JOHN ATKINSON

Rockport Technologies Avior II

LOUDSPEAKER

Following my review of the floorstanding Magico S5 Mk.II last February,[1] I spent some time with two-way stand-mounted speakers from Aerial Acoustics, Bowers & Wilkins, and Dynaudio. As much as I appreciated the small speakers' virtues, I found myself missing the big Magico's bass extension and ability to play loud; my next loudspeaker review, therefore, would be of another floorstander.

It's been a while since we published a review of a Rockport Technologies loudspeaker. Michael Fremer raved about Rockport's Antares in August 2002, which at the time cost $41,500/pair.[2] In September 2004, he was also impressed by the combination of the Rockport Merak II loudspeaker and Sheritan II subwoofer ($29,500/system).[3] I've been consistently impressed by the sound of Rockport speakers at audio shows over the past few years, so I asked Rockport's Andy Payor for a pair of Avior IIs.

The raked-back enclosure features a triple-laminated, constrained-mode-damped construction.

The Avior II

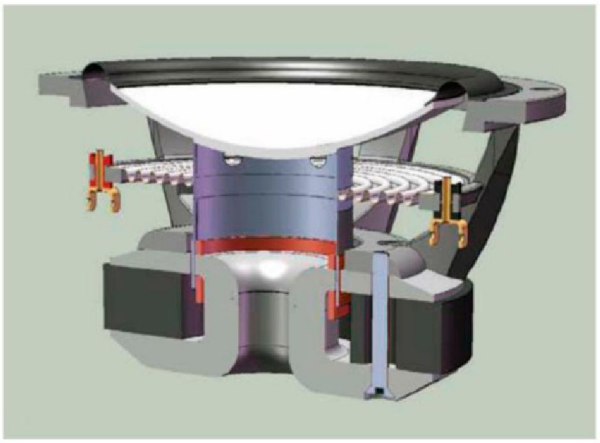
At $38,500/pair, this three-way design is almost identically priced to the Magico S5 Mk.II and is very similar in height, width, and weight—a back-breaking 220 lbs—but is significantly deeper. The review samples were finished in a high-gloss piano black, and the speakers' appearance belied their bulk. Other than on the stepped rear panel, there's hardly a straight line to be seen: the top slopes down, the sidewalls are gently curved, and the sloped-back, 6"-thick front baffle is faced with inset black felt and narrows toward the top, to optimize the tweeter's acoustic environment.

1 See www.stereophile.com/content/magico-s5-mkii-loudspeaker.
2 See www.stereophile.com/floorloudspeakers/644/index.html.
3 See www.stereophile.com/floorloudspeakers/904rockport/index.html.

SPECIFICATIONS

Description Three-way, reflex-loaded, floorstanding loudspeaker. Drive-units: 1" (25.4mm) beryllium-dome tweeter; 6" (152.4mm) carbon-fiber, sandwich-composite-cone midrange; two 9" (230mm) carbon-fiber, sandwich-composite-cone woofers. Frequency response: 25Hz–30kHz, –3dB. Sensitivity: 88dB/2.83V/m. Nominal impedance: 4 ohms. Minimum amplification: 30W.
Dimensions 46.5" (1181mm) H by 15" (381mm) W by 24.5" (622mm) D. Weight: 220 lbs (100kg).
Finishes Metallic gloss or high-gloss paint.
Serial numbers of units reviewed 1702L & R.
Price $38,500/pair. Approximate number of dealers: Not disclosed.
Manufacturer Rockport Technologies, 586 Spruce Head Road, South Thomaston, ME 04858. Tel: (207) 596-7151. Web: http://rockporttechnologies.com.

The raked-back enclosure is heavily braced and features a triple-laminated, constrained-mode-damped construction with sections of varying thickness, and stands on an integral base, which has a subcompartment for the potted crossover circuitry. The network is wired point to point, and uses film/foil capacitors manufactured exclusively for Rockport Technologies as well as custom inductors and Caddock power resistors. All the crossover components are matched to within 1% tolerance, and each individual network is fine-tuned for the specific drive-units with which it will be used.



The Avior II's proprietary midrange unit features a titanium voice-coil former.

