Subject: BR + TL + FH
Posted by Ralph on Fri, 03 Sep 2004 18:24:11 GMT
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I'm looking hard at making a FR speaker and a light bulb went on. What if I use a front horn for mids and highs, a rear TL that was proper length for midbass and ported low for the very deepest bass?Ralph

Subject: Re: BR + TL + FH
Posted by robertG on Fri, 03 Sep 2004 22:29:43 GMT
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Except for the TL, reminds me of an Altec A7 (small front horn and BR for - not so low - bass).By the way, unless I don't get it, BR and TL are mutually exclusive.

Subject: Re: BR + TL + FH
Posted by Ralph on Fri, 03 Sep 2004 22:55:27 GMT
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I'm thinking of a dual horn concept. The front wave fires into a front horn as you say. The rear wave fires into a 24" pipe for ~150hz TL. The pipe volume and the port opening would also make a Helmholtz cavity so I could size the port for ~60hz. What do you think of this staggered tuning arrangement?

Subject: Re: BR + TL + FH
Posted by Martin on Fri, 03 Sep 2004 23:58:22 GMT
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Hi Ralph,I think that the problem you are going to run into is that the front horn will raise the efficiency of the driver's output and the TL (or BR) at the back will only match the driver's original efficiency. You will end up with a very weak bass output once you factor in the baffle step response and the elevated mids and highs. I think the only possibility would be to mate a short front loaded horn for the mids and highs and a longer bigger back loaded horn for the bass. You could arrange these two horns to acoustically "cross-over" at the same frequency. The design work would be a little tricky but I don't think it is impossible. I have been thinking about this type of two horn system a lot lately, I just need to find time to merge the two computer models I wrote for the front and back loaded horns to see what results I can achieve.Hope that helps,Martin

Subject: Re: BR + TL + FH
Posted by akhilesh on Sat, 04 Sep 2004 01:03:52 GMT
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Hi Ralph & Martin,Woudn't bi/tri-amping solve it? The efficiency issues I mean?thanx-akhilesh

Subject: Re: BR + TL + FH
Posted by Martin on Sat, 04 Sep 2004 11:34:45 GMT
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akhilesh,Yes, bi/tri-amping might help if it was a multi-driver speaker. But in the single driver speaker concept I am not sure how it would be done. I guess the other option is to put a severe shaping filter in the system to blend the bass with the mids and highs but that seems to be taboo for most single driver users.Martin

Subject: Re: BR + TL + FH
Posted by akhilesh on Sat, 04 Sep 2004 17:34:20 GMT
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HI Martin,DUH! Sorry, I didn't read the post carefully, I thought it was for a multi way speaker. Yeah, for a single driver, i guess there is no way that I can think of. A shaping filter is a good consideration, as we have discussed before.thanx-akhilesh

Subject: Re: BR + TL + FH
Posted by robertG on Sun, 05 Sep 2004 00:09:48 GMT
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This require some thoughts! At first, I would beleive that the setup would be high-mid heavy. Did you try to model it in sim software?Would it be superior to a FH + BH setup? In my experience, a back horn will "boost" output from probably 50Hz all the way to 300 Hz, which might be all you need. On the other hand, your idea would probably yield to a smaller (and easier to design) and more convenient (as in WAF) package... Hum...

Subject: Re: BR + TL + FH

Posted by roncla on Sun, 05 Sep 2004 00:28:14 GMT
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All depends on the FR curve of the driver and what boost in what range you are looking for. I am working on a FLH/BLH at the moment using the Fe-206e. But if you look at the rising response of the 206e(typical of low Qts full range drivers) you will see it needs boost in the lows and mids to bring it up to the higher response level of the higher frequencies.If a driver had near a totally flat FR curve and just needed a boost in the lower frequencies then you have to design around that requirement.The trick is getting close to equal loading(not physically possible to get equal) and making the mechanical XO blend and getting the correct range and amount of boost needed. This could all be solved with multiple drivers in seperate cabs with bi or tri amping.....but whats the fun in that?ron

Subject: Acoustic versus electrical shaping?
Posted by akhilesh on Sun, 05 Sep 2004 12:16:07 GMT
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Hi MArtin,I read the posts here again, this time a little more carefully. Do you think that the system will sound different with an electric circuit doing the frequency shaping, versus the back loaded horn?The only differences I can see are:1. The horn will actually amplify frequencies as opposed to suppressing them2. The efficiency of the system will be higher. With solid state amps, would that be an issue? thanx-akhilesh

Subject: Re: BR + TL + FH
Posted by Ralph on Sun, 05 Sep 2004 14:52:18 GMT
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Thanks for your input, Martin. A dual horn might be the best bet.However, on a purely technical standpoint, do you think a speaker can be made that uses Helmholtz and pipe organ resonation, both and at the same time? Rear horns are so large and I hoped to make a smaller box.Thanks,Ralph

Subject: Re: BR + TL + FH
Posted by Oberon on Sun, 05 Sep 2004 15:05:14 GMT
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Please keep us posted on your computer program!

Subject: Re: BR + TL + FH
Posted by Ralph on Sun, 05 Sep 2004 15:09:54 GMT
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What size is your horn? It sounds promising if not too big.

Subject: Re: BR + TL + FH
Posted by Ralph on Sun, 05 Sep 2004 15:12:12 GMT
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I would rather have a dual horn but size is the reason I am thinking about other alternatives.Ralph

Subject: Re: BR + TL + FH
Posted by Oberon on Sun, 05 Sep 2004 15:16:48 GMT
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Has there ever been a full range speaker with dual voice coils? That would be one way to biamp.

