

KALMAN RUBINSON

Perlisten S7t

LOUDSPEAKER



received an email from a longtime press representative I've known for years, telling me about a new loudspeaker company he's representing. The company is bursting from the gates with a line of products that includes floorstanders, standmounts, wallmounts, surrounds, center channels, and a range of subwoofers.

Looking at the pictures, the products do look much more elegant, well made and ambitious than those from the usual hi-fi startup, but still, I'm thinking, I've heard a lot of clever and ambitious fluff like this before: a full-blown catalog of

SPECIFICATIONS

Description Four-way loudspeaker in bass-reflex (or sealed) enclosure. Driveunits: 28mm beryllium-dome and two 28mm thin-ply carbon-diaphragm tweeters in a "DPC" waveguide; four 180mm thin-ply carbon-diaphragm woofers. Crossover frequencies: 500Hz, 1.1kHz, 4.4kHz. Frequency response: 80Hz-20kHz (±1.5dB), 22Hz-37kHz (-10dB). Typi-

cal in-room bass extension: 16Hz. Impedance: 4 ohms (3.2 ohms minimum). Sensitivity: 92dB/2.83V/m. Recommended amplifier power: 100-600W RMS. SPL capability (100Hz-20kHz): 117dB peak at <2% 2nd and 3rd harmonics. **Dimensions** 51.25"

(1301.9mm) H × 14.4" (365mm) W × 18.5" (470mm) D including base. Weight: 122.5lb (55.7kg). Finishes Gloss Ebony. Options are Piano black, Gloss white, Cherry (gloss or matte), Mahogany (gloss or matte), Oak (gloss or matte), Ebony (gloss or matte).

Serial numbers of units reviewed

10004064/10004065. Manufactured in China.

Price \$17,990/pair, piano

black and white, \$19,995/ pair for "special edition" wood finishes. Approximate number of US dealers: 10. Warranty: 5 years.

Perlisten Audio, 807 Liberty Dr., Verona, WI 53593. Tel: +1 (414) 895-6009. Web: perlistenaudio.com. US distributor: Fidelity Imports LLC, Web: fidelityimports.com. home theater-friendly speakers and, as is common these days, manufactured in China.

I beg off saying that I'd really like to find out who is behind this and, if at all possible, some rather granular technical detail about, say, the big floorstander. Put up or shut up.

Shortly thereafter, I got what I asked for but didn't expect: specific and detailed answers to my questions.

"Perlisten" is short for Perceptual Listening. The company was conceived and organized during the period 2016–2019. They designed and produced their first six products in 2020 and made their worldwide debut in 2021. The principal managers are Daniel Roemer and Lars Johansen, both of whom have long résumés that include technical and management positions with major speaker companies.

Second, and more significant to me, Perlisten provided detailed technical and test-and-measurement data that is well beyond what is common in this industry.

Hi-fi companies, like other companies, always offer poetic blandishments and



dwell on certain physical enhancements perceived as being marketable. Perlisten, of course, also makes marketing claims-but the company also presents data: graphs of frequency response (on- and off-axis), impedance, phase, and distortion, and spectrograms showing off-axis response along vertical and horizontal axes. Floyd Toole's work made a strong case for such measurements,1 which these days are most often obtained with a Klippel Near-field Scanner² or a similar proprietary system, but few companies publish such detailed information about their products. I hope Perlisten's transparency will encourage other companies to provide this information.³

While such transparency doesn't assure a slam-dunk, it grabbed me by the collar and shouted "We are serious!" So I asked for the big floorstander, the S7t.

When the S7t's arrived, I was glad to

1 Toole's book, Sound Reproduction: The Acoustics and Psychoacoustics of Loudspeakers and Rooms, is in its third edition. Kal's Stereophile review of the first edition is at bit.ly/3nFxHJQ. 2 See bit.ly/3nC4q2I.

