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Subject: Re: LSAF 2008 - Show Coverage, Seminar Recordings, Slideshows and Handouts

Posted by [Wayne Parham](#) on Fri, 09 May 2008 17:19:15 GMT

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Don't leave out Skip Pack and Bob Brines. They generally have very good sounding systems. I regret that I didn't get a chance to stop by and listen. Too much to do! About Duke's speakers, I was able to listen briefly and what I heard sounded very good. The source material may have been responsible for a perceived "boominess" when you were there. Or maybe it was the room, I don't know. But I thought it sounded great in his room when I was there. To be honest, there is very little difference between our design philosophies. We're both concerned with creating a uniform reverberent field, and we both use constant or uniformly collapsing directivity to accomplish it. Our speakers are DI matched at the crossover point, as are other similar designs like Geddes Summa loudspeakers. I remember when I first heard the Summas in Duke's room at

nearly identical. They're DI matched two-way speakers with a constant directivity horn for the tweeter, using similar components for woofer and tweeter and similar crossover topologies. So naturally they would sound very much alike. Later, when Duke started making his Jazz Modules, he stuck with that design approach. There is only one significant difference, in my opinion. Duke LeJeune and Earl Geddes both use round horns with a symmetrical 90° radiation pattern, and I use rectangular horns with a 90°x40° pattern.

The woofers in each speaker radiate omnidirectionally at bass frequencies, but the pattern begins to narrow into a cone shape in the midrange. Where the woofer pattern matches the horn, that's where crossover is done. In Duke's and Earl's speakers having round horns, the pattern remains a constant cone shape above that point, up to about 10kHz where it narrows to the compression driver exit angle. There are also lobes that appear in the crossover region above and below the speaker, off-axis in the vertical plane.

continues to collapse. The horizontal radiation angle is matched at 90° at the crossover point and remains constant above that point, but the vertical angle narrows to 40°, right where the lobes fall. In my design, the vertical pattern remains narrow from the crossover point up, actually taking advantage of those lobes.

I personally prefer this approach for two reasons. First, the narrower vertical pattern reduces ceiling and floor reflections. As I demonstrated at LSAF, if you clap your hands you can hear the HF ringing from reflections off the ceiling, and that's something I try to avoid by narrowing the vertical pattern at high frequencies. The second has to do with the vertical off-axis lobes I mentioned above, symptomatic of all DI matched loudspeakers like this. The position of the drivers on the baffle determines the angles where lobes fall, and this sets a maximum vertical angle for uniform response. My speakers have HF horns with vertical angle less than this, to avoid ripples in vertical off-axis response. The tweeter horn would not have pattern control in the vertical plane at this low frequency because it is too small. So these lobes actually help set the vertical pattern around the crossover frequency, and above that, the HF horn provides control.

I use a similar approach on my cornerhorns too, but instead of matching DI from a woofer with collapsing directivity, each subsystem has equally matched directivity throughout the band. This has the advantage of being more uniform since directivity doesn't change, and also has reduced IMD by virtue of reduced bandwidth through each subsystem, i.e. three-way verses two-way. Of course, room modes shape the bass energies in the room, but if the opposite walls were anechoic, directionality would be truly constant through the entire band. Since no room is anechoic at low frequencies, another improvement one can make is to use multiple subs. Add subs, not just to extend the response but more importantly to smooth room modes. And that brings me to a second difference that Duke included in his Dream Maker design. I think this is a great idea. Each speaker uses a second rear-facing woofer. This woofer is located in a different position in 3D space, which helps to smooth floor bounce and room modes. It works like a 2.5 way speaker or like having a subwoofer placed right beside or behind your mains, and located also at a different height. In my opinion, this is the most effective way to smooth bass modes caused by standing waves in the room. It increases the number of bass sound sources, puts them in different points in 3D space, yet maintains symmetry and physical nearness to the mains so that the apparent source is the same. The woofers are far enough apart to average the bass nodes, certainly enough to fill in the floor bounce that would otherwise exist having a midwoofer placed at ear level. Yet they're close enough together to prevent any summing or localization problems. Just from looking at the setup, I think it is a very good layout and I'd like to see measurements of it. I usually recommend to people installing subs that they model their rooms with CARA, and to try to achieve a room layout something like this. I suggest finding symmetrical arrangements that smooth room modes by putting the woofers in different places in 3D space, but physically close to the mains. This is built-in to the Dream Maker design.

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