Subject: Re: BR + TL + FH
Posted by roncla on Sun, 05 Sep 2004 15:30:43 GMT
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Small horn huh? Well the basic laws of physics are kinda not with you for a bass horn.I have tried small horns and just wasent satisfied. As Vb goes up then efficency goes up. The basic dimensions are on page 1 of this link. Just make the height dim 63". The rest are very close. I havent finished the complete dwg for this horn as it took me around 6 months to design and finalize and test my last design.Its a complicated design and will demand a higher level of woodworking skills.ron

http://www.ampchipdiy.com/phpBB2/viewtopic.php?t=405&start=10&sid=c943992e5f8958a4889ff8103b60f809

Subject: Re: BR + TL + FH
Posted by Merrill on Sun, 05 Sep 2004 16:24:50 GMT

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What are you up to, Martin?(your work on FR QW pipes is appreciated greatly;this look at FR horns is good news indeed!)Merrill

Subject: Re: BR + TL + FH
Posted by Ralph on Sun, 05 Sep 2004 16:31:49 GMT
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I understand and agree. I would love to make a full sized horn but can't spare the space. Your horn looks like it must be very good, very good indeed. It looks like it is about 5ft tall and 1ft wide. I am very impressed and hope you will continue to report back on it.All the best,Ralph

Subject: Re: BR + TL + FH
Posted by Oberon on Sun, 05 Sep 2004 17:06:35 GMT
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Excellent work Ron! Please keep us informed of your progress.

Subject: Re: BR + TL + FH
Posted by Martin on Sun, 05 Sep 2004 23:11:50 GMT
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I have no idea, not in my limited experience.

Subject: Re: Acoustic versus electrical shaping?
Posted by Martin on Sun, 05 Sep 2004 23:16:50 GMT
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akhilesh,I use electric filters in my speaker systems because they do not perform well without them. I do not feel that a filter degrades the sound any, so I guess one could be used on a horn if required. I am still new to horns and have not spnet much time building, testing, or listening to one. For me, a SS amp allows an easy implementation of a filter because the efficiency of the

speaker is not critical, there is plenty of power. I am not sure I know how else to answer your questions.Martin

Subject: Re: BR + TL + FH
Posted by Martin on Sun, 05 Sep 2004 23:21:46 GMT
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Ralph,I really do not know the answer to your question. In most cases you are looking to maximize the bass output to balance the mid and high end. You can use a back loaded horn to offset the baffle step but as you say the size becomes an issue. I don't see any easy way to get the volume of bass required to run a speaker system without a BSC circuit without it becoming very large like a back loaded horn. Bass reflex, TL's, TQWT's and closed boxes do not seem to produce this type of bass volume.Martin

Subject: Re: BR + TL + FH
Posted by Martin on Sun, 05 Sep 2004 23:23:32 GMT
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The best way to remain current on what I am working on and posting to my site is to add your name to the mailing list. I generally do not announce additons to my site on any of the forums figuring the really interested people are on the mailing list.Martin

Subject: Re: BR + TL + FH
Posted by Martin on Sun, 05 Sep 2004 23:29:05 GMT
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Hi Merrill,Thanks for the positive feedback on my site.A few weeks ago I posted my first pass analysis of horn loaded (front and back) loudspeakers on my site. This si a first cut and I will be visiting several areas of horn design in more detail this winter. Horns have me fascinated and I hope to be able to look at things a little bit different from the way it has been done in the past.After posting the horn articles, I took a slight detour to finish upgrading my closed and ported box worksheets to be 3D, standing waves in all three directions in the enclosure. This is almost done and I am going to write a short document on the impact of different standing waves on the system performance, this includes a look at the golden ratio design method.Oh, at some point this winter I want to build another Lowther based speaker system.Keeping busy,Martin

Subject: Re: BR + TL + FH
Posted by Oberon on Sun, 05 Sep 2004 23:29:34 GMT
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Thanks!

Subject: Re: BR + TL + FH
Posted by Oberon on Sun, 05 Sep 2004 23:31:01 GMT
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Just a thought!

Subject: Re: Acoustic versus electrical shaping?
Posted by akhilesh on Mon, 06 Sep 2004 11:39:54 GMT
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HI Martin,I guess the point I was raising (and we have all discussed it before but I thought it may be worthwhile bringning it up again) is:Given a low Q , high eff driver with a rising frequency response (the usual candidate for a full range single driver speaker), one can either:boost the lower frequencies using a horn, orlower the rising frequencies using an electrical circuitThe former will lead to higher efficiency, but the latter will lead to cheaper construction (by far), ability to adapt parameter values and tailor to different rooms, and can even lead to multiple frequency spectra contouring. It will of course lead to lower efficiency. If one is using a decent power amp, it should be OK. I know you have favored the latter approach, and to some extent, my home brew is a mix between the latter & the former (I don;t use a horn but a traditional BR, with a subtle step circuit). The eff is around 95 db for me. I just thought anyone who has not read our earlier posts on this may find this useful to know.thanx-akhilesh

Subject: Re: Acoustic versus electrical shaping?
Posted by Martin on Mon, 06 Sep 2004 21:32:56 GMT
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akhilesh,Very nice summary! I think that you have stated the trade-offs and compromises involved accurately.Martin