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Audiovector R 8 Arreté

LOUDSPEAKER

Many loudspeaker designers are minimalists at heart. They embrace a design aesthetic that says that simpler is better. Based on the evidence of the company's R 8 Arreté, Ole Klifoth, of Danish loudspeaker maker Audiovector, is *not* one of those designers.

On its website, in the Specifications section for its "R"-model loudspeakers,[1] Audiovector offers a long checklist of technologies, many of them optional, some of them, called "Concepts," assigned snappy names and acronyms: IUC for Individual Upgrade Concept; LCC for Low Compression Concept; SEC for Soundstage Enhancement Concept; NES for No Energy Storage; FGC for Freedom Grounding Concept; and NCS for Natural Crystal Structure.

Several Audiovector loudspeakers come in different versions, sort of like trim levels in cars: Pay more to get more. The R1, R3, and R6, for example, come in three levels: Signature, Avantgarde, and Arreté. The differences among the levels can be meaningful: The R6 Signature has a soft-dome tweeter, while the Avantgarde upgrades the tweeter to an air-motion transformer (AMT) tweeter. The Arreté version has an AMT tweeter, too, but the Arreté's tweeter employs an integrator grid behind the dispersion lens, which helps to integrate it with the other drive-units, and a "special resistive termination." The Arreté adds a a rear-firing midrange driver, the Freedom Grounding Concept, and Natural Crystal Structure.

Audiovector's two largest speakers, the flagship R11 and the one-step-down R 8, are only available fully loaded, in the Arreté trim level, which is to say, the options aren't optional—except for one, sort of. In the US, the R 8 Arreté—the product under review—sells for $69,995/pair plus a ($3850) upcharge for the optional grounding cable, which is necessary if you want to take advantage of the Freedom Grounding Concept.

I first encountered Audiovector at the 2019 Toronto Audiofest. The R 8 Arreté was in the room, but the room was small, so the smaller R3 Arreté was getting most of the playing time. The R3 sounded very good, like a *complete* speaker, one that was well thought through. I was struck by several aspects of the design including the relatively lightweight enclosure, the openness of the cabinet, and especially that grounding cable and its associated grounding terminal. It was the first time I'd ever encountered that in a loudspeaker. I was also struck by its appearance: The R3 was attractive.

I'm not sure I paid much attention at the time, but here in my living/listening room, the much larger R 8, with its acres of glossy "Piano" Italian Walnut Burl veneer, is more than pretty. It's gorgeous.

Mounted on the top, front part of that lovely wood-grain cabinet is a matte-finished aluminum-alloy baffle; all the front-firing drivers are mounted on this baffle, with contrasting polished rings providing just a touch of bling, luxury with a hint of ostentatious fun, enough to make you grin a little even before the music starts playing. Pride in ownership. A black grille comes standard, but who would cover up that lovely front?

That pleasingly blingy baffle holds three 6.5" midwoofers designed by Ole in collaboration with a couple of other, unnamed driver specialists and built elsewhere,[2] each with a different passband, plus, as already mentioned, the company's most advanced AMT tweeter. The woofer cones combine carbon fiber and aramid fiber (think Kevlar) "loaded with synthetic wood resin." This last piece of information comes courtesy of Audiovector CEO Mads Klifoth, the designer's son. Mads continued: "Both these fiber types are strong, and together they form a very stiff, light, and sound-

1 Audiovector also offers a less expensive series, designated QR. QR-series speakers have fewer "options."

2 This approach makes sense for just about any loudspeaker manufacturer, because each specialty driver manufacturer has different tooling. The ability to shop around gives a loudspeaker manufacturer more options. Audiovector's drivers are made by Denmark's Scan-Speak.

SPECIFICATIONS

Description Multi-way, bass-reflex, floorstanding loudspeaker with down-firing isobaric woofer system. Drive-units: AMT tweeter, 4" rear-firing midrange with polypropylene cone; three 6.5" (165mm) midwoofers with carbon-fiber/aramid fiber/synthetic wood cones; 6.5" (carbon/aramid fiber) and 8" (carbon fiber) woofers; all cone drivers with titanium formers. Crossover frequencies: 100Hz/250Hz/3kHz. Frequency range: 22Hz–52kHz. Sensitivity: 92.5dB/W/m. Nominal impedance: 8 ohms. Power handling: 500W.
Dimensions 56.8" (1442mm) × 12.9" (327mm) × 21" (533mm) (not including spikes). Weight: 160lb (72.6kg) each.
Finish Italian Walnut Burl Piano (natural wood veneer) and aluminum alloy. Several other finishes available.
Serial numbers of units reviewed R8AWBC 537043 (both). Made in Denmark.
Price $69,995/pair. Approximate number of US dealers: 10. Warranty: Five years, parts and labor.
Manufacturer
F3 / Audiovector ApS, Mileparken 22 A, DK-2740 Skovlunde, Denmark
Tel: +45 3539 6060
Web: audiovector.com

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dead membrane. This one is the one we have chosen over many others in our listening tests." Voice-coils are wound on titanium formers. Because titanium is less magnetic than aluminum, which is slightly *para*magnetic, using titanium instead "drastically reduces hysteresis compared to most other drivers," Mads told me.

