Subject: Wayne, compensation question please
Posted by ToFo on Wed, 13 Nov 2002 05:58:30 GMT
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Hi Wayne,When making my Theater 4's I had trouble getting CH-3's and didn't want the smaller horn for aesthetic reasons, so I ended up with a 2370 horn. I recall it came up once that it is fine in this speaker but may be a little "splashy". You were right about that, and that it's subtle, but I would like to tame that a bit. I have since acquired the CH-3, but there is still something about that 2370 that I can't do without. I really like it's sound in the low thousands.When compared to CH-3 it seems that it needs less compensation and maybe at a little higher frequency. Actually, my suspicion from looking at JBL's data, is that the slot loaded part makes the 2370 look more like a shelved response, not falling. JBL shows response is roughly flat to 5.5K then drops 4dB, then it is flat to 15K. So when you add the sloped reponse of the cap is this what makes it "splashy"? I have noticed that with PSD 2002 (as opposed to the JBL used for their data) it still falls a little over the top two octaves, but not as quick as on a CH-3. So it still needs a sloped compensation.My first thought is to try a .33mF bypass on the pad. I know this will make the comp happen higher. In relation to the rest of the HF band, if the comp happens "later" is it also reduced in level due to it's "knee" being further out of band? Also, say I used an LF driver that is more sensitive. (delta pro for instance) This forces me to use less HF padding. would this reduce the effect of the cap without having to raise the frequency of compensation? Would this have the overall effect of making the compensation curve seem shallower, or would it just seem to have moved up in frequency? I think I need shallower compensation, but I dont want it to start too late. I see the comp cap as a first order rising response, but I know it behaves differently as part of the system. I do not have a good handle on all this yet. what is the best approach for a 2370?Thanks for putting up with us can't leave well enough aloner's,Thomas

Subject: Re: Wayne, compensation question please
Posted by Wayne Parham on Wed, 13 Nov 2002 06:17:36 GMT
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You've assessed the situation pretty accurately - The Peavey CH-3 has a little less in the bottom octave than the 2370. But they're really more similar than you might expect, particularly if a person uses them above 1.6kHz. For the octave below that, the slightly larger size of the 2370 gives a bit more energy and prevents it from being as peaky as smaller horns.One thing that differentiates the 2370 from the horns I like to use is that it's the only one with a secondary acoustic device in addition to the horn flare. The 2370 has a diffraction slot to increase horizontal dispersion at the highest frequencies. It creates wider dispersion at the expense of an added internal reflection, which causes a slight bit of impedance and response ripple. That's the cause of its "splashy" sound.

Subject: Re: Wayne, compensation question please
Posted by ToFo on Wed, 13 Nov 2002 08:26:39 GMT
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Wayne,I dug up an old E-Mail from you about this.You wrote "The 2370 will sound a bit more "splashy" because of the diffraction slot in its throat. But overall character is very much the same."Good call! You nailed that one.I should have remembered that, It took me a few weeks to really listen and see that this is exactly what it is that bugs me about them. I agree that it is not a big deal, and for most people it would be too small an issue to bother with. If I leave it alone this is still the best set of speaks I've ever had by far.If I just wanted to be obsessive, what might I do to tame it a bit? Can it be done by a change of value in the existing compensation circuit? I think I might get some smaller caps to see what happens. Is that a viable plan for this? Or will it just push my top octave down too far?I know I am splitting hairs at this point, and I really appreciate all of your help on this. Thanks,Thomas

Subject: Re: Wayne, compensation question please
Posted by bqc on Wed, 13 Nov 2002 13:46:13 GMT
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The vertical line in the JBL 2426 response graph after the 10KHz markis that a 15K or 20K mark? If you look at the 1K mark, the nextmarker is 2K. Usually that means that the next marker after the 10Kshould be 20K. Wayne how do read the 2426 frequenc response graph?is it flat to 20K or just 15 KHz ?

