks alot for your input! It really helps alot. I wish I was smart enough to actually come up with some good ideas for you smart people, but I'm still a stupid newbie. Give me a couple of years.

Subject: Re: what kind of tweeter horn?
Posted by Adrian Mack on Wed, 24 Dec 2003 07:15:38 GMT
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Hey again Bill makes some really nice horns ey. Its cool your building your own though, you'll feel really good about them when you finally get it to work exactly as you wanted. I know I did when I finally got my midrange horn to work properly after three different prototypes and hours of experimenting with various things like front and back chambers, phase plugs, throat size, etc. Why don't you want to use any resistors in your crossover network?Perhaps you could benefit from Waynes compensation network on your magnavox horns seeing as you say your missing out some of the top end. I guess you cant really know until you take a few freq response measurements on-axis. Use Speakerworkshop. Adrian

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Subject: Some new pictures
Posted by Adrian Mack on Wed, 24 Dec 2003 10:17:57 GMT
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Just thought I'd put up some new pictures Above shows the whole thing tipped on its side. That fibreglass you see is not really needed. The section it is in is completely closed off from the woofer chamber, its just wasted space actually. So it was probably a waste, but oh well - I got a ton of the stuff anyway. Above shows enclosure with sides attached Above shows box with sides and top attached. Still gotta attach all this stuff to the other tower, then I gotta put in the lips for the back panel, as the top half is removable. Then all the odds and ends, like sanding down bumps, cutting and drilling holes for terminal cups + components, finishing etc.

Subject: Re: Some new pictures
Posted by Adrian Mack on Wed, 24 Dec 2003 13:06:39 GMT
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just realized I still havn't cut the port holes :P I wonder why I forgot to.

Subject: Re: Some new pictures
Posted by Wayne Parham on Wed, 24 Dec 2003 15:53:46 GMT
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That's a bummer on the port. But I expect it will be easy to correct. Better to have too small a hole (or no hole) than one that's too big!Those speakers are coming along very nicely!

Subject: Re: what kind of tweeter horn?
Posted by stupid newbie on Thu, 25 Dec 2003 01:46:46 GMT
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Reguarding resistors, I've always felt like they were detrimental to sound quality. I've used them before in minimoniter style speakers, and I thought they made the tweeter sound like I placed a thin blanket over it. Maybe I just applies them wrong(?)I wish I could take response measurements, but currently I have to rely on my ears. I play guitar, piano, harmonica, and drums though and I have a pretty good ear for what's going on. That's why I'm building horns. I don't see why I ever wasted my time building anything else. Nothing else has the dynamics and clarity of horns. Electrostatics seem clear though, but their hard to drive, expensive, and require solid state amplification as far as I know. Anyway, I trust my ears. I know they're not perfect, but I know what instruments sound like. I'm just trying to get a stereo that will make instruments sound like instruments, and not ones half a mile away. I also want to do it on a tight budget b/c I'm a student and I really can't afford to spend thousands. I've had a job building speaker enclosures, and I've been a carpenter for years. I've built about a dozen complete loudspeakers in the past that amazed all my friends, but nothing has satisfied me since owning some Klipsch. I had kg5.5s and 3.5s, but their colorations were too much. I don't how I got off on that tangent(sorry), but thanks alot for your input. I'm going to put it to good use! Thanks again!

Subject: Re: what kind of tweeter horn?
Posted by Wayne Parham on Thu, 25 Dec 2003 04:48:56 GMT
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the behaviour of each component in the circuit.Like anything else, there are many ways to accomplish things, and some things work better than others. Resistors are neither "friend" nor "foe" - They're just part of a circuit. Loudspeakers are partially resistive and partially reactive, so sometimes a circuit is ill-formed without resistance.Some circuits benefit from values of resistance in series and/or shunt, others don't. It depends on your specific configuration more than anything else.