A convex aluminum panel runs the length of the backside of the R 8's teardrop-shaped cabinet. At the top of that panel, opposite the tweeter, five horizontal slots, each about $^{5}/_{16}$" tall, allow the tweeter's back wave to exit to the rear; that's part of the Soundstage Enhancement Concept and also perhaps the Low Compression Concept. A few inches farther down that back panel, opposite the topmost midwoofer, a 4" midrange driver fires to the rear through *seven* horizontal slots—another piece of the Soundstage Enhancement Concept. This rear-firing 4" driver uses "a polypropylene membrane and a strong magnet," Ole told me. Farther down are two port openings, each venting through seven horizontal slots, one serving the chamber shared by the two lowest-frequency midwoofers, the other serving a down-firing isobaric woofer.

Isobaric woofers are rare in the hi-fi world, though not unheard of. The isobaric concept was invented by Harry F. Olson in the 1950s; "isobaric" means "equal pressure," achieved by having two identical drivers firing in phase in a single chamber so that the region between the two drivers isn't pressurized. Olson's insight was that the bass output achieved by such a configuration is equivalent to what you'd get with a single driver and twice the cabinet volume. (Since the extra driver takes up space, the actual yield is less than double.) The downside: It takes more current to feed two drive-units instead of just one. Which makes the R 8's amplifier-friendly specifications—8 ohms nominal impedance, 92.5dB/W/m sensitivity, equivalent to 92.5dB/2.83V/m if it *is* an 8 ohm speaker—surprising.

The R 8's isobaric woofer system is a variation on Olson's original concept in that it uses woofers unequal in size: a 6" driver internally and an 8" driver on the outside; the 8" driver uses a carbon-fiber cone, and the 6" driver is similar to the front-firing midwoofers. The R 8's elegant, slotted aluminum base directs the woofer output in a controlled manner to the rear and sides.

In the course of writing this description, I've come to recognize an apparent Audiovector design philosophy, a unifying concept behind the acronyms. Ole Klifoth aims to keep things free and easy, the pressure low and stored energy minimal. The LCC, or Low Compression Concept, means the cabinet is open so that pressure doesn't build up too much on the inside—no more than necessary. The teardrop-shaped cabinet minimizes standing waves in the internal air space, and the enclosure is relatively lightweight so that it cannot absorb and store much energy. Don't lock energy up inside the speaker; rather, send it out into the air as music.

The R 8 Arreté sends energy out into the air via no fewer than nine sound-radiating openings, only four of them—the three midwoofers and the tweeter—firing forward. The others are the down-firing woofer (which radiates through those base slots to the back and sides), the rear-firing midrange driver (diffracted through those five horizontal grooves), the vent that allows the tweeter's back wave to emerge from the rear, and the two aforementioned ports. This rather complex radiation pattern is summed up in Audiovector's SEC.

While I'm on the subject of "concepts," here are the others. NCS stands for "natural crystal structure"; it means that all the copper parts used in the speaker are cryo'd. FGC, for

MEASUREMENTS

As with the Magico A5 loudspeaker that Jim Austin reviewed in the July issue,[1] I drove my test gear to his apartment to perform the measurements of this large, heavy speaker. I used DRA Labs' MLSSA system, an Earthworks microphone preamplifier, and a calibrated DPA 4006 microphone to measure the Audiovector R 8's behavior in the farfield. (We maneuvered one of the speakers onto a dolly and aimed it across a room diagonal so that it was maximally distant from the sidewalls.) I used an Earthworks QTC-40 mike for the nearfield and spatially averaged in-room responses. (For the latter, the loudspeakers were in the positions where JCA had auditioned them.)

The R 8's sensitivity is specified as 92.5dB/W/m. My estimate was slightly lower, 90dB(B)/2.83V/m, but this is still usefully higher than average. Audiovector specifies the R 8's impedance as 8 ohms. Using Dayton Audio's DATS V2 system, I found that the impedance magnitude (fig.1, solid trace) was less than 8 ohms across the audioband and remained below 4 ohms for almost the entire bass and midrange. I checked this measurement with the other R 8 sample; the impedance values were identical. The minimum magnitude was 2.52 ohms at 43Hz and 2.54 ohms at 250Hz. The electrical phase angle (dashed trace) is generally low. However, the EPDR[2] does drop below 2 ohms between 29Hz and 42Hz, with minimum values of 1.4 ohms at 36Hz and 1.63 ohms between 510Hz and 530Hz. The R 8's demand for current will be ameliorated by its high sensitivity, but it should be used with amplifiers that don't have problems driving 4 ohm loads.

The traces in fig.1 are free from the small discontinuities that would imply resonances of some kind. When I investigated the enclosure's vibrational behavior with a plastic-tape accelerometer, I did find some resonant modes on the sidewalls and on the front baffle below the panel on which the forward-firing drive-units are mounted. The most significant mode lay at 375Hz (fig.2), with other,

1 See stereophile.com/content/magico-a5-loudspeaker.

2 EPDR is the resistive load that gives rise to the same peak dissipation in an amplifier's output devices as the loudspeaker. See "Audio Power Amplifiers for Loudspeaker Loads," *JAES*, Vol.42 No.9, September 1994, and stereophile.com/reference/707heavy/index.html.