Those drive-units? Starting at the bottom of the baffle, the twin 9" woofers are reflex-loaded with a flared port approximately 8" deep and almost 3" in diameter on the rear panel. Above the woofers is a 6" midrange unit that covers the range from 150Hz to 2kHz. At the top of the baffle is a custom 1" beryllium-dome tweeter from Scan-Speak, housed within a shallow catenary waveguide. According to Andy Payor in an e-mail, this waveguide "improves the acoustic impedance match of the tweeter at the low end of its range, and allows for lower distortion and greater dynamic expression from the tweeter itself, as well as improved dispersion characteristics at the midrange/tweeter crossover point.

The lower-frequency drivers in Rockport's previous generation of speakers, including the Antares and Merak, used Audiotechnology motors, in Denmark, mated to Rockport's carbon-fiber composite cones. The original Avior, introduced in 2011,

MEASUREMENTS

I used DRA Labs' MLSSA system and a calibrated DPA 4006 microphone to measure the Rockport Avior II's frequency response in the farfield, and an Earthworks QTC-40 for the nearfield and in-room responses. A complication was that the 220-lb loudspeaker was too bulky for me to move it outside for the testing, or to lift it onto my computer-controlled turntable. I therefore had to do the quasi-anechoic measurements in my listening room, where the proximity of room boundaries led to more than usually aggressive windowing of the time-domain data, which in turn reduced the graphs' resolution in the midrange.

My estimate of the Rockport's voltage sensitivity was 89dB/2.83V/m, slightly higher than the specified 88dB. Fig.1 shows how the Avior II's impedance magnitude and electrical phase angle varied with frequency. There's no getting away from the fact that the Rockport is a relatively difficult load for the partnering amplifier to drive. The impedance remains between 3 and 5 ohms between 17 and 850Hz, with a minimum magnitude of 2.6 ohms at 210Hz. Although the electrical phase angle remains low over most of this region, it does increase to 43° at 760Hz, where the magnitude is still low, at 4.5 ohms. With this speaker, tube amplifiers should probably work best when used from their 2 ohm transformer taps.

With one exception, the Avior II's heroically constructed enclosure seemed inert when I listened to the behavior of its panels with a stethoscope while I slowly swept a sinewave up and down through the upper bass and midrange. The exception was the section of the rear panel between the port and the binding posts, where I could hear a strong, high-Q (Quality Factor) resonant mode between 560 and 570Hz. (This was with the left speaker; the mode was slightly higher in frequency in the right speaker.) Further investigation with an accelerometer revealed that this resonance was also present, at a lower level, toward the bottom of the two side panels and on the rear of the base. There is no evidence of this mode in the impedance traces, and as the affected areas are relatively small and the resonance is of high Q,[1] it's possible that the effect of this resonance on sound quality will be negligible. But I do wonder if it was responsible for the slight amount of character I noted with some piano recordings—the mode lies close to the frequencies of the notes C-sharp (554.4Hz) and D (587.3Hz).

The saddle centered at 22Hz in the impedance-magnitude trace suggests that this is the tuning frequency of the large, rear-facing port. However, mea-

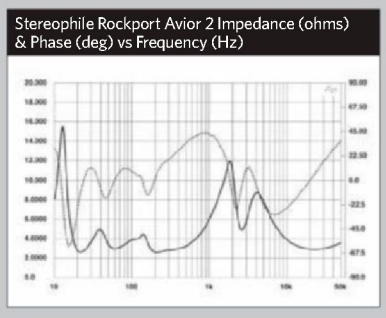


Fig.1 Rockport Avior II, electrical impedance (solid) and phase (dashed) (5 ohms/vertical div.).

1 Work by Floyd Toole and Sean Olive has shown that the higher the Q of a resonance, the less audible it will be. This is because the resonance needs an increasing amount of time for it to be excited with energy at the same frequency to fully develop.

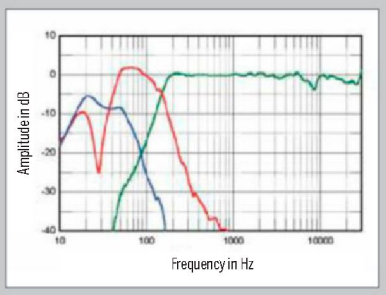


Fig.2 Rockport Avior II, acoustic crossover on tweeter axis at 50", corrected for microphone response, with nearfield responses of midrange unit (green), woofers (red), and port (blue), respectively plotted in the ratios of the square roots of their radiating areas below 350Hz, 850Hz, and 160Hz.

was the first loudspeaker to use a midrange drive-unit and woofers designed from the ground up by Rockport Technologies. According to Payor, "I felt it was extremely important to have full control over every aspect of the drive-unit's design and construction in order to elevate the performance potential of our loudspeakers beyond what is possible using off-the-shelf drive units. That's not to say that there aren't plenty of excellent drive units available for purchase, but I can say with confidence that none are like the ones we build, and these are not merely another manufacturer's drivers with our dust caps on them."