3 I'm sure that one reason Perlisten is so forthcoming with measurements is that the S7t's measurements are so outstanding.**-Jim Austin**

MEASUREMENTS

he center of the Perlisten S7t's DPC high-frequency driver array is just 32" from the floor. While the distributor had placed the loudspeaker on a 3"high dolly when he delivered it, I wasn't able to lift the speaker any higher for the measurements. (It weighs 122.5lb.) I therefore performed my farfield frequency response measurements at 1m rather than my usual 50" in order to push the reflections from the floor as far back in time as possible. (I allowed for the slight tiltback of the loudspeaker's front baffle, to ensure that the microphone was on the central tweeter axis, and I didn't use the vestigial grille.) I used DRA Labs' MLSSA system, an Earthworks microphone preamplifier, and a calibrated DPA 4006 microphone to measure the Perlisten S7t's farfield behavior, and an Earthworks QTC-40 mike for the nearfield responses.

Perlisten specifies the S7t's sensitivity as a high 92.2dB/2.83V/m, which was confirmed by my B-weighted measurement. The S7t's impedance is specified as 4 ohms nominal, with a minimum magnitude of 3.2 ohms. Using Dayton Audio's DATS V2 system, I found that the impedance magnitude (fig.1, solid trace) remained above 4 ohms for much of the audioband with minimum values of 3.125 ohms at 147Hz and 2.47 ohms between 14.5kHz and 16.3kHz. The electrical phase angle (dashed trace) is occasionally high when the magnitude is low. For example, there is a combination of 4.7 ohms and -45° at 88Hz, a frequency where music can have a high level of energy. The EPDR¹ drops to 2.2 ohms between 32Hz and 39Hz, 1.5 ohms between 93Hz and 111Hz, and 1 ohm at 20kHz. The EPDR also lies below 3 ohms for the entire midrange. The S7t should be used with amplifiers that don't have problems driving 2 ohm loads, though the drive difficulty will be alleviated by



Fig.1 Perlisten S7t, electrical impedance (solid) and phase (dashed) (2 ohms/vertical div.).

the speaker's high sensitivity.

The traces in fig.1 are free from the small discontinuities in the midrange that would imply resonances of some kind. When I investigated the enclosure's vibrational behavior with a plastic-tape accelerometer, I found a couple of resonant modes in the midrange (fig.2). However, these are low in level and have a relatively high Q (Quality Factor), both of which imply that they will not affect sound quality.

The saddle centered on 27Hz in the

1 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.



Fig.2 Perlisten S7t, cumulative spectral-decay plot calculated from output of accelerometer fastened to center of sidewall level with the second woofer from the top (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

have help setting them up-definitely not a oneperson job. Three masked men—Steve Jain of Fidelity Imports, his son Ethan, and a friend-made quick work of assembling and positioning the S7t's, which came in a spectacular Gloss Ebony finish. The substantial-looking rectangular cabinet bears what at first glance appears to be five drivers mounted to a thick, meticulously sculpted front panel. On the rear is a glamorous polished brass panel with two massive pairs of multiway binding posts fitted with jumper plates. Below that is a perforated rectangular metal grille that is echoed on the side panels; they function as the vent when the S7t is used in its standard, bassreflex mode. A 27.5lb steel



The satisfaction I derived from the S7t extends beyond bass and dynamics.

plate attached to the base supports four adjustable outrigger feet. Spikes are optional.

When you look closer, you see that the S7t has seven drivers, not five. Four of those—two on bottom, two up top—

are 7" (180mm) woofers. Between them is a carefully contoured waveguide-an acoustic lens-that is roughly the same size as the woofers. Its central element is the 28mm (1.1") beryllium-dome tweeter. Closer examination reveals two additional 28mm domes embedded at the top and bottom edges of the lens so that their perforated covers preserve the lens's contour; these domes are made from "thin-ply" carbon. Perlisten calls this central assembly the Directivity Pattern Con-

trol (DPC) waveguide. This feature is central–literally and figuratively–to Perlisten's Signature and Reference speakers.