Stereophile Audiovector R 8 Impedance (ohms) & Phase (deg) vs Frequency (Hz)

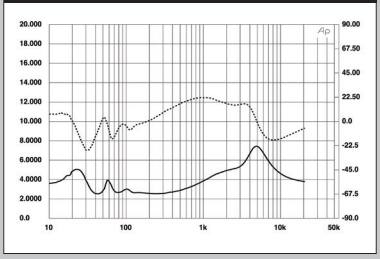

Fig.1 Audiovector R 8, electrical impedance (solid) and phase (dashed) (2 ohms/vertical div.).

"freedom grounding concept," is where that grounding cable comes in.

A grounding cable for loudspeakers? What's up with that? "In one sense, this is quite simple," Ole Klifoth told me in an email. "We are simply grounding the baskets."

When I first heard about it, I thought I understood what it was about, at least a little. Some driver baskets are made from ferrous metal. With all the magnetic activity nearby—strong magnets and magnetic voice-coils—I assumed the grounding was intended to modify eddy currents, which could be expected to influence the motion of the cones much as the eddy-current break on my Thorens TD-124 turntable modifies the speed at which the platter rotates.

Nice theory, except that Audiovector's driver baskets are made of an aluminum-magnesium alloy. They possess *no* ferrous metal and minimal magnetism. If the FGC is not about modifying magnetic interactions, then what is it about?

Audiovector noticed that different driver baskets were at different electric potentials, which is to say, there was a potential difference, or voltage, between them. "Let's see what happens if we get rid of that," Ole recounted in an email. So they grounded the baskets.

The result? "If we connect the two baskets directly to earth while playing music, the dynamics of the music gets severely restricted," Ole told me. Not a good outcome, but it meant they had discovered a way to influence the sound. They experimented and eventually came up with an approach in which those potential differences are *controlled*, not eliminated: They grounded the baskets "not directly to earth, but through a dedicated filter," Ole wrote in an email—like a crossover but for baskets. "If we connect through our dedicated Freedom circuit"—that's the grounding network—"we do not lose any dynamics, and we can create a more quiet background and a deeper 3D perspective."

measurements, continued

lower-level modes present at 336Hz, 508Hz, and 891Hz. However, all the modes are relatively low in level and have a high Q (Quality Factor), which will work against their having audible consequences.

With the R 8 supported on its spiked feet, its tweeter is 52.5" from the floor. This is well above the ear height of a typical seated listener, which a survey undertaken for *Stereophile* in the 1990s by Thomas J. Norton indicated averages 36". According to an email JCA received from Audiovector, the R 8's recommended listening axis is between 100cm and 110cm high (39.4"–43.3"). Accordingly, for the quasi-anechoic farfield measurements, I positioned the microphone level with the junction between the two upper woofers, which was 43" from the top of the dolly.

The black trace and the green trace above 400Hz in fig.3 show, respectively, the farfield responses of the tweeter and the lower-frequency drive-units on the recommended listening axis. The specified crossover frequency is 3kHz, but the tweeter rolls off sharply below 4kHz. Although the output of the lower-frequency drivers slopes down above 1.5kHz, there is significant energy up to 10kHz, with narrow peaks at 4.3kHz and 9.1kHz. The former peak is higher in level than the tweeter's output at the same frequency.

The green trace below 400Hz in fig.3 shows the summed nearfield output of the three midrange/woofers on the front baffle. (The top midrange/woofer's output extends into the treble; the middle woofer's output starts to roll off above 650Hz, the bottom woofer's above 300Hz.) While their nearfield output is relatively flat above what appears to be a high-pass corner frequency of 50Hz, the usual boost in the upper bass that occurs with nearfield measurements[3] is absent. Also absent is the notch at the port tuning frequency, which the

3 A nearfield measurement assumes that the radiators are mounted in a true infinite baffle, ie, one that extends to infinity in both planes.

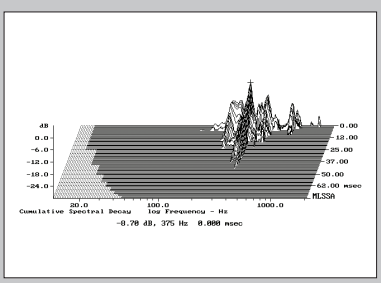

Fig.2 Audiovector R 8, cumulative spectral-decay plot calculated from output of accelerometer fastened to center of sidewall level with bottom woofer (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

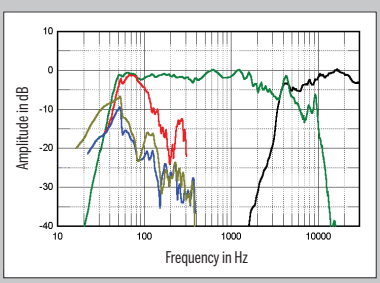

Fig.3 Audiovector R 8, acoustic crossover on listening axis at 50", averaged across 30° horizontal window and corrected for microphone response, with the summed nearfield response of the woofers (green), the nearfield response of the internal isobaric woofers (red), the nearfield response of the middle port (blue), and the nearfield response of the bottom port (amber), respectively plotted below 420Hz, 300Hz, 400Hz, and 400Hz.

