Finalist Monitor

Main / Design Goals

I have Mark and the gang at Meniscus to thank for the idea and support for the Finalist Monitor design. Use the same drivers as the Finalist design, but leave off the woofer for a smaller, more personally sized design suitable for surrounds, desktop speakers, or anywhere a small speaker with good sound is required. Per Marks suggestion, we utilized the NE149-08 Eight ohm driver this time to make it amp friendly. And of course the ubiquitous RS28F tweeter.

Major specifications

A 2 way vented design with the Dayton RS28F fabric dome tweeter, and the Vifa NE149W-08 reed paper cone neodymium driver housed in an conventional vented enclosure

Nominal Impedance: I'll call this one 8 ohms as the impedance curve flirts with, but never quite reaches 5 ohms at any frequency, and spends as much of its time above 8 ohms as it does below. The impedance is above 10 ohms below 120 Hz. The minima are 5.5 ohms at 200 Hz, and again dips briefly to 4 ohms between 2500 and 3000 Hz, but then increases to above 8 ohms at higher frequencies. The worst amplifier load is 4 ohms and -20 degrees at 2500 Hz. This suggests an easy load for any reputable 6 ohm rated amplifier.

Dimensions: external: 8.5" wide, 12.5" tall, 10.0" deep

Basic Sensitivity: Approximately 84 dB / 2.83v / 1 meter

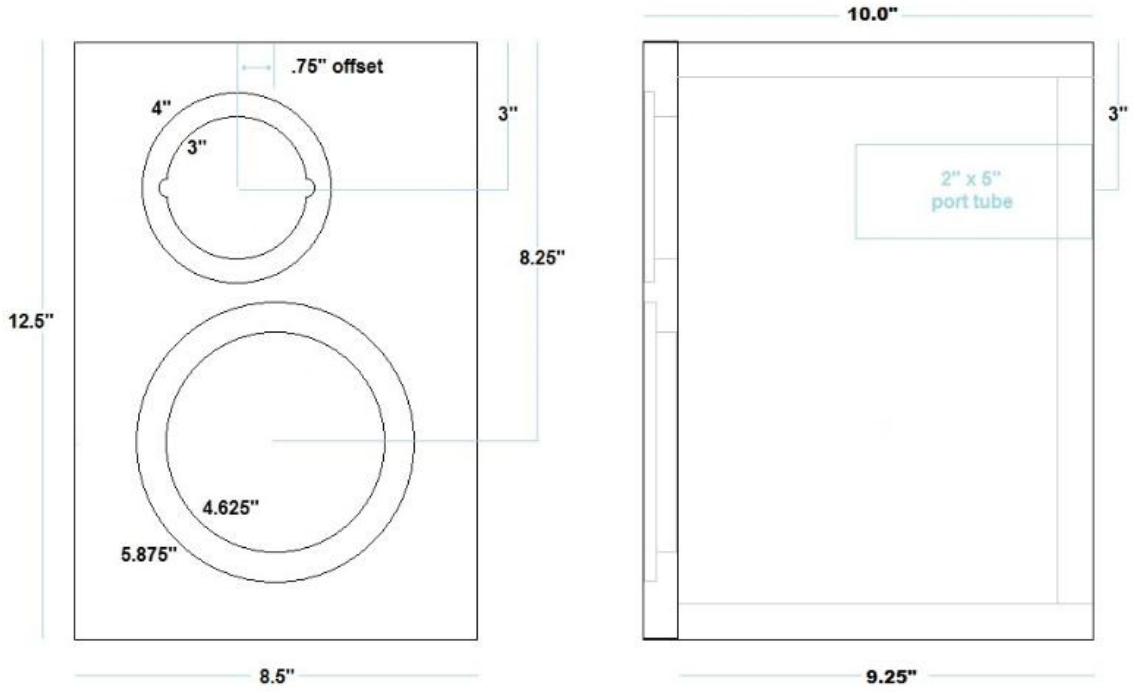
Max SPL: (Modeled at woofer published Xmax) 102 dB / 1meter

Driver Selection

The NE149-08 was chosen based on feedback from Finalist owners that have compared it favorably to its high end siblings from Scan-Speak. Like the Finalists, the Dayton RS28F tweeter was also chosen. The Dayton driver is a proven performer whose sound quality far exceeds its price point.