These flanking carbon-dome drivers together function as a midrange driver; the central beryllium dome is, as you might expect, a tweeter—although Perlisten calls it a "fullrange tweeter." The DPC controls horizontal and vertical dispersion—the latter effect minimizing early reflections from floor and ceiling. The dome midrange drivers have much less moving mass than a traditional midrange cone, which should result in better transient response, lower distortion, and higher efficiency. (Perlisten specifies the S7t's sensitivity at 92dB/2.83V/m.)

measurements, continued

impedance magnitude trace suggests that this is the tuning frequency of the reflex-loaded woofers. The red trace in fig.3 shows the nearfield response measured at one of the vents at the speaker's base. There is a broad peak centered on 27Hz but also significant output in the midbass region before the response rolls off steeply above 80Hz. The blue trace below 350Hz is the summed nearfield response of the four woofers. Although the information sheet on Perlisten's website says that the woofers can be operated



Fig.3 Perlisten S7t, acoustic crossover on tweeter axis at 1m, corrected for microphone response, with the nearfield response of the ports (red) and the summed nearfield responses of the woofers (blue), respectively plotted below 220Hz and 350Hz. with the reflex ports open or closed, all four woofers behaved identically, with a minimum-motion notch at the port tuning frequency, which indicates that the ports were open. The boost in the upper bass is an artifact of the nearfield measurement technique, which assumes that the radiators are mounted in a true infinite baffle, ie, one that extends to infinity in both planes. When corrected for this, the woofer's upper- and mid-bass output will be flat.

The blue trace above 350Hz in fig.3



Fig.4 Perlisten S7t, anechoic response on tweeter axis at 1m, averaged across 30° horizontal window and corrected for microphone response, with the complex sum of the nearfield responses plotted below 300Hz. shows the farfield response of the woofers. The woofers at the top and bottom of the front baffle start rolling off above 600Hz, but the two woofers closest to the DPC array cross over to the farfield output of the array (green trace) at 1.4kHz, with then a steep, 18dB/octave rolloff. The DPC array rolls in steeply with what appears to be a 24dB/octave slope. Its output is flat in the low and mid-treble, though a slight peak is apparent at 10kHz. The tweeter's fundamental dome response can be seen at 23.7kHz, safely above



Fig.5 Perlisten S7t, lateral response family at 1m, normalized to response on tweeter axis, from back to front: differences in response 90° - 5° off axis, reference response, differences in response 5° - 90° off axis.

While the Perlisten spec sheet calls the S7t a four-way system, it is by no means a typical four-way. The top and bottom woofers are slowly rolled off around 500Hz; the other two (sandwiching the DPC) roll off about an octave higher. All three drivers in the DPC come into operation around 1.1kHz. The peripheral carbon domes roll off at about 4.4kHz. The central beryllium-dome tweeter extends up to and beyond the top of the audible band; the specified upper end of the S7t's range is 37kHz, -10dB.

It was apparent to me that the transitions between the large cones and the domes and the central dome and the flanking ones would require something other than classic textbook crossovers. Roemer confirmed that it is "atypical" and that there is "greater overlap" than one often finds among the drivers. He also said that he didn't much like specifying crossover frequencies "because this implies [a] traditional approach." Perlisten's approach, he told me, was to "not think in terms of manipulating driver+Xover to match a set of electrical filter ideals," ie, fourth-order





Butterworth, and then to force each driver to handle a specific bandwidth. Instead, they wanted it "all to work together to meet the design goals" and to "create a single coherent wavefront." This, he said, is "where speaker imaging comes in" and "how the speakers can virtually disappear." He suggested that I "walk toward the speaker while playing some music with vocals, keep-

ing your head approx. on the main axis." He indicated that I would find that "it is difficult if not impossible to point to a single transducer creating the sound."

"This makes for a rather complex X-over, but well worth it given the outcome," he said.

Unusually, Perlisten speakers are designed to be used either sealed or bass-reflex (ported)—the latter achieved by plugging the downfiring port. Throughout this audition, I listened in bass-reflex mode, which, according to specifications, extends the response down to 22Hz

the audioband. Fig.4 shows the S7t's farfield response averaged across a 30° horizontal window centered on the tweeter axis. The nearfield bump in the upper bass is present, but overall the response is impressively even in the midrange through to 7kHz or so. There weren't any significant differences when I repeated this measurement with the grille covering the DPC array (not shown).