Listening

I found the Audiovector R 8 Arreté to be mostly neutral in its sonic presentation—maybe slightly on the sweet side; I'll be interested to see what JA's measurements show. The bass is full and full-range but in my room not overly assertive.

At first I wondered if the sweetness I heard was due to the fact that the tweeters were high and my chair low: The centers of the R 8's AMT tweeters are about 52.5" off the floor, while, as I sit in my listening chair, my ears are about 34" off the ground. (It's an IKEA POÄNG chair, which is low to start with, and when I sit in it, the bentwood frame bends several more inches under my circa 200lb weight.)

I asked Ole Klifoth: What is the preferred listening axis for the R 8? "The preferred listening height for us is 100–110cm at a distance of 3m, but this is not overly critical," he replied—that's 39"–43" at a distance of about 10' in countries that never embraced the metric system. Seated comfortably in my listening chair, my ears were several inches below the preferred vertical listening range.

So I tilted the Arretés forward as much as I could with the provided spikes and listened. I moved the listening chair out and moved an adjustable-height office chair in, and listened again. In its lowest position, the office chair placed my ears about 39" from the floor; its hydraulic lift took me through and beyond the preferred range. Listening to music, I heard a slight reduction in the highest frequencies, let us say 8kHz or so and up, at my normal listening height relative to the preferred zone. I heard *no* difference, or even a slight increase in level, in the presence region and upper treble. So, my listening height was softening the presentation a little, but the effect was small.

With apologies to Ralph the Christmas Dog (who is featured on the first *Stereophile Test CD*), now for some pink noise (16/44.1 FLAC, rip from *Stereophile* STPH-002-2).

Pink noise through the R 8 Arreté was unremarkable,

measurements, continued

low-frequency saddle in the impedance magnitude trace in fig.1 suggests is 43Hz. The blue trace in fig.3 shows the nearfield output of the second port from the bottom on the R 8's rear, which I was told loads the two lower woofers. (I have truncated this trace at 22Hz and 400Hz, as below and above those frequencies the measurement was contaminated with crosstalk.) This port doesn't extend the woofers' low-frequency response. However, Audiovector's R&D manager and founder, Ole Klifoth, mentioned in an email that they "try to avoid any compression build up. ... [T]he drivers become able to deal with more power with very low distortion."

The isobaric woofers fire downward into the R 8's vented base. Their output (fig.3, red trace; truncated below 30Hz and above 300Hz because of crosstalk) is specified as operating below 100Hz, which was confirmed by the measured nearfield response. This rolls off below 50Hz, no lower in frequency than the front-firing woofers. The amber trace in fig.3 shows the nearfield response of the bottom port on the R 8's rear panel, which reflex-loads the isobaric woofers. The port response peaks between 30Hz and 60Hz, extending the isobaric woofers' output. The port behind the top woofer is where a rear-firing midrange unit vents; I haven't shown it in this graph.

The black trace below 300Hz in fig.4 shows the complex sum of the nearfield responses, each weighted in the ratio of the square root of the radiating areas and compensating the acoustic phase for the differences in distance from a nominal farfield microphone position.[4] It peaks in the region covered by the internal isobaric woofers; the rolloff below that region has an approximate slope of 18dB/octave. Above 300Hz in fig.4, the trace shows the R 8's farfield response, averaged across a 30° horizontal window centered on the recommended axis. The balance is relatively even. The depression in the presence region may well have contributed to my estimate of the loudspeaker's sensitivity being slightly lower than the specification. The output between 100Hz and 450Hz is also a little lower than that between 500Hz and 1.6kHz.

Fig.5 shows the R 8's horizontal radiation pattern, normalized to the response on the recommended axis, which thus appears as a straight line. (The physical limitations of perform-

4 See stereophile.com/content/measuring-loudspeakers-part-three-page-6.

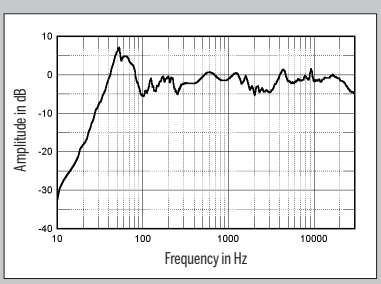

Fig.4 Audiovector R 8, anechoic response on listening axis at 50", averaged across 30° horizontal window and corrected for microphone response, with the complex sum of the nearfield responses plotted below 300Hz.