Subject: Re: Wayne, compensation question please
Posted by Wayne Parham on Wed, 13 Nov 2002 17:17:38 GMT
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Some CD horns of this size are better canidates than others. They all have a pretty similar overall curve, but each has its own particular "signature," and it's small peaks and valleys are in different places. Again, the reason for the "splash" is a ~7kHz peak in the 2370 from the diffraction slot in its throat. It causes an internal reflection that makes ripples in the impedance and response. You'll see this in Manta Ray and BiRadial horns, and it's there to increase dispersion. Pretty much any horn with sharp edges does this. Those edges are there for pattern control but their disadvantage is they cause internal reflections, impedance and response peaks.The deal with passive compensation is your ability to tailor the curve is somewhat limited. For example, when attenuation requirements are low, that also necessarily means that top octave augmentation ability is also low. You could add notch filters to the RC filter/damper I've employed, but I prefer to keep it simple. There are some limits to this approach, but the horns discussed on this forum are

horns that wouldn't benefit by some amount of this technique.If you need a lot of augmentation and a little attenuation, your passive network design choices are generally limited. Likewise, if you need attenuation but the augmentation slope deviates from diagonal too much, then your choices are also limited. But really, when used above the frequency where a horn becomes well loaded, it will generally be flat for a while and then enter a couple of octaves of smooth rolloff at a

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Subject: Re: Wayne, compensation question please
Posted by Wayne Parham on Wed, 13 Nov 2002 17:20:48 GMT
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The upper cutoff of a horn is determined by the compression driver used. Most modern ones are

16kHz-18kHz with just about all the current production compression drivers, some a little higher than that.

Subject: Thanks!
Posted by ToFo on Wed, 13 Nov 2002 17:25:41 GMT
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Subject: tweaking to suit
Posted by Sam P. on Thu, 14 Nov 2002 16:04:23 GMT
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Tom, Not to second guess Wayne, but sometimes "you just have to fly by instinct". I feel the altec 511's also exhibit that shelved response, which subjectively sounds slightly "hot" when combined with the nominal attenuator bypass HF augmentation. Try that 0.33uF cap first. Maybe even .2uF. Also, you may have noted that the ONLY difference between a "PI" approved 10dB and 12dB pad is simply the value of R1 specified. You could try adding 1, 2, or more ohms of additional series resistance to drop the HF level some, to perhaps better suit your room/system/ears. Samoops, you can also "split" the R1 resistance, and only bypass a portion of it, if you really want to tweak it to death:)

Subject: now thats what I call timing.
Posted by ToFo on Thu, 14 Nov 2002 16:49:04 GMT
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You must have wrote that while I was listening to my new pad value. You have hit on some other stuff I didn't think of as well. How does that partial bypass work? Say I have three 47 ohm mills in a stack, I put one of the resistors in series with the cap so the bypass only happens to two of them? I think I get it. Cool! (and let me know if Im wrong)Thanks Sam,Thomas

Subject: revisus stupidus
Posted by ToFo on Thu, 14 Nov 2002 17:21:06 GMT
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Upon thinking (I do that sometimes) It occurs to me that 47 ohms in series with my bypass cap is not such a good idea. I am dumb on this one. Could I just undervalue the stack by a small amount and add it in series with the cap, say 4 ohms to start with? hmmm. does this do anything weird to the crossover? I dunno, damping or something?Thomas

Subject: Spice
Posted by Wayne Parham on Thu, 14 Nov 2002 17:29:14 GMT
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Try the circuit in Spice. It's easy to do, since the model is already there and all you have to do is modify the values. That will show you the exact response you can expect from the circuit.

Subject: Re: now thats what I call timing.
Posted by Sam P. on Thu, 14 Nov 2002 18:09:36 GMT
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You used the THREE mills in parallel, for the 16 ohm R1 value. right? The only way partial

bypass can work is when you build R1 using, say TWO 8 ohm resistors IN SERIES to achieve 16 ohms. Then you can bypass just half the R1 resistance if desired. With a 12dB "PI" pad I've also tried using THREE 8 ohm resistors in SERIES to build R1, then you can bypass 1/3, 2/3. or all 24ohms with a variety of caps, for finer tuning. Won't take long to determine which one provides the best results with the largest percentage of your recordings. I figure that at least 10 or 20% of all CD's are too damn bright/sybilant with many systems anyway. A slight lack of high end extension is one heck of a lot easier to live with during extended listening than slightly hot, sybilant highs, so I tend to "ear tune" for a little more laid back overall sound. While you are playing with the 10/12dB pad, trying ANY value between 16 and 25 ohms for R1 is within reason as a means of level adjustment. If 16 is too hot, 25 too cold...ha, maybe 20 ohms will be perfect for you! This is the DIY part where YOU are the number one customer that must be pleased. BTW, ratshack sells a 25 ohm rheostat you might try using as R1 for finding the rough value needed, then install the closest Mills value available. Whatever you try, don't make more than one, easily reversed modification at a time. And leave well enough alone between tweaks, giving you ears time to acclimate to the "new" sound of each tweak. Try listening to your handiwork FIRST THING in the morning. Sam

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Subject: thanks!
Posted by ToFo on Thu, 14 Nov 2002 21:40:34 GMT
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