Enclosure Design

Nothing magic here. The small size suggests internal bracing is not required. While this enclosure is just under 11 liters, any 1/2 cubic foot enclosure with similar front baffle dimensions would be appropriate. The port is a simple cardboard or PVC tube. The enclosure is mostly filled with 6 to 8 oz. of polyfill to help ameliorate the standing waves generated in a small rectangular enclosure. Although its not shown on the drawing, I recommend a round over or chamfer on the front baffle edges.



Cut List:			
Based on .75" thick MDF		Front:	12.5" x 8.5"
Port:	2" x 5"	Sides:	12.5" x 8.75"
Stuffing:	6-8 oz polyfill per enclosure	Top/Bottom:	7" x 8.75"
		Rear:	11" x 7"

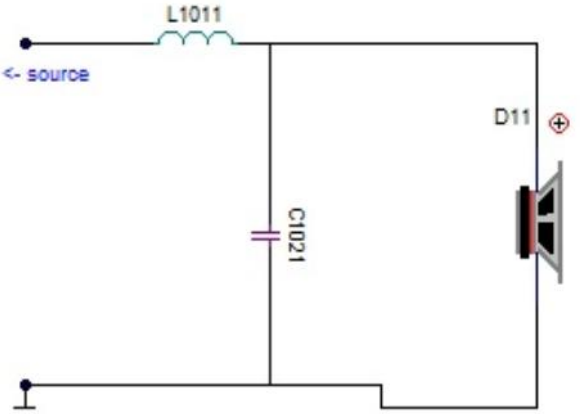
Crossover Design:

It doesn't get much simpler than this: Second order HP and LP sections and 1 attenuation resistor. I let the drivers choose the crossover point, and they went low, taking advantage of the RS28F's excellent capabilities in that area. This also led to the simple crossover topology. I used a steel laminate inductor for the woofer, but the tweeter inductor can be any 18 to 20 ga. air core. Note the tweeter is connected in normal polarity with respect to the woofer.

Net 1

L1011 3.000 mH

C1021 30.00 uF



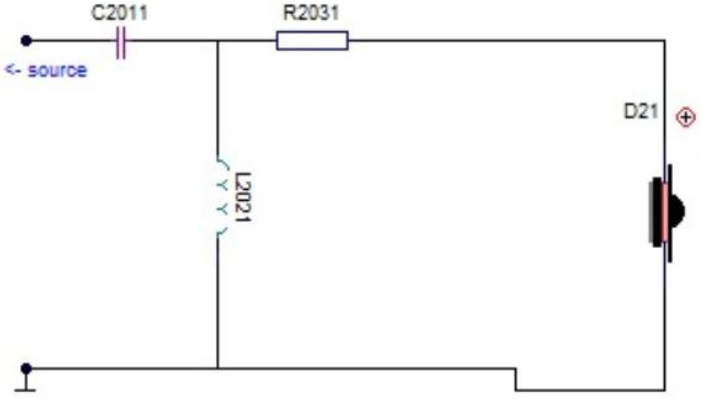
Driver unit 1 (D11)
SPL data file : F:\...\NE149frd112115.frd
Impedance data file : F:\...\NE149zma2inPort112215.zma