The sandwich diaphragms for the Avior II's midrange unit and twin 9" woofers are terminated with low-loss rubber surrounds and feature a geometry of varying thickness. They comprise stiff carbon-fiber fabric outer and inner skins just 0.004" thick and pre-impregnated with a custom epoxy resin, these bonded with a Rohacell core under high pressure and heat. The midrange driver has a cast-aluminum frame and a vented titanium voice-coil former. Payor again:

"When we began building our own custom midrange and bass units about six years ago, we changed to titanium formers because they are considerably stiffer than the Kapton formers we previously used. I prefer not to use aluminum formers because of the unwanted eddy-current damping (aluminum is a very good electrical conductor). On the other hand, titanium's electrical conductivity is quite low, so we can avoid the eddy-current damping (as with the Kapton formers), yet still benefit from much better transfer of force to the cone, as well as better thermal dissipation. Our motor systems utilize optimized copper shorting rings and tapered pole pieces, and have generous, radiused venting through the motor system."

Setup

I was somewhat taken aback when the Avior IIs were delivered. Each was packed in a large, well-finished crate that only just fit in the vestibule to my listening room. (Though the crate is narrow enough to fit through a standard doorway, the fact that the vestibule's door to the street is not in line with the door to my room left just ½" of clearance!) Casey McKee, of Austin dealer Ne Plus Ultra, visited to help me unpack the Aviors and set them up.

Having found the approximately optimal positions for the speakers, McKee laid out a grid in blue tape for each, with markings every ½". Using familiar recordings and moving each speaker one marking at a time, from side to side and from front to back, he zeroed on a position for each that gave the most-even transition from the low bass through the sured in the nearfield, the two woofers (which behaved identically) have their minimum-motion notch a little higher in frequency, at 28Hz (fig.2, red trace). This is the frequency where the woofer cones are held stationary by the back pressure from the port resonance; the port's output (blue trace) peaks both a little lower and a little higher in frequency than 28Hz, but rolls off smoothly above 60Hz, with no resonances apparent in its higher-frequency response. The woofers' output covers a relatively narrow bandpass, crossing over to the midrange unit (green trace) at 150Hz and rolling off with a steep, approximately 18dB/octave slope. The midrange unit rolls in with the same third-order slope, then offers an astonishingly flat response until it's crossed over to the tweeter at 2.3kHz. Other than a small suckout between 6 and 9kHz, the Avior II's response in the region covered by the tweeter is also superbly flat.

Fig.3 shows how the individual responses sum on the tweeter axis, with the response averaged across a 30° horizontal window. The rise in output in the midbass region is almost entirely an artifact of the nearfield measurement technique used to measure the response below 300Hz in this graph. While there is still a slight lack of energy apparent in the mid-treble, this is less deep than in fig.2 because it fills in to the speaker's sides, as can be seen in fig.4. Other than that small suckout, the Avior II's quasi-anechoic response falls within an extraordinarily tight limit of ±1.2dB from 280Hz to 15kHz. Even more notable, the outputs of the two speakers of the review pair matched to with 0.5dB across the same range.

Because of the practical limitations mentioned earlier, I plotted the Rockport's horizontal dispersion across a ±45° window rather than my usual ±90°. The result, with each off-axis response normalized to the tweeter-axis response, is shown in fig.4. Other than the mid-treble suckout tending to fill in to the speaker's sides, the contour lines in this graph are evenly spaced. This behavior always correlates with accurate, stable stereo imaging. As expected from the waveguide surrounding the tweeter, the Avior II starts to become directional in the top octave, but not significantly so until more than 15° to

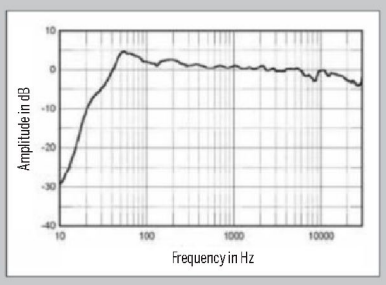


Fig.3 Rockport Avior II, anechoic response on tweeter axis at 50", averaged across 30° horizontal window and corrected for microphone response, with complex sum of nearfield midrange, woofer, and port responses plotted below 300Hz.