The S7t's horizontal dispersion is shown in fig.5. (The traces are normalized to the response on the tweeter axis, which thus appears as a straight line.) Other than a slight off-axis flare



Fig.6 Perlisten S7t, vertical response family at 1m, normalized to response on tweeter axis, from back to front: differences in response $15^{\circ}-5^{\circ}$ above axis, reference response, differences in response $5^{\circ}-10^{\circ}$ below axis.

in the presence region, the loudspeaker's radiation pattern is smooth and even up to 6kHz. Above that frequency, the DPC array's radiation pattern starts to narrow, which might make the speaker sound a little airless in very large rooms. The Perlisten's vertical dispersion, again normalized to the response on the tweeter axis, is shown in fig.6. The loudspeaker's balance doesn't change appreciably over a wide $\pm 10^{\circ}$ window, though a suckout at the crossover frequency starts to develop 15° above the tweeter axis. Don't listen to this speaker while standing.

In the time domain, the S7t's step



Fig.7 Perlisten S7t, step response on tweeter axis at 1m (5ms time window, 30kHz bandwidth).

response on the tweeter axis (fig.7) reveals that all the drive-units are connected in positive acoustic polarity. The decay of the DPC array's step smoothly blends with the positivegoing start of the woofers' step, which implies optimal implementation of the crossover filters. The S7t's cumulative spectral-decay plot (fig.8) is superbly clean, especially in the region covered by the DPC array.

To say that I was impressed by the Perlisten S7t's measured performance would be an understatement. It typifies excellent loudspeaker engineering. —John Atkinson



Fig.8 Perlisten S7t, cumulative spectral-decay plot on tweeter axis at 1m (0.15ms risetime).

(-10dB), with in-room response down to an impressive 16Hz.

Listening

Initially, the S7t's were placed where my Revel Ultima Studio 2s had been. My first impression was of a full and clean sound, which I found quite pleasing. After a short time, I realized that the soundstage seemed crammed between the speakers and that imaging was a bit vague. I was enjoying the clarity of the mid and low bass and very good dynamics but, overall, it was not what I expected. I removed the speaker grilles, but that yielded no improvement.

My eyes were drawn to the DPC array, the treble source, which was situated significantly lower than tweeters on most floorstanding loudspeakers. The central tweeter dome is 32" from the floor, lower than



The impact was much as it would have been live from good seats. It was thrilling.

typical ear height and lower than my ears at my sofa (38"). I adjusted the front feet to tilt the speakers up a bit so that the speakers' axes were aimed at my head, but that made no audible difference. I asked Dan about it (while not admitting what was going on). He then told me, in detail and with illustrations, that the "S7t has a 2° tilt back" and that the "design reference axis is at the 2° angle (meaning, it is much higher at a distance)." Consequently, at my initial listening distance of about 12', the reference axis of the tweeter is at 37 $^{1}/_{4}$ ". My ears, at 38", were quite close to that axis. In fact, at 12', the $\pm 2^{\circ}$ window encompasses ear heights from 32–42"; at 10', the $\pm 2^{\circ}$ window ranges from 32" to 40 $^{3}/_{8}$ ".

Clearly though, this speaker was not immune to placement/boundary issues. More effort in positioning them was the only remaining option, so I moved them around. They ended up not far from where they started but somewhat closer to me (10.5' rather than 12') and closer together (7.5' rather than 8'). The Super Bass Traps I keep on the sidewalls were moved from just in front of the speakers to a position behind them. Given the wide horizontal dispersion of the S7t, it seems likely, in retrospect, that the traps were absorbing a significant amount of the medium- and high-frequency early reflections that contribute to the sense of immersion and soundstage width.⁴

Listening anew

One of my favorite recordings for solo and grouped voices with instruments is "Nobody" on Ry Cooder's album *Jazz* (Warner Bros 3197-2, CD). This track has always seemed somewhat artificial in that the male voices, which are warm and forward, contrast sharply with Cooder's vocal solos, which are cooler and more distant. Sometimes I co-localize Cooder's guitar with his voice, while at other times it seems integrated with the other instruments.

With the Perlistens in their sweet spots and I in mine, placement of the instruments was perfectly clear. More than that, the relationships between them and their tonal characteristics were more consistent and seemed less artificial. This has been one of my "go to" cuts for years; hearing them rendered this way left me impressed with the S7t.

An obvious next step was to "Sister Rosetta Goes Before Us," from Allison Krauss's *Raising Sand* (Rounder 11661-9075-2, CD) on Qobuz. Much as I love this, it's another track with sonics that have per-

plexed me in the past. The S7t's sorted it out. Krauss's voice is pure and sweet, as is her violin. The bloat I'd heard in the bass with other speakers was gone; the bass lines remain full and decisive. I'm used to having multiple subwoofers and yet, with the S7t, I do not feel bass-deprived because the lows I hear are full, dynamic, taut, and balanced at all listening levels—not only when played loud.

