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Pioneer S-1EX LOUDSPEAKER

Kalman Rubinson

One of the highlights of such annual events as the Consumer Electronics and Primedia Home Entertainment shows has been the demonstrations of loudspeakers from TAD, the professional division of Pioneer Electronics. Designer Andrew Jones is always generous in using recordings brought by visitors, and enthusiastic in explaining the technology behind these beautiful behemoths. Among these speakers' unique features are a beryllium dome tweeter mounted concentrically inside a beryllium midrange cone, and a cabinet built of stacked, carved horizontal sections, for incredible rigidity without using exotic materials or excessive mass. The concentric upper-range driver is a reminder that, some time back, Jones worked for KEF, where the coaxial UniQ driver was developed, but the materials and details of the TAD drivers are all new. While the TAD Model 1s are always good for musical and audiophile thrills, their price is in the upper five figures, which put them out of serious purchase consideration.

However, at the 2006 CES, I found Jones in the Pioneer room, just downstairs from the TAD room, demonstrating Pioneer's new EX speaker line, which is derived directly from the technology developed for the TAD products. That demo, of the stand-mounted S-2EX ($6000/pair), was very encouraging; the demo at HE2006 last May of the larger S-1EX ($9000/pair) convinced me that I had to get a pair for review.

DESCRIPTION Three-way, reflex-loaded, floorstanding loudspeaker. Drive-units: 1⅜" (35mm) beryllium-dome tweeter with aluminum voice-coil and concentric 5.5" (140mm) magnesium-cone midrange unit, two 7⅛" (180mm) aramid-cone woofers with 2.5" (64mm)-diameter voice-coils. Port: 5" opening. Crossover frequencies: 400Hz, 2kHz. Frequency range: 28Hz–100kHz. Nominal impedance: 6 ohms. Sensitivity: 88.5dB SPL Distortion at 4W, 100Hz–10kHz: <0.7% second harmonic, <0.35% third harmonic. Maximum power: 200W