Subject: Re: 4 pi with alternate compression drivers
Posted by Wayne Parham on Thu, 20 Jan 2011 17:55:57 GMT
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I don't know if you can use Radian 475 compression drivers, I haven't tried them. But my experience with 1" exit compression drivers is their differences fall largely in two categories: 1. Voltage sensitivity and 2. Breakup modes in the top octave. There are technically other things that can be different, like diaphragm mass and front chamber and phase plug differences. But these two things seem to be pretty much the same between modern compression drivers, with notable exception being beryllium diaphragms having a slight edge in terms of mass rolloff.

Digging a little deeper, the differences in breakup and voltage sensitivity are diaphragm/voice coil dependent. A lower impedance gives higher voltage sensitivity, so you may need to adjust R1/R2 values. You can see this in the two drivers I use - the PSD2002 has slightly lower voltage sensitivity than the DE250 and so R1/R2 values pad it more. Titanium diaphragms tend to have some peaking in the top octave, which sometimes makes them "look" like they don't have as much mass rolloff. You gain some extra sparkle at the top end but at the expense of having a little more jagged response.

Sometimes, reducing the value of C1 or removing it entirely is warranted if the breakup peaks are strong. I've even seen a few cases where shunt capacitance (across the driver) was needed, which is why there is a position called "C1-alt" on my crossover boards. It provides a place to put shunt capacitance in place of bypass capacitance. It reduces top octave output rather than augmenting it. So you can manipulate the R1/R2/C1 (or C1-alt) values to support just about any compression driver.

As an aside, this crossover topology has proven to support just about any compression driver on a constant directivity horn. It has been adopted on virtually every CD horn/waveguide speaker out there. I've even seen it used on some horns that don't provide constant directivity, which clearly wasn't its purpose, but the ease of manipulating the R1/R2/C1 values to suit any transfer function desired makes it a pretty attractive choice. However, I must say that while you can use it to tailor the transfer function to provide reasonable response from a compression driver with a lot of breakup, I myself would suggest selecting another driver. If a driver has too much peaking up high, it sounds fatiguing to me even if the crossover is configured to make the response fairly flat. So keep that in mind when selecting compression drivers.

A quick look at the Radian 475 spec sheet leads me to believe it doesn't have shrill breakup, and probably will work very well as a drop-in replacement. So don't take my comments about breakup to be directed at that driver specifically. It is more a general observation on various drivers, and I mention it mostly for other readers that might be contemplating other compression drivers.