Let's find out how well the Perlistens do with tracks with serious bass. First I listened to several performances of Saint-Saëns's Third Symphony, which, of course, vary in their rendering and balance, from the classic with Charles Munch with the Boston Symphony Orchestra (RCA Red Seal 82876-61387-2, SACD) to the recent audiophile recording with Michael Stern and the Kansas City Symphony (Reference Recordings RR-136, SACD). In every case, it was easy to pick out and follow the organ's bass line in the second movement, even when the playing was soft and slow. However, with Stern's Reference Recordings take, the impact of the opening and the run-up to the conclusion of the finale was awesome. The dynamic capabilities of the S7t's exceeded anything that I've heard before in this room.

I had a similar experience with the opening scene of Bartók's *Miraculous Mandarin*, which depicts chaos and danger in the city. The danger is ominously intoned in a passage scored for organ and low brass, including a bass tuba. Some recordings fail to give this passage sufficient weight, rendering it toothless. Others, such as Antal Dorati's Detroit Symphony recording (Decca 411 894-2, CD), give it full and fearsome power, to the point where the sound clogs on lesser systems. Not so with the Perlisten S7t's, which filled my room with huge, angry pulsing and set me up for the awful events to come.

For a final demonstration of the S7t's dynamic capabilities, I picked some Mozart! No kidding, Mozart, but with a little help from some friends. One of my longtime favorite discs, *Dream of the Orient* (DG 474 9922 SACD),

⁴ The Ready Acoustics Chameleon Super Sub Bass Traps are not tuned bass traps. Rather, they're thick (6") sound-absorbing panels. Consequently, they absorb at high and midrange frequencies at least as much as they do in the bass. The manufacturer claims that they absorb all the way down to 20Hz, but, seeing as how a 20Hz wave has a wavelength of 55', there can't be a lot of absorption going on at the lowest frequencies.—Jim Austin

pairs Concerto Köln with the Ensemble Sarband, which Wikipedia describes as a "German early music ensemble with musicians from 7 nations, focusing on musical connections between Orient & Occident; Jewish, Christian & Muslim music." This album attempts to demonstrate the bidirectional flow between the classical music of Europe and the traditional (and formal) music from cultures farther East. Of the many lovely surprises on the wonderful album, none is more arresting than the Overture to Mozart's opera Die Entführung aus dem Serail. A brief, improvised introduction in dulcet tones precedes the Overture, which begins as listeners would expect. Then, after the brief statement of the main theme in the strings, Ensemble Sarband piles on and there is an explosion of strings, winds, and exotic percussion. I set the volume to a comfortable level for the intro, but now there was much more of a *jump!* at the *tutti* than I'd ever heard before. The impact was much as it would have been live from good seats. It was thrilling.

I got to thinking that the S7t would be great for Bruckner, Mahler, Wagner, and other Romantic composers who carry melodic lines in the lower strings and brass. So it was with the second movement of Bruckner's 7th Symphony, where so much of the action flows through the cellos and bass fiddles with commentary from French horns. Herbert von Karajan's 1970–71 DG recording with the Berlin Philharmonic, remastered in DSD (Esoteric EES 90059), was as warm and rich as ever, but the Perlistens delivered new details in the lower strings and a greater sense of depth.

The satisfaction I derived from the S7t extends beyond bass and dynamics. This speaker is superb on subtler fare, such as the delightful *French Duets* (Hyperion LC 7533) on which Paul Lewis and Steven Osborne play music for four hands by Faure, Poulenc, Stravinsky, Debussy, and Ravel. The music is charming and playful, and the piano tones were as clear and light as champagne bubbles.

Zuill Bailey's recent recording of Bach's Cello Suites, on the PS Audio–sponsored Octave Records (OCT-0008, 2 SACDs + 2 DataDiscs), is a triumph musically and technically. Bailey's 2008 recording of the suites was highly praised, but this new one—made in January of 2021, a year into the COVID-19 pandemic—reveals a more mature artist, seasoned by time and circumstance. Bailey's instrument is well-defined, centrally placed, and quite far forward, set within a comfortable (but not distracting) ambiance. As reproduced by the S7t's, Bailey's tone was full, and the distinct contributions of bow, strings, and wood were easy to hear and appreciate. Two-plus hours disappeared gracefully.