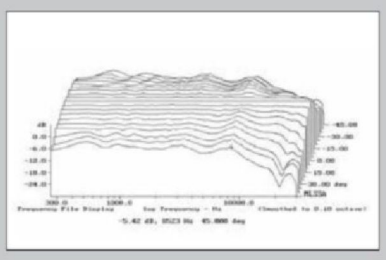


Fig.4 Rockport Avior II, lateral response family at 50", normalized to response on tweeter axis, from back to front: differences in response 45–5° off axis, reference response, differences in response 5–45° off axis.

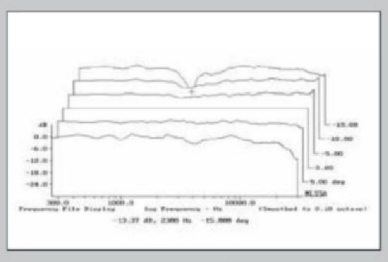


Fig.5 Rockport Avior II, vertical response family at 50", normalized to response on tweeter axis, from back to front: differences in response 15–5° above axis, reference response, differences in response 5–10° below axis.

upper bass and the most neutral reproduction of vocal vowels. He then made small adjustments to the positioning to bring out what he calls "that ineffable 'musical expression thing'—whether or not ensemble members seem to be listening to one another and actually making an ensemble, whether or not the music is moving, etc." Finally, McKee experimented with the speakers' angle of toe-in, to give the best balance between soundstage depth and imaging precision. Then and only then did we install the carpet-piercing cones. I experimented further with position and toe-in during the listening period, but ultimately returned to McKee's setup as getting the best sound from the Rockports.

I usually use a mix of balanced AudioQuest interconnects and Kubala-Sosna speaker cables. However, Andy Payor asked that I use Transparent Reference cables for my listening. The bulk of the following auditioning comments were made using Transparent cables.

The 1" beryllium-dome tweeter is mounted in an anodized-aluminum waveguide.

Listening

The Avior IIs initially had a somewhat lean balance. Though the presentation of recorded detail was breathtaking with the Chord DAVE and Ayre QX-5 DACs I used during setup, without a preamp in the system, I then switched to the softer-sounding PS Audio PerfectWave DirectStream DAC, which sacrificed some detail in favor of a less-forward balance. The Rockport's tonal quality steadily improved over the next two weeks, but could never be described as "warm" or "rich"; instead, it remained resolutely neutral.

Once they'd broken in, the Avior IIs excelled with voices. The contrast between Ella Fitzgerald's smoothly seductive

measurements, continued

the side. In the vertical plane (fig.5), the Rockport's balance is maintained over a wide (±10°) window centered on the tweeter axis, with a suckout at the upper crossover frequency not appearing until 15° above that axis.

The red trace in fig.6 shows the Avior II's spatially averaged response in my listening room with, for reference, that of the Magico S5 Mk.II, which I reviewed in February.[2] (The in-room response of both speakers was calculated by averaging 20 1/6-octave-smoothed spectra, individually taken for the left and right speakers using SMUGSoftware's FuzzMeasure 3.0 program and a 96kHz sample rate, in a rectangular grid 36" wide by 18" high and centered on the positions of my ears. This mostly eliminates the room acoustic's effects.) The coincidence of the port tuning and the lowest-frequency mode in my room boosts the Rockports' output in the octave between 18 and 36Hz, a region where the sealed-enclosure Magicos were more neutrally balanced. The Magicos also had more energy in the lower midrange than the Rockports, and a smoother rolloff in the treble. (Because of the increased absorptivity of the room furnishings at high frequencies, the optimal response in this kind of graph is not flat in the treble, but smoothly slopes down. I'm puzzled why the Avior II's in-room response had a slight excess of energy in the presence region in this graph while its quasi-anechoic response was superbly flat; I wonder if this correlates with the slightly forward balance I noted in this region.