Subject: thanks!-nt
Posted by stupid newbie on Thu, 25 Dec 2003 05:11:40 GMT
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nt

Subject: may i know your whole box dimension?
Posted by adkins on Thu, 25 Dec 2003 08:53:58 GMT
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I am starting to reasearch for a DIY project for high efficiency speaker for use with SET amps. Looking at your in-progress cabinet, I am curious as to what bass cut-off frequency have you tuned your cabinet to be? Is it possible to tune a 15" woofer to reach 25hz if ever cabinet size is no problem? what is the outside dimension of your whole cabinet? are you using SET amps? I am new to DIY projects and need some help. Whats xover are you going to use? Is it o.k. to use professional electronic x-over?thanks for any input! MERRY XMAS!!

Subject: Re: may i know your whole box dimension?
Posted by Adrian Mack on Thu, 25 Dec 2003 10:14:56 GMT
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Hey AdkinsThe towers I'm doing is a 3-way design having a tweeter horn, midrange horn, and direct radiator 15" bass reflex to cover the midbass/bass. My particular one uses JBL 2225H's for the midbass/bass - thats a 15" woofer. Since my system has a subwoofer, I've tuned the cabinets to give about a 70Hz cutoff where it crosses to my 18" 18LW1400 subwoofer in a 300L vented box with small amount of electronic EQ which takes care of the subbass down to about 20Hz in my room. Certainly, its possible to tune a 15" to have a cutoff of 25Hz or even less. Cabinet size will be your main enemy here though, its pretty typical that 15" woofers with output this low are going to be rather large. It may or may not be a problem for you. JBL 2235H is an excellent choice for bottom octave operation. Where you set your crossover points will completely be determined by what your drivers are capable of, things to consider are distortion and bandwidth of each subsystem. My particular one has crossover points at 300Hz and 2Khz - but that only works for my configuration. You'll likely use a setup pretty different from mine, so your crossover points will likely need to be changed. Electronic crossovers used in pro sound are fine too, if the filter type and points suit your application. I'm not using SET amps on mine, I need all the output I can get! I love to listen to music at high levels, and I like the sound of SS amps and other high-powered amps. I admit I've never heard any tube amp before ever, but I also feel that they wouldn't suit my needs. Just beware though that not all drivers are suited to SET amps - drivers which produce a lot of back EMF typically need an amp with good current sourcing/sinking ability, which means having a high damping factor, so tube amps are out of the question (they have high output impedance, inversely related to damping factor which would be low). As a guideline, its drivers

with high impedance peaks at resonance which are not suited to SET amps. Wayne likes to draw the boarder at about 50ohms, anything below 50ohms impedance peak is likely to perform well on a SET amp, but anything above isn't, although it isn't a strictly 50ohms, its an approximation. Some tube amps behave differently from other tube amps too, so you may find that on some it'll work fine but it won't on others. If you do run a SET amp on a driver which produces large amounts of back EMF, the cone will be rather uncontrolled and you'll also notice a large lack of bass output in the bottom octave, motor strength is a function of current too and the amplifier needs to be able to source and sink the current or it won't be controlled. It's part of motor damping. Also SS amp's and other such high powered amps perform more like a constant voltage source so the load impedance of the driver doesn't have much effect on performance, but a tube amp act like it has a voltage divider and the cone goes crazy. External dimensions for my cabinet is 46" high, 18" deep and 20" high, that is rounded to the nearest inch. Adrian