A comparison

I compared the Perlistens to my Revel Studio2 speakers sequentially by moving each into their ideal positions, and by placing them side by side and using an A/B toggle switch. When comparing them sequentially, I noted that the Revels' soundstage was consistently wider but their tonal balance was thinner, particularly in the upper bass. Conversely, the Perlistens had a more even tonal balance and, while the soundstage was not as wide, it was just as deep as that cast by the Revels. It was, as Dan Roemer said it would be, impossible to localize any sound to the individual Perlisten drivers.

I got similar impressions in the direct A/B comparisons, although in this round of testing, the tonal balance differences seemed less striking than I expected. I consistently preferred the fullness of male voices with the S7t's, but that preference could be erased by invoking Dirac Live correc-

ASSOCIATED EQUIPMENT

Digital sources Oppo Digital UDP-105 universal disc player, custom Baetis Prodigy-X4i music server running JRiver Media Center v28 and Roon 1.8, exaSound s88 streaming DAC and Okto DAC8 Pro D/A processors. QNAP TVS-873 NAS for file storage.

Preamplifiers 3 Topping Pre90 for gain/buffer. Coleman Audio 7.1SW for source switching.

Power amplifiers Benchmark AHB2, NAD C298. Loudspeakers Revel Ultima2 Studio with IsoAcoustics Gaia I isolation feet. Revel Performa3 F206 for surrounds. Two SVS SB-3000 & one SB-2000Pro subwoofers. Cables Digital cables: AudioQuest Coffee (USB). Analog interconnects: AudioQuest Earth/DBS balanced, Kubala-Sosna Anticipation (RCA and XLR). Speaker cables: Benchmark Studio&Stage, Canare 4S11 (Blue Jeans Cable). AC cables: Kubala-Sosna Emotion, SignalCable MagicPower 20A.

Accessories AudioQuest Niagara 5000 and Brick-Wall BrickWall 8RAUD power conditioners, Teddy Pardo 12V PS (for exaSound s88), HDPLEX 400W ATX Linear Power Supply and CyberPower 850PFCLCD AC filter (for the Baetis server).

Listening room 24' L × 14' W × 8' H, furnished with 2 MSR Acoustics Dimension4 SpringTraps in the front corners, 2 Ready Acoustics Chameleon Super Sub Bass Traps to the sides, and moderately sound-absorbing furniture. Front wall has large windows partly covered by fabric drapes and 4" thick 2' × 4' OC 705 panels. Rear of room opens into 10' × 7' foyer and a 12' × 8' dining area.—Kalman Rubinson

tion with the Studio2s. Overall, and without the advantages of Dirac Live, the S7t seemed more neutral and relaxed. The Revels offered a wider soundstage and also more midrange detail, but, in extended listening with the S7t's, I didn't miss them.

Conclusion

The Perlisten S7t reminded me of no other passive speaker that I have heard before. The closest comparisons in my recent memory are both DSP-controlled loudspeakers: the Dutch & Dutch 8c and the Kii Three. What all have in common is their dispersion. The Perlistens, though, are entirely passive, much larger, and seemed capable of dynamic response beyond what the smaller, active speakers could achieve; that's from memory of course. Driving the S7t's, my Benchmark AHB2 amplifiers never blinked—assisted, no doubt, by the S7t's 92dB sensitivity.

It's rare to find an audio product, let alone a loudspeaker, that is beyond reproach. The S7t is one such loudspeaker. True, it doesn't shake the room,⁵ but that's a virtue, not a vice: It has ample bass and plays plenty loud. The result is a system that sounds transparent, producing music not obscured at any listening level.

Overall, the Perlisten S7t is the best speaker I've heard in this room. It should be considered by anyone seeking long-term musical satisfaction without practical limitations. New company, new speaker, new world.

⁵ If you want more bass, and I sometimes do, the right way to do it is to add one or more subwoofers, properly placed and properly equalized. Perlisten's range of subs looks quite appealing.