Turning to the time domain, the Avior II's step response on its tweeter axis is shown in fig.7, which reveals that all four drive-units are connected in positive acoustic polarity. While the tweeter output arrives at the microphone before that of the midrange unit, which in turn arrives before that of the woofers, the decay of each unit's step blends smoothly with that of the next lower in frequency. This, in conjunction with the speaker's slightly sloped-back front baffle, indicates optimal crossover design. The Avior II's cumulative spectral-decay plot (fig.8) features a superbly clean initial decay.

Overall, the Rockport Avior II's measured performance indicates some excellent speaker engineering.

—John Atkinson

2 See www.stereophile.com/content/magico-s5-mkii-loudspeaker-measurements.

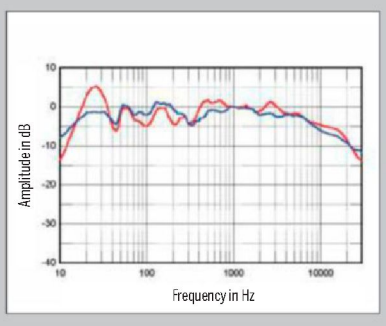


Fig.6 Rockport Avior II, spatially averaged, 1/6-octave response in JA's listening room (red); and of Magico S5 Mk.II (blue).

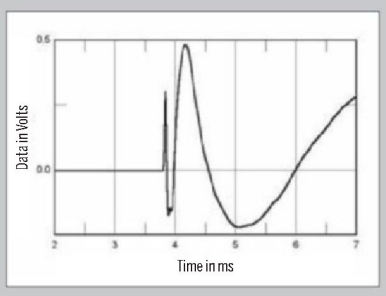


Fig.7 Rockport Avior II, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

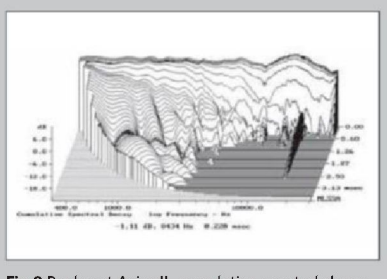


Fig.8 Rockport Avior II, cumulative spectral-decay plot on tweeter axis at 50" (0.15ms risetime).

instrument and Louis Armstrong's vocal gravel in "They Can't Take That Away from Me," from *Ella & Louis* (DSD64 files, Verve/Acoustic Sounds) was extreme, yet neither voice sounded exaggerated or forced. Similarly, the Aviors easily resolved Jerry Rafferty's and Joe Egan's head-cold-inflected vocal lines in "Star," from a reissue of Stealers Wheel's *Ferguslie Park*, the original album superbly engineered by the great Phill Brown (24-bit/192kHz needle drop from LP, A&M/Intervention INVLP 002).

The Rockports were less happy with modern, over-cooked recordings, however. I hadn't heard of country star Chris Stapleton, but had been impressed when I saw him performing on *CBS This Morning*, so I checked out his new album, *From a Room: Volume 1* (16/44.1 stream, Mercury Nashville/Tidal HiFi). The album was recorded in Nashville's RCA Studio A—you'd think it would have a decent chance of sounding good. But through the Aviors, every track sounded relentlessly loud and compressed to within an inch of its life. Even "Either Way," which features Stapleton backed by just his acoustic guitar, shouted at me. Yes, individual instruments in the mix, particularly the drums, sounded clean, and every inflection and ornament in Stapleton's singing stood out without any editorializing from the Rockports. But with recordings like this, more detail doesn't translate into more better.

But with a good recording, the Rockports' ability to step out of the way of what had been captured by the engineers was a thing of beauty. On our May "Recording of the Month," Dominic Miller's *Silent Light* (CD, ECM 2518), guitarist Miller paints impressionistic soundscapes either alone or with sparse accompaniment. In "Chaos Theory," Miller's acoustic guitar paints a wash of sound punctuated by subtle interjections from drums and overdubbed bass guitar. The Aviors opened a superbly clean window on the recorded space, with stable, precisely defined stereo imaging. With the dual-mono pink-noise track on *Editor's Choice* (ALAC file ripped from CD, Stereophile STPH016-2), the central image was very narrow and stable.

Bass extension was impressive. The ⅓-octave–spaced warble tones on *Editor's Choice* remained at full level down to the 40Hz band, with the 32Hz tone boosted by the lowest-frequency mode in my room. The 25Hz tone was audible at my normal listening level, but the 20Hz tone was not, suggesting low distortion.