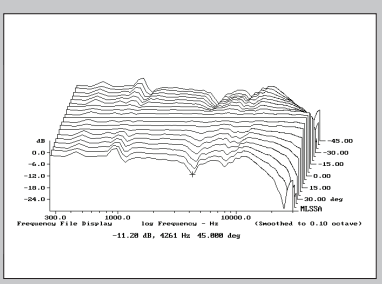

Fig.5 Audiovector R 8, lateral response family at 50", normalized to response on listening axis, from back to front: differences in response 45°–5° off axis, reference response, differences in response 5°–45° off axis.

in the best way. Nothing stood out. What I heard from the pink noise was consistent with an overall balance in which the bass is slightly elevated relative to the treble but without any prominent peaks.

Next up, the warble tones from the *Stereophile Editor's Choice* CD (16/44.1 FLAC rip from Stereophile STPH0016-2). In the bass, listening at a level of about 80dB, (C-weighted, measured with pink noise), I heard strong, even output (with some fluctuations due to room interactions, not too severe) down to 31.5Hz; the two lowest tones, at 25kHz and 20kHz, were easily audible but significantly lower in subjective level.

Listening to the midrange warble tones, I noted a slight reduction in level—just audible—in the lower midrange. That's consistent with what I heard with music, although I didn't notice it listening to music.

The first real music track I listened to with the R 8 Arreté was "Visions," the Stevie Wonder song, performed by Cécile McLorin Salvant on her album *The Window* (24/96 FLAC, Mac Avenue/Qobuz, and LP, Mac Avenue MAC 1132LP). The most striking aspect of this recording is the immediacy and physicality of the vocal: I have heard her live several times, and on this recording Salvant herself is in the room. Would that immediacy and physicality be retained through the R 8, which fires some of its midrange energy to the rear for added ambience?

But first things first: The piano comes before the vocal. Sullivan Fortner's piano was more spacious-sounding than I'm used to—quite a different presentation but no less natural. Salvant's voice, when it entered, was significantly farther back on the stage than it was with the Magico A5s, for example. The Audiovectors have a meaningfully different spatial presentation than that of the speakers that preceded them in my listening room.

Did Salvant's voice lose any presence, vividness, or corporeality? Not meaningfully, which surprised me. The vocal was no less intimate than it usually is. It didn't seem affected by the added ambience. The piano now occupied a different, more resonant acoustic than the voice.

This was a subtle thing, and it's not unnatural. Setting aside the fact that the vocal was probably recorded in an isolation room, and that studio effects could be added, the degree of resonance or room sound is determined by where the mikes are placed. Salvant is close-miked while the piano

measurements, continued

ing the measurements in JCA's room restricted the off-axis measurements to 45° to the sides rather than my usual 90°.) The loudspeaker's dispersion is relatively even, with apparent peaks and dips off-axis compensating for dips and peaks in the on-axis output. The tweeter starts to become directional in the top audio octave, as expected. Fig.6 shows the Audiovector's vertical dispersion, again normalized to the response on the recommended axis. Usefully, the response 5° below the recommended axis, which will be close to JCA's listening axis, is not dissimilar to the response on the recommended axis, though the depression in the mid-treble deepens a little. A large suckout develops at 3.55kHz more than 5° below that axis. The output in the tweeter's passband increases a little as you move above the recommended axis.

The red trace in fig.7 shows the Audiovector R 8s' $^1/_{10}$ octave-smoothed, spatially averaged response in Jim Austin's room. (The spatial averaging[5] tends to average out the peaks and dips below 400Hz that are due to the room's resonant modes.) The blue trace shows the spatially averaged response of the Magico A5s taken under identical conditions, other than the presence of subsonic noise from JCA's building's heating/ventilation system, which could not be turned off on the morning that I performed the A5 measurements. The heating system was not operating when I measured the Audiovectors; the red trace in fig.7 therefore plots their output down to a lower frequency than the Magicos'. Because the loudspeakers have different sensitivities, I have normalized their outputs in the lower midrange and mid-treble in this graph.

Both pairs of speakers have an excess of midbass energy in-room, which I suspect will be due, at least in part,

5 Using MLSSA to generate white noise, I averaged 20 $^1/_{10}$-octave-smoothed power spectra, individually taken for the left and right speakers in a rectangular grid 36" wide by 18" high and centered on the positions of Jim Austin's ears, which were 36" from the floor.

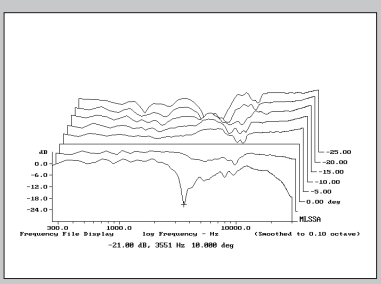

Fig.6 Audiovector R 8, vertical response family at 50", normalized to response on listening axis, from back to front: differences in response 25°–5° above axis, reference response, differences in response 5°–10° below axis.

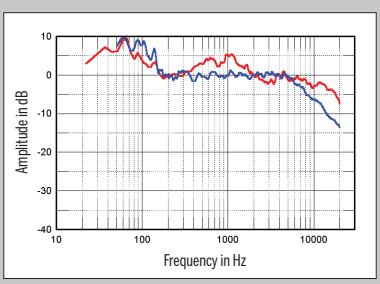

Fig.7 Audiovector R 8, spatially averaged, $^1/_{10}$-octave response in JCA's listening room (red), and of Magico A5 (blue).

is miked—well, I'm not sure how or where, but well outside the piano case, so there's more room sound on the piano.