Net 2

C2011 10.00 uF

L2021 0.400 mH

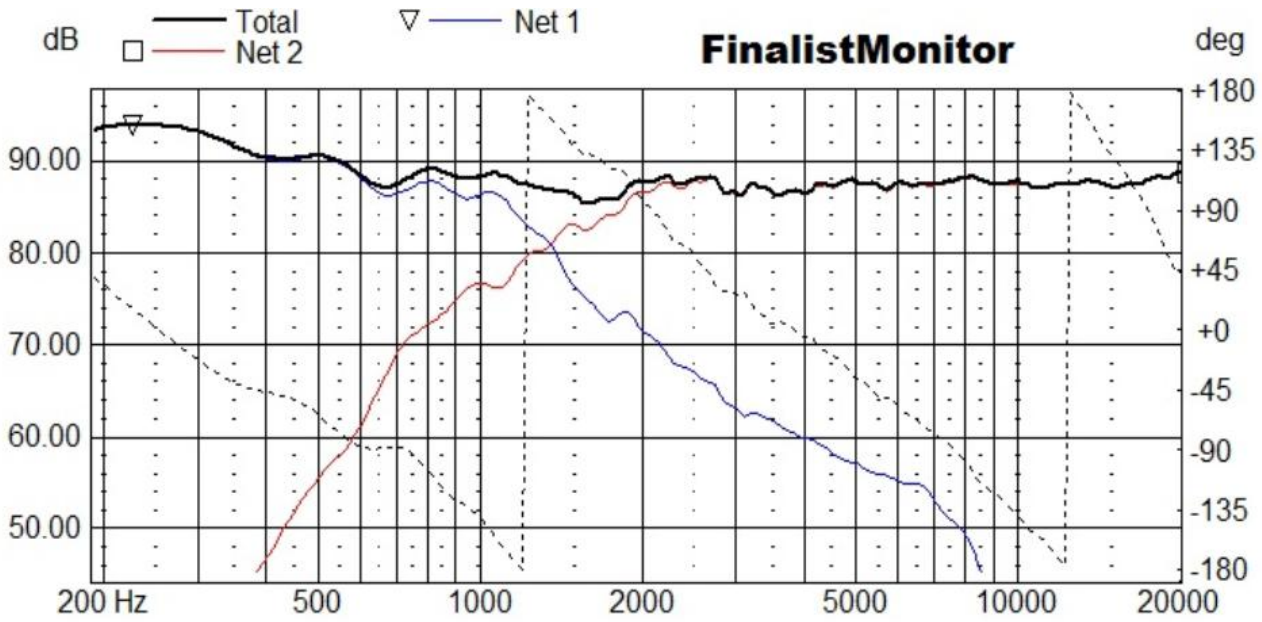
R2031 4.70 ohm



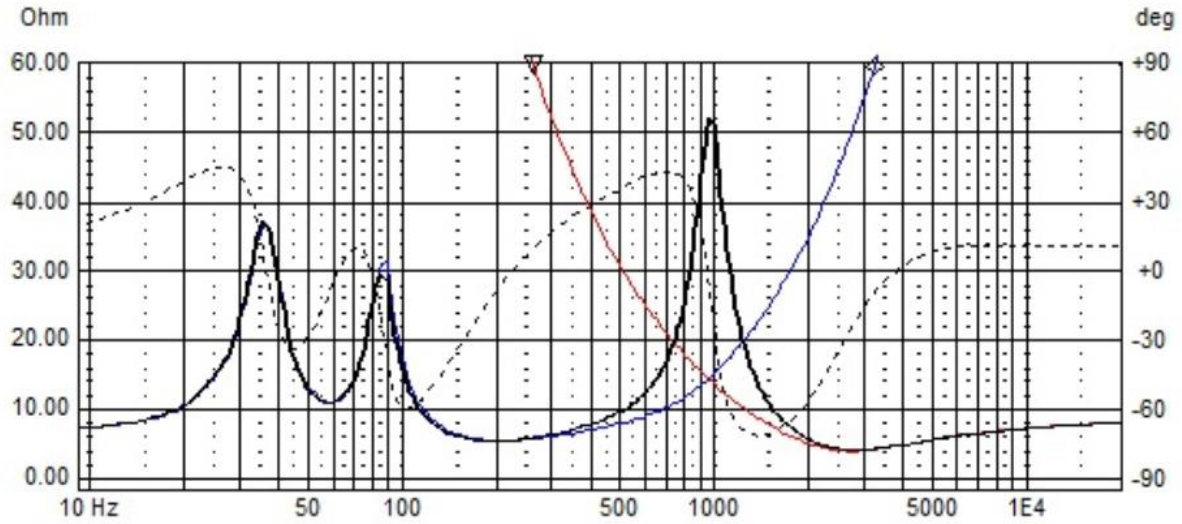
Driver unit 1 (D21)
SPL data file : F:\...\RS28Ffrd112115.frd
Impedance data file : F:\...\RS28Fzma112115.zma

Measurements:

