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Subject: Re: Compression Drivers

Posted by [Wayne Parham](#) on Mon, 12 Nov 2012 07:17:51 GMT

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I see tank circuits in a variety of loudspeakers, but I see them most often used with CD horns and waveguides. Conical horns are usually peaky if truncated at all, and all CD horns and waveguides share a common heritage with conical horns. So it is natural to conjugate these peaks with (notch filter) tank circuits. The problem is as driver characteristics change, either from unit-to-unit variation or even from thermal drift, the tank circuit required would need to change too. That's why I prefer resistive dampers to reactive dampers (notch filters) in this case.

There are a lot of horn/waveguide products on the market that are highly reactive in their passbands. An example of a horn like this is the SEOS12. It is more a curved baffle than a horn, pretty much just a dimple on the baffle. At 3.5" long, it's barely long enough to even hit the primary resonant mode at its ~1kHz crossover point. So it provides very little acoustic loading for the first octave and is reactive high into the passband.

A conical horn and most of the waveguide derivatives load the driver poorly, and the ratio of mouth area to depth is all it has to set the load. As with all things, there are competing priorities here. A 90° wall angle sets the depth accordingly, but then to add a secondary flare to combat waistbanding decreases depth or increases mouth size, whichever way you want to look at it. That's why the SEOS horns are so reactive. Lots of other waveguides suffer this problem too, to tell the truth.

Conventional wisdom says larger mouths smooth ripple, but this is only true when the mouth is undersized. One can go too far with this, and actually make the mouth too large. That will increase ripple too. A horn is reactive not only when the mouth is too small, but also if it is too short. The former problem is usually the case with basshorns, because mouth area requirements are prohibitively large. But the latter problem is sometimes seen in tweeters, especially in the newer waveguides that may not have been analyzed for acoustic loading.

In any case, I personally find it better to not try and chase down a horn with peaks using tank circuits. It's like trying to push an air balloon under water with a pole. I much prefer the R1/R2/C1 method, which I developed after years of working with these kinds of speakers. The speaker document I referenced above was sort of a treatise on the various strategies I had used over the years, and it sort of builds up to the solution I use today.