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Subject: Re: may i know your whole box dimension?
Posted by adkins on Fri, 26 Dec 2003 07:50:54 GMT
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THANKS FOR THE VERY INFORMATIVE REPLY. YOUR CABINET LOOKS GREAT BTW!! I HAVE A FEW MORE QUESTIONS TO ASK IF YOU DON'T MIND,WHAT DO YOU GUYS MEAN WHEN SAYING, "TUNING AN ENCLOSURE TO SAY 30HZ?" HOW DO YOU EXACTLY DO IT? BY JUST DETERMINING BOX SIZE? OR I STILL HAVE TO COMPUTE FOR A LOT MORE STUFF?WHAT MID&HI DRIVERS ARE YOU PLANNING TO USE? AND SORRY BUT HOW DO WE CONVERT A CU. FT TO LITERS?ARE PRO HORN DRIVERS ROLLED OFF AT THE VERY TOP END AT AROUND 12KHZ? WILL I LOSE SOME SPARKLE AND CLARITY IN MY MUSIC? MANY PRO SET UP USE EQ TO COMPENSATE, WILL I STILL HAVE TO USE EQ? DO I ABSOLUTLEY NEED TWEETERS OF ULTRA-HIGH FREQ. SUCH AS THE 2404H TO HAVE SOME SPARK IN MY MUSIC?HERE NOW IS MY REVISED PLAN FOR DRIVER SET-UP FROM JBL, CAN YOU COMMENT IF THIS IS ALREADY A RIGHT SET-UP?18" 2242H FROM 25HZ-100HZ VIA SOLIDSTATE AMP12" 2020H FROM 100HZ-1.2KHZ VIA 22-WATT SET AMP2" 2246H FROM 1.2KHZ-12KHZ VIA 22-WATT SET AMP1" 2204H FROM 12KHZ-20KHZ VIA 22-WATT SET AMP

Subject: Re: may i know your whole box dimension?
Posted by Mike.e on Fri, 26 Dec 2003 08:36:00 GMT
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WHAT DO YOU GUYS MEAN WHEN SAYING, "TUNING AN ENCLOSURE TO SAY 30HZ?" http://www.jlaudio.com/tutorials/magic/ported.htmlARE PRO HORN DRIVERS ROLLED OFF AT THE VERY TOP END AT AROUND 12KHZ?Knowledge + Compensation circuitry + a good horn = good results to 16khz +HOW DO WE CONVERT A CU. FT TO LITERS? 28L=1 cubic foot

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Subject: Re: may i know your whole box dimension?
Posted by Adrian Mack on Fri, 26 Dec 2003 09:27:14 GMT
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Hi AdkinsThanks for the kind words. How you tune an enclosure depends on what sort it is. In a sealed box, the only thing you can vary is box volume, but in a vented box you get the port (helmholtz resonator) and the box volume too. Perhaps you would benefit from a site which explains the basics of typical box types like sealed, vented, bandpass etc. www.diysubwoofers.orgIn my towers, I'm using 15" JBL 2225H drivers for the bass/midbass sections. The midrange is covered by an Eminence Alpha 6 driver horn loaded in a conical horn flare (which I designed and built), and the HF is JBL 2370 horn flare loaded with P.Audio PA-D45 comp drivers. If you want to see pictures of all my parts, see this post http://www.audioroundtable.com/HighEfficiencySpeakers/messages/100.html on the high eff AudioRoundTable forum. My subwoofer uses an 18" 18LW1400 in a 300L vented cabinet which takes care of 20Hz and up in my room. Most horn/comp driver combo's do rolloff on the top end. Some horns self equalize (like radial horns do) in the top octave so compensation isn't always needed. However most do need some sort of compensation still. And, YES !!!! IT IS VERY, VERY IMPORTANT !!!! Go listen to some without a compensation network, AWFUL. You don't need a UHF tweeter like the 2404 though - just use a compensation circuit on the compression driver. Theres too many other problems introduced when crossing very high as well, I would prefer not to do it. I assume you meant 2446 2" compression driver, and not 2246 which doesn't exist. JBL makes some crossovers which include high frequency correction to restore response up to 16KHz, which is all you need. Some compression drivers will allow you to go 18KHz. Another great way though is to use the crossover network used in Pi Speakers, which augments the top octave by removing attenuation there compared to the rest of the circuit, so it also matches sensitivity to that of the woofer at the same time. The first few octaves are flat before the augmentation kicks in, so its just what you need. You didn't specify a horn flare for the 2446 - use the 2380 horn flare. Dont use the 2382, it rolls off way too early (+ it has too wide dispersion characteristics for home environment). Might I suggest though, since your using a 12" driver for the midrange and its capable of HF extension into many kilohertz that you use a 1" exit compression driver instead, like the JBL 2426. The 2" comp drivers don't reach into the top octave very well, their diaphrams are too big. They go lower in frequency though, so they are normally paired with 18" speakers which can't go very high. Since your 12" can go very high though, then use a 1" exit driver. You will gain more HF extension on the top end. In that case, use something like the JBL 2370A horn flare on the 2426 comp driver. I suggest you use the 2206 12" instead of the 2020. If you look at the response curve for the 2020 you'll notice that its got a fair bit of variation throughout the midrange, its a continually positive rising slope. The 2206 on the other hand is dead flat through the midrange and well into the treble region too until a bit past 2KHz. It also handles more power, has lower distortion, etc. The 15" 2226 is also really good. Good sub there, 2242. You'll need to use some EQ on this one though. JBL makes a unit which does the electronic equalization for the bottom octave I think, but the Behringer Ultra-Q Pro PEQ2200 fully adjustable parametric equalizer is also really good for the job, its US$99 (probably a lot cheaper than any JBL EQ). JBL reccomends 8ft^3 vented cabinet tuned at 25Hz for this. Set the EQ to give +6db boost at 25Hz with Q=0.67 (2 octave bandwidth). It gives a nice smooth curve when used with the 2242 in that box alignment, and has a small gentle rolloff on the low end, so once you factor in room gain the response curve is nice and flat to the lowest frequencies. Adrian