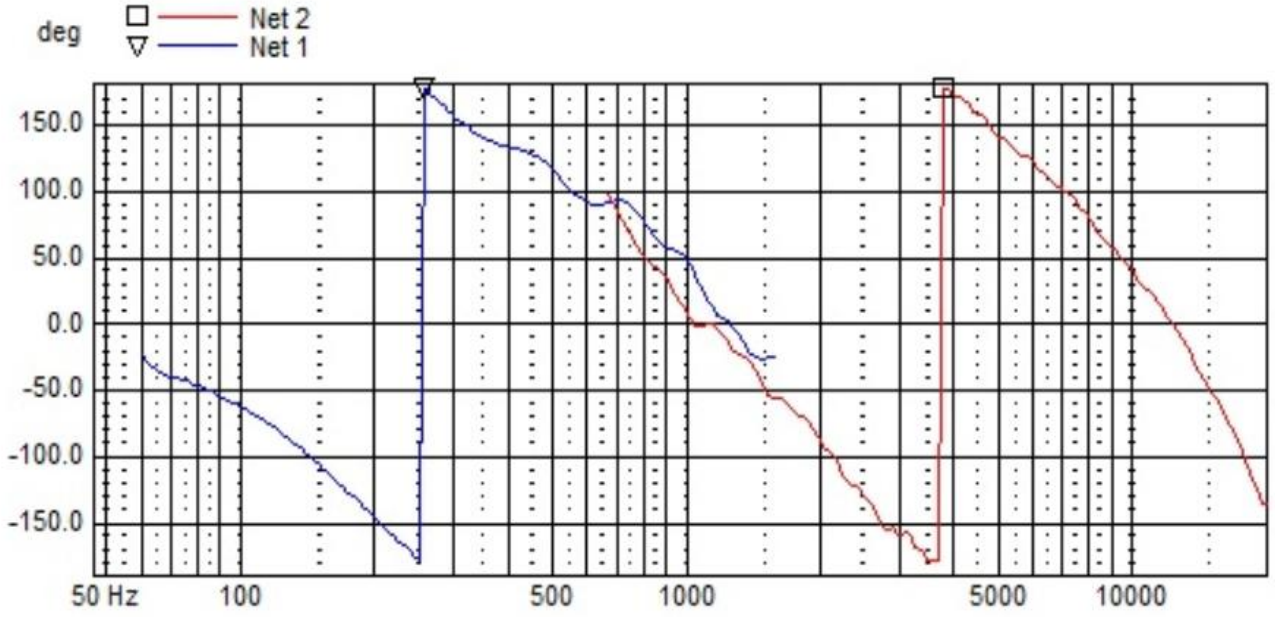
The Finalist Monitors exhibit reasonably flat modeled response.



