Posted by Wayne Parham on Wed, 08 Jul 2009 21:46:46 GMT
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I've been working with the TD12S woofer for a week now and I have some preliminary test data to report.

In short, the woofer looks good. Not only is it well constructed, it also measures and sounds good. Looks very nice too, a high quality part.

couldn't ask for better electro-mechanical parameters. I haven't done high power testing yet so I don't know how much drift there is at higher temperatures, but my expectation is that drift will be lower than normal due to the attention AE has paid to thermal performance. They use aluminum

noticed though that impressed me right away is the T/S specs are pretty close to what's quoted, right out of the box. Most woofers aren't.

The impedance curve is just like AE shows, smooth and flat up to the stratosphere. It doesn't rise until tweeter territory. From that, I knew to expect the Zobel would be reduced if even needed. Turned out, you just throw the Zobel away. That was weird for me, all woofers need conjugate filters, so I sort of wanted to leave it in place with a smaller capacitor. But you just don't need it, and it really shouldn't be there. The impedance is flat through the crossover band and well above it. So ditch the Zobel. It's a waste of money and response is improved without it when using this woofer.

The tweeter high-pass filter is the same as other models, third-order with mass-rolloff compensation but the woofer low-pass filter needs to be second-order. In fact, the crossover needed is almost exactly like what we were using in the 1990's and early 2000's. So if you have

work right out of the box. Just toss the Zobel.

Naah, if you're going to splurge and get the new good woofer, swap out the crossover too. Get the new PCB and populate it with 15 guage coils and other good parts.

Anyway, here are the components you'll want:

B&C DE250 tweeter (note reverse tweeter leads, black to positive)
AE TD12S woofer (red to positive)

* tweeter crossover
C2 6.8uF
L1 1.0mH
C3 20uF

* tweeter compensation

C1 0.47uF

* woofer crossover
L2 1.5mH
C4 20.0uF
L3 (jumper wire)

No Zobel, so nothing in positions R3 or C5

Here's a little video I did that shows some of my tests, and where the vertical nulls are on this model with the crossover described above:
Vertical NullsWatch the response curve on the laptop computer, lower right of the video. The S&L measurement system is sending a series of bursts to the speakers, and the microphone captures the signal. When the microphone is positioned anywhere between the vertical nulls, the response curve is basically flat. (Unless I'm talking, of course)

When I move the microphone to the bottom edge of the speaker, you'll see a notch form in the response curve. That is the lower null. Later, I move the microphone to a position beyond the top edge of the speaker. Watch the response curve as I move the microphone, you'll see it remains flat until I reach the upper null, where a dip again forms.

You might also notice that when I moved the microphone to show the lower null, I moved it just a smidge too far - just past the deepest part of the null. But you can still clearly see the upper and lower nulls, and the smoothness of response in between. Pay attention to the response curve as I move the microphone, you'll see it stays nice and smooth all the way between nulls, over a wide vertical range.

I also want to do some distortion measurements, just to compare the TD woofer with JBL 22xx woofers. Both are really nice, and I think we have a winner either way. But I'd like to see how these two family of woofers stack up in terms of harmonic distortion, because that is an indirect measurement of motor linearity.

More to come...