Still, I wondered: What would happen if the piano and the voice *were* in the same acoustic? This album is a mix of live (recorded at NYC's Village Vanguard) and studio tracks (Sear Sound Studios), so I didn't have to go far for a live comparison. I put on Salvant and Fortner's account of Bernstein and Sondheim's "Somewhere," from *West Side Story*, another track I turn to often in reviews.

This live track didn't sound that much different than "Visions," which is an impressive engineering feat. The piano was still more resonant than the vocal, somewhat more distantly miked; the voice was still intimate and direct and a bit farther back on the stage than I'm used to. Which presentation—this one or the one I'm more used to—is truer to the source? I can't say. As I've written before, data in a FLAC file don't really make sound, do they?

At the climax of this song—"Somewhere"—Salvant sings loud, and, at natural listening levels, it *sounds* loud: almost piercing but also natural and real. This was true also with the Magico A5 and the Magico M2. Good speakers give you all the dynamics the music has to offer.

Similarly, on "I've Got Your Number," pianist Fortner hits a few notes *hard*. Once, with the volume front-row Village Vanguard loud (although this track was recorded in-studio), I jumped. Again, good. I don't want speakers to protect me from scary things.

As I listened more, I adapted to the R 8's distinctive presentation, as one does. I stopped hearing it as *different* from what was here before and instead heard it for what it is, on its own merits, the new default. I put on another familiar

recording—my reissue of *The Paul Desmond Quartet featuring Don Elliott* (LP, OJC-119, originally Fantasy 3235). Very clean, explicit, with good transients, good rhythm. Slightly more spacious-sounding than I'm used to hearing. (It's a mono recording, so I'm hearing more reverb.)

On John Atkinson's recording of Robert Silverman playing the Liszt B minor sonata (16/44.1 rip from *Stereophile* STPH008-2), at about 11:20 of the first movement, *Lento*

measurements, continued

to the excitation of the low-frequency modes in JCA's room. Compared with the A5s, which have an impressively even balance at the listening position, the Audiovectors produce too much output in the upper midrange and slightly too little in the presence region. With an unflat response like this, whether the upper mids will be heard as exaggerated or the lower mids and treble will be heard as suppressed depends on the music being played. I listened to one of my recordings on the R 8s—"In Paradisum" from the Portland State Chamber Choir's *Translations* album—and was impressed not only by the well-defined stereo imaging but also by the loudspeakers' excellent midrange articulation. This may well have been the result of the balance shown in fig.7.

The R 8s have a little higher output than the A5s in the top two audio octaves, but if you take as a reference the level at 1kHz, the in-room response slopes down in a generally smooth manner. A speaker that has a flat measured top-octave output in an in-room measurement will sound as if the highs are tilted up.

In the time domain, the R 8's step response on the recommended axis (fig.8) reveals that the tweeter and woofers are all connected in positive acoustic polarity. The decay of the tweeter's step smoothly blends with the positive-going start of the top woofer's step, but there is a second arrival, presumably from the middle woofer, 200µs later. The slight rise just before 6ms in this graph might be the output of the isobaric woofer—looking at its nearfield output revealed that it is also connected in positive acoustic polarity. Other than ridges of delayed energy at the frequencies of the treble peaks in the on-axis farfield response, the R 8's cumulative spectral-decay plot (fig.9) is relatively clean.

With its multiple drive-units, each covering a different passband but with significant overlap, the Audiovector R 8 is the most complex loudspeaker I have ever measured. Whether it is more complex than it need be can only be determined by listening, and for that I refer readers to JCA's auditioning comments.**—John Atkinson**

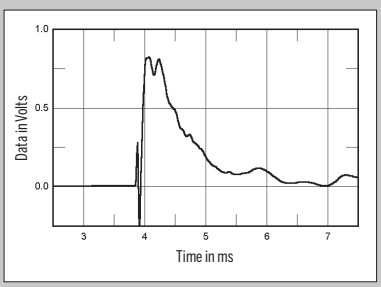

Fig.8 Audiovector R 8, step response on listening axis at 50" (5ms time window, 30kHz bandwidth).

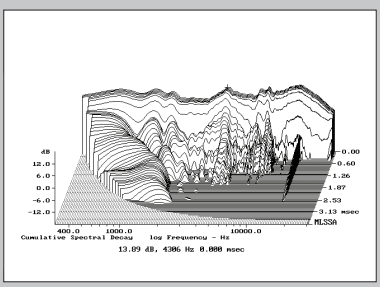

Fig.9 Audiovector R 8, cumulative spectral-decay plot on listening axis at 50" (0.15ms risetime).

Assai, those big chords were very big indeed, noisy in a good way, every tone so distinct I could count 'em. The metal in those strings was easy to hear, especially in the long reverberation tails as the notes faded out one by one.