Unusually for a speaker with reflex-loaded woofers, the transparency extended to the low frequencies. The weave of double bass and bass guitar Brian Wilson had used in the Beach Boys' *Pet Sounds* (24/192 AIFF files, Capitol/HDtracks), particularly in "Sloop John B," was unwound, but without the mix losing its coherence. The Rockport was definitely a bass guitarist's speaker, offering definition without boom. I recently bought *Truth, Liberty & Soul*, the newly rediscovered and remixed NPR recording of a live concert in 1982 featuring bass genius Jaco Pastorius leading a big band (24/192 AIFF files, Resonance/HDtracks). In his solo-tuba intro to "Donna Lee," David Bargeron duets with himself, singing into the instrument's mouthpiece. Through lesser speakers this would become intermoddy mud, but with the Rockports the two lines remained distinct.

The Avior II's treble was silky smooth, except that that implies that there was an identifiable character to the high frequencies, and the Rockports had *no* sound of their own in this region. Cymbals sounded maximally different from each other, and violins were neither too rosiny nor too dull.

ASSOCIATED EQUIPMENT

Analog Source Linn Sondek LP12 turntable with Lingo power supply, Linn Ekos tonearm, Linn Arkiv B cartridge.
Digital Sources Aurender N10 music server; Ayre Acoustics C-5xe^{MP} universal player; Arcam irDAC-II, Ayre Acoustics QX-5, Chord DAVE, PS Audio PerfectWave DirectStream D/A converters; AudioQuest JitterBug, UpTone Audio ReGen USB cleaner-uppers; Mac mini running Vinyl Studio, Pure Music 3, Audirvana 1.5, Roon 1.3; Ayre Acoustics QA-9 USB A/D converter.
Phono Preamplifier Channel D Seta L.
Preamplifier Ayre Acoustics KX-5.
Power Amplifiers MBL Corona C15, Pass Labs XA60.5 (both monoblocks).
Cables Digital: AudioQuest Coffee (USB), Canare (AES/EBU). Interconnect (balanced): Transparent Reference. Speaker: Transparent Reference, Kubala-Sosna Elation!. AC: Kubala-Sosna Elation!, manufacturers' own.
Accessories Target TT-5 equipment racks; Ayre Acoustics Myrtle Blocks; ASC Tube Traps, RPG Abffusor panels; Shunyata Research Dark Field cable elevators; Audio Power Industries 116 Mk.II & PE-1 AC line conditioners (hard drive, computers). AC power comes from two dedicated 20A circuits, each just 6' from breaker box.—**John Atkinson**

But after a while, with recordings of solo piano, I noticed a narrowband coloration. I wasn't aware of this with my new favorite performance of Rachmaninoff's Piano Sonata 2, by Evelina Vorontsova (CD, STH Quality Classics 1416092), which was reproduced with weight and power in the bass register; nor was it particularly noticeable with superbly engineered recordings of piano with orchestra, such as Dejan Lazic's live performance of Rachmaninoff's Piano Concerto 2, with the London Philharmonic conducted by Kirill Petrenko (DSD64 files, Channel Classics CCS SA26308). But when the writing for piano was more open, as in Haydn's Piano Sonata 32 in g, Hob.16 No.44, from András Schiff's *Encores After Beethoven* (CD, ECM New Series 1950), the more obvious it was that some notes were unnaturally accentuated.

This is, in absolute terms, a minor flaw, but it surprised me, considering how well the Avior II performed in every other area.

Summing Up

The Rockport Technologies Avior II is a neutral, uncolored, full-range loudspeaker capable of both rocking-out loudness and the presentation of subtle sonic differences. It's not entirely without character—the slight coloration I noted with solo-piano recordings will be a problem for some. But that aside, its superb transparency doesn't get in the way of the music. As I described in one of the first reviews I wrote for *Stereophile*,[4] a frequent problem with speakers that excel in the presentation of recorded detail is that, among all the dramatically revealed trees, the listener loses sight of the musical forest. This was not the case with the Avior II; whichever recording I played, I was compelled to listen though to the end, even when I had other things to attend to, other places to be. That is the sign of greatness. ■

4 See www.stereophile.com/floorloudspeakers/650/index.html.