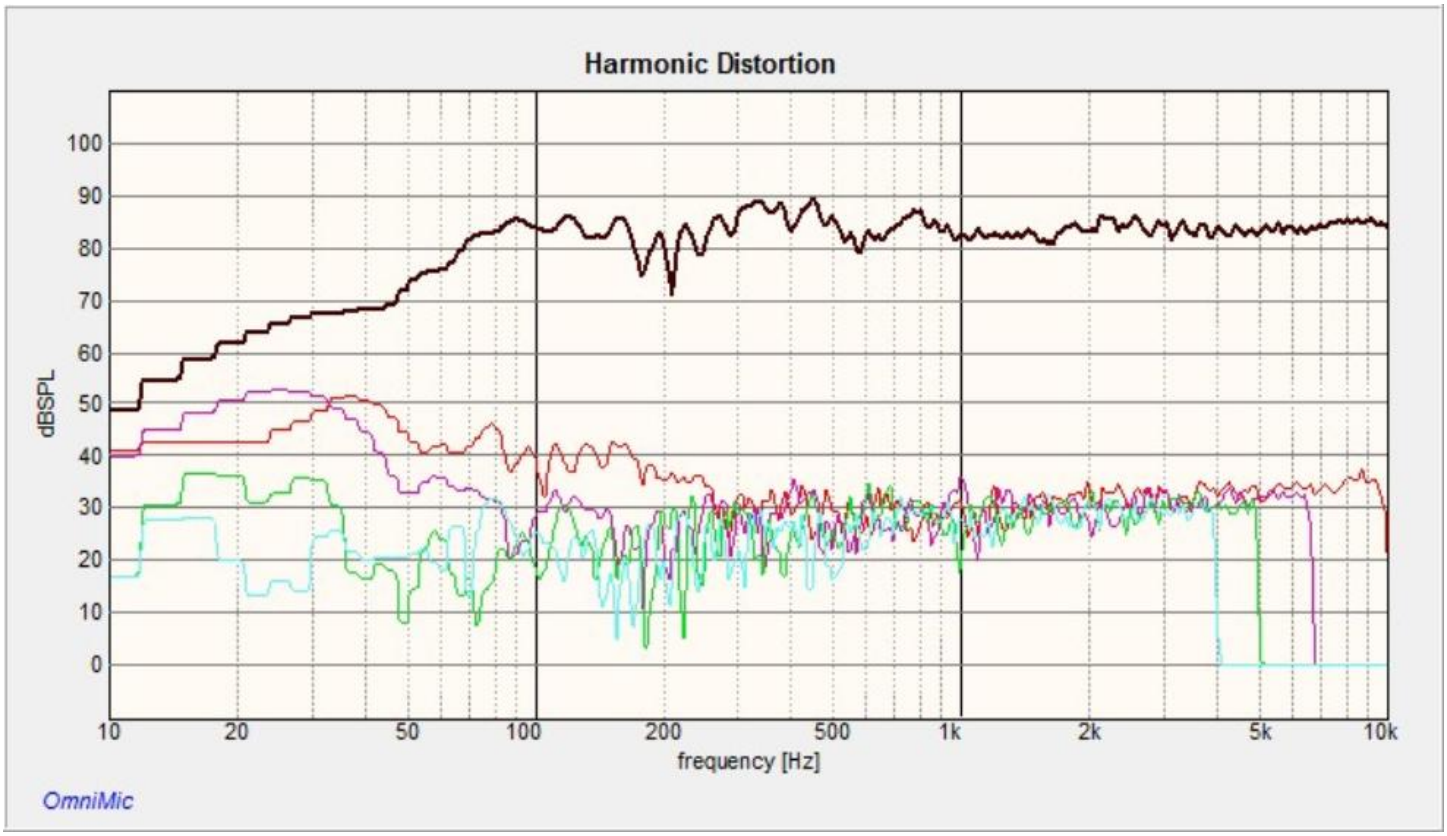
While the impedance drops below 8 ohms in a couple of places, those minima are generally associated with low phase angles suggesting an easy load for any 6 ohm capable amplifier.