The R 8's imaging was impressive, and not just from the sweet spot. I put on some Charles Mingus, *Mingus Ah Um* (24/192 FLAC Columbia/Qobuz). I moved my listening chair several feet to the right so that it was lined up with the inside edge of the right speaker, to see whether the soundstage would survive there. It did, and very well. The piano, which normally comes almost entirely from the left speaker, continued to come almost entirely from the left speaker. When the whole band entered, it filled the space between the two speakers. This is another speaker that, like the Magico A5 that preceded it in this room, projects a complete stage even when you're far off the center line. Audiovector attributes this good off-axis behavior to the SEC concept—which, the website says, "means the soundstage stays intact, wherever you are positioned." I attribute it to good horizontal dispersion.

However, the SEC—all those drivers firing in different directions in measured amounts—is surely responsible for what I found to be the speakers' most distinctive and appealing feature: their presentation of soundstage depth.

In several recent reviews, I've mentioned the third movement of Mahler's Symphony No.2 with Benjamin Zander and the Philharmonia Orchestra (24/192 ALAC file, Linn Records). I've emphasized the challenge that recording poses to the reproduction of bass instruments—specifically the massed double basses at a particular moment in the third movement, as first noted by John Atkinson in his review of the Pass Laboratories XA60.5 monoblock amplifier.[3]

But this recording isn't good only for a single moment. It's a great orchestral recording, a profound pleasure, and it presents many opportunities to take the measure of an audio component. Whenever I listen, I start at the beginning.

I put on the third movement. Immediately I heard something unfamiliar in this very familiar recording, something happenening in the percussion section way at the back of the soundstage.

At the very beginning of the movement, there's timpani, and then, about 10 seconds in, *different* timpani, even farther back. But it's the quiet bass drum at 14 seconds that most drew my attention—that I found especially moving.

These percussion instruments are oh so far away, way back on a vast stage carved out from space in my room by the orchestra's own sound, extending well beyond my back wall. I've listened to this many times and know it well, but here, familiar music was subtly transformed—or maybe not subtly at all. The illusion of depth was much stronger with the R 8s than I'm accustomed to, and it made a strong emotional impression.

It's fascinating to me how a rag wrapped on a stick gently bumping a stretched membrane and recorded in London can be so moving here in my NYC living room. Put this same music, the same notes, in a plane between the loudspeakers, without the depth, and it would be ignorable. We like to say it's about the music, but for me it is about the sound, too, equally. Music, after all, is made up of sound. It is a distinction without a difference.

Something similar happened at the 3-minute mark when a snare (or is it that pile of sticks, called *ruthe* in Mahler scores?) plays along with the timpani. Once again, these instruments, together, mapped out a space far back behind the plane of the speakers. Again, it touched something inside.

ASSOCIATED EQUIPMENT

Analog sources Thorens TD-124 turntable (reconditioned by Schopper AG) with Thomas Schick 12" tonearm; Ortofon Xpression cartridge; SME 30/12 turntable with V-12 tonearm and Ortofon Windfeld Ti cartridge (in for review).
Digital sources Intel NUC computer with SSD drive running Roon Optimized Core Kit; Denafrips Avatar CD transport; Synology DS918+ 4-bay Network Attached Storage device with 16TB; TP-Link 8-Port Gigabit network switch (unmanaged); PS Audio DirectStream and dCS Rossini DACs.
Preamplification Auditorium 23 Standard step-up transformer, Pass Laboratories XP-27 and Sutherland Engineering prototype phono preamp, Pass Labs XP-22 line preamplifier; Zesto Leto Ultra II line preamplifier.
Power amplifiers Pass Labs XA60.8 monoblocks.
Cables Digital: AudioQuest Carbon, Cinnamon & Coffee, Comprehensive Connectivity DXLRP-DXLRJ-6EXF (all USB). Interconnect: Clarus Crimson (RCA, XLR). Speaker: Clarus Crimson.
Accessories PS Audio Power Plant P10 power conditioner, Oswalds Mill Audio slate plinth (under Thorens), Butcher Block Acoustics RigidRack.—**Jim Austin**

Summing up

Some speakers I've heard that radiate energy in many directions gain an enhanced sense of space but only at the expense of articulation, image corporeality and specificity, and other virtues. The R 8s managed to avoid that trade-off: They achieve an enhanced sense of space while *retaining* exemplary articulation and precise, fleshy images.
They manage this, I'm thinking, via careful balancing: Not counting the bass, the amount of energy being launched in directions other than forward is modest. "Rear radiation is about 20% of front radiation," Ole told me.

As I wrote at the beginning of this review, the Audiovector R 8 Arreté is more complicated than your typical loudspeaker. But what I *heard* from the R 8s was anything *but* complicated: It was pure and coherent and easily grasped. It was commendably neutral but also slightly sweet and a touch warm, with bass that, while extended, was not overprominent in this room. The spatial presentation was quite special, especially the perception of depth. The R 8 Arreté managed this while remaining articulate and rendering concrete, precise images.

Let's not forget about the appearance. Tastes vary, but my tastes are mine and I'm the one writing this: This is one of the most attractive loudspeakers I've encountered. It's classical but also edgy—just a little bit.