Subject: Re: may i know your whole box dimension?
Posted by Adrian Mack on Fri, 26 Dec 2003 10:20:13 GMT
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By the way, a 2206 with 2426 compression driver that I described is very much like the Profession Series 3 Pi speakers. http://www.pispeakers.com/AvailableComponents.htm#ProfessionalCheck out the other stuff there too, such as the cornerhorns, etc.

Subject: Where does the knowledge come from?
Posted by Dean Kukral on Sun, 25 Jan 2004 13:30:54 GMT
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In the post above, Mike says,Knowledge + Compensation circuitry + a good horn = good results to 16khz +How do you get the "Knowledge" to design the "Compensation Circuitry?"For example, I have ordered a pair of BMS 4592 2" compression drivers from Bill Martinelli. Say, I want to build a crossover for a speaker using this driver. (I have not studied xo's yet, so please forgive me if I spout newbee nonsense.) How do I know how to design the compensation? Suppose that I am the world's best crossover designer. How do I know what this system needs? Do I look at the specs for the drivers? Do I look at the response graph? Do I measure spl with my meter across the spectrum? Do I listen to the driver before building the crossover? Trial and error: build a crossover and tweak it by swapping components out one or two at a time?

Subject: Re: Where does the knowledge come from?
Posted by Adrian Mack on Sat, 31 Jan 2004 01:58:28 GMT
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BMS 4592 is flat right to 20KHz and needs no compensation circuitry.

Subject: Re: Where does the knowledge come from?
Posted by Dean Kukral on Sat, 31 Jan 2004 04:36:10 GMT
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Thanks, that answers the specific question, but what is the answer to the general questions? If it were not flat, how would one go about correcting it? What are the techniques?

Subject: Re: Where does the knowledge come from?
Posted by Adrian Mack on Wed, 04 Feb 2004 08:37:04 GMT
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Hi DeanThe word "compensation circuit" can mean a variety of things. It depends on what needs correcting, and there are different circuits for every type of 'correction'. Notch filters, coutour networks, parallel trap filters, etc - all are response shaping circuitry. There are others, and there's also custom ones too that can be made for a specific application. I guess electronics can correct almost anything, if that is what one wants to do. Adrian