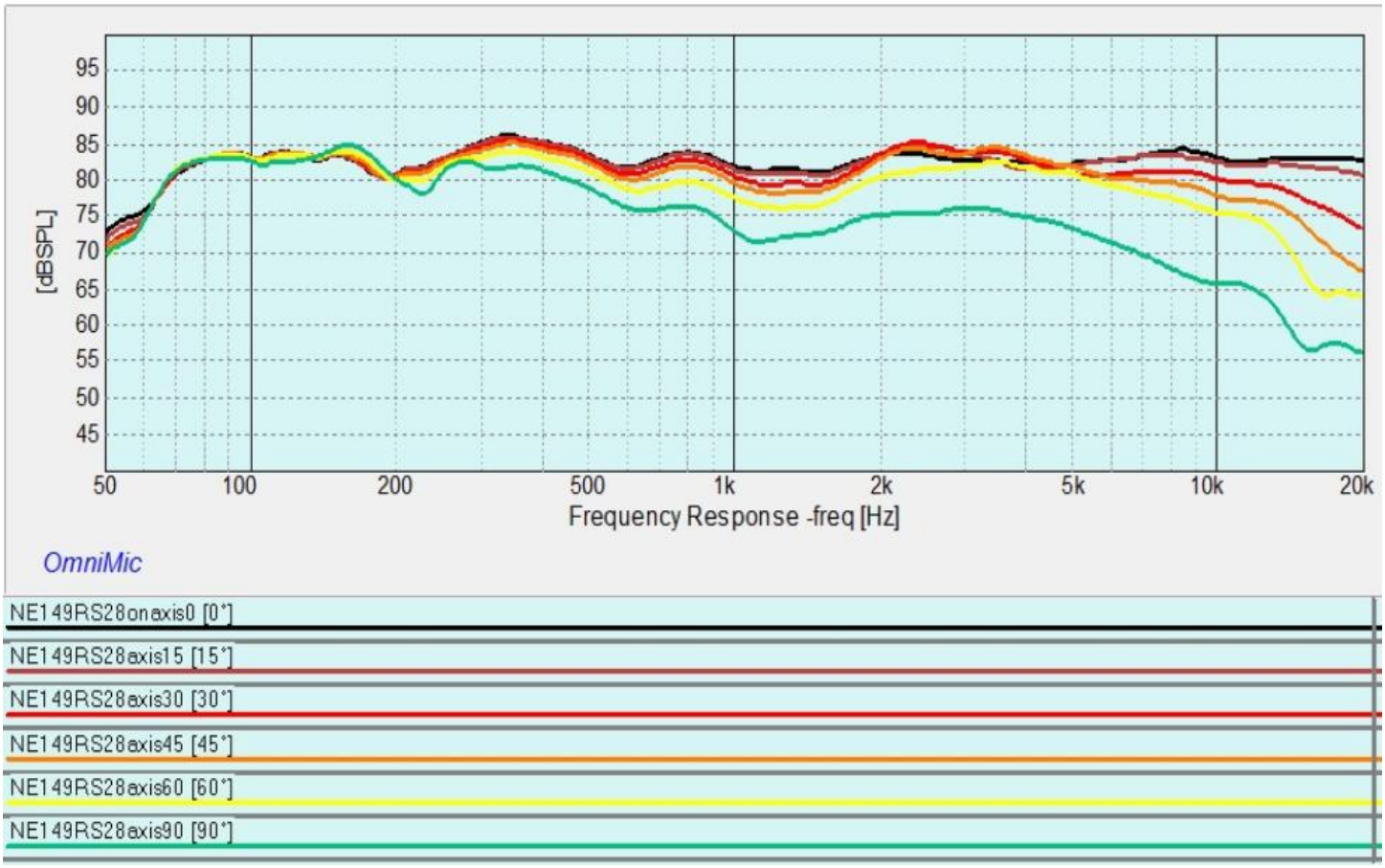
The phase tracking is excellent for a simple crossover and no mechanical correction to the acoustic centers of the drivers.



The harmonic distortion plot at 2.8 volts show distortion values below 0.3% over most of the frequency range. This shows the quality of the drivers, and how well the RS28F tolerates the lower crossover point. The 8.0 volt excitation plot (not shown) showed the 2nd harmonic rising with the fundamental, providing the same relative distortion percentage, while the higher order distortion plots remained lower..



Lastly, a horizontal response plot derived from measurements made every 15 degrees up to 90 degrees, showing excellent off axis response up to the point where the tweeter starts beaming. The polar plot is the same information displayed in another fashion



Imaging & Presentation:

I was very pleased (but not surprised) at how these turned out. While there are a great many small 2 ways out there, (-And lets be honest, in all likelihood some of those are excellent designs in their own right, and may better the Finalist Monitors in one aspect or another/) In spite of this, I felt the Finalist Monitors brought much of the sound of the Finalists home in a much smaller package and at a very attractive price. The NE149's are overachievers when it comes to bass extension and reproduction in general. With a bit of front wall reinforcement, they produce usable bass well into the 30's, yet still shine in their midrange performance. The RS28's are just amazing considering their cost. Here's what Jim Holtz says about these drivers in the Finalists:

Jim on the RS28F: Cymbals sound like cymbals and the sound of triangles float in the air. The highs are open and airy with great off axis dispersion. The RS28F has great sound quality that realistically reproduces the original performance. It’s a real over achiever, IMHO.

Jim on the NE149's: Here's where The Finalists really shine. The NE149’s are extremely smooth, clear and detailed. Everything from the performer licking their lips to shifts in where they're standing are audible. Tonal balance is exceptional. Very, very real sounding to my ears. I am particularly impressed with the level of detail the NE149’s offer yet they are never harsh and even allow poor recordings to sound their best. This is an amazing driver, IMHO.

In summary: Voiced very similarly to the Finalists, they will make excellent surround speakers, or mains for smaller venues. They play acceptably loud in normal to larger sized rooms. In fact, they were easy for me to forget that I was clinically listening to them, and instead got caught up listening to the music. I suggest that’s what good speakers are supposed to do; get out of the way and let the music define the moment.