I'm tempted to call the R 8's presentation *relaxed*. Instead, I'll choose a different word: *free*, which I admit I picked up from the Audiovector literature, where freedom is a prominent concept. It's not empty marketing: It's easy to see how the concept informs the R 8's design, and you can hear it in the R 8's sound. There's never a sensation of pent-up energy with these speakers. The R 8 Arretés release their music into the air in a way that seems effortless—and free. ■

3 See stereophile.com/content/pass-labs-xa605-monoblock-power-amplifier.

MANUFACTURERS' COMMENTS

THIS ISSUE: Representatives of WallyTools, Shaknspin, QHW, Cyrus, Naim, Focal, Audiovector, TechDAS, Canton, Boulder, and Pro-Ject respond to our reviews of their products.

Naim and Focal

Focal and Naim belong to the VerVent Group, which combines both brands as leaders of high-end audio and electronics. Each brand develops its best products, which can be enjoyed on their own but that also work perfectly together. We love to hear consumers enjoy the combo of Focal and Naim products, but we also let consumers choose electronics or speakers that match perfectly with their expecta-

tions. The sound experience, the design, and the features are a personal journey, and as a manufacturer developing universal high-end products, we aim to help them to find their best match.

Romain Vet,
VP Marketing and Communications
Focal Naim America

Audiovector R 8 Arreté

Firstly, I'd like to thank Jim Austin for his thorough and comprehensive appraisal of the R 8 Arreté. I'm proud and humbled that he found many aspects in the design that we also focus on as a target for our end users. The R 8 (and indeed R 11) offers the pinnacle of Audiovector performance, consequently delivering the best possible sonic reproduction within its parameters. The goal behind the speaker was to deliver genuine class-leading performance that brings the listener *into* the music, with a large-scale, open, and holographic sound. Realistic dynamics, scale, and accurate bass performance were also significant considerations—all within a traditional, yet luxurious, Danish design. Indeed, many concepts and features that were originally developed for the R 8 have migrated over to be utilized throughout the rest of our portfolio.

Since Ole Klifoth founded the company in Copenhagen more than 40 years ago, his absolute goal was always musical communication—and that crucial element remains in our work to this day. The "free"-sounding element of the R 8 is something that we feel to be not only the essence of that particular design but also the ethos of everything that we do.

We are considerably proud of the fact that Audiovector adheres to handcrafting our loudspeakers in Denmark. In addition to exceptional build quality, we strive to offer universally admired Scandinavian levels of visual elegance and simplicity that are discrete but attractive additions to any interior. However, ultimately—and perhaps somewhat ironically considering our attention to visual appeal—we aim for a performance level from all Audiovector products where the listener forgets the speakers in front of them and simply enjoys open, involving, free-flowing music, not boxes!

Mads Klifoth, CEO
Audiovector

TechDAS Air Force Zero

As the one who conceived, developed, and designed Air Force Zero, I already had an idea of this ultimate turntable in my mind when the Air Force One was launched. Although the Air Force One was designed to have the best performance in the market in as compact a size possible, there were a few concessions we had to make, just like with any product in the world.

When designing the Zero, we aimed to remove all the limitations so as to realize the best ever record player in history in performance and musicality. Our goal was to fulfill the following six aims.

1) To play back all energy engraved in the groove of a vinyl disc.
2) To minimize surface noise and scratch noise generated on the vinyl.
3) To minimize any tracking error.
4) To reduce resonance on the disc.

5) To achieve a smooth and precise rotation without mechanical and electric noise by maximizing the moment of inertia.
6) To create a turntable without musicality compromised vs reality.

By pursuing these aims, we have achieved the highest level of musical energy, a black background, and a sense of air in reproduction so that it delivers the breathing voice of the artist with all its subtleties.

Hideaki Nishikawa,
TechDAS

Canton Reference 7K

Thanks to John Atkinson for his thorough review and test of the Canton Reference 7K.

We at Bluebird Music are happy to have brought Canton loudspeakers back to the US and Canada; as John notes, Canton does indeed have a strong presence in Europe, where it is one of the largest-selling brands.

As a company, Canton is remarkable in that their two European factories produce virtually everything in-house: cabinets, drivers, crossovers, and even some passive components. They truly *build* speakers—not just assemble them or have them assembled by a contractor. As a result, the level of technology offered in even modestly priced Canton products is off the charts, and build quality is second to none. John noted how closely the two speakers were matched, at their worst differing by no more than an incredible ±0.25dB. These are levels of precision generally associated with electronics, not speakers!

It is particularly rewarding to read how the Reference 7K satisfied "both Atkinsons": the technical analyst and the musician. Canton is one of the few audio companies whose products are able to please both the demanding objectivist and the music lover who just wants to feel the music. The elegant designs and finishes are icing on the cake.

It's wonderful to read John's descriptions of his listening experiences using terms generally associated with far more expensive speakers: "The clarity of these [piano] crashes as reproduced by the Cantons was impressive, as was the low-frequency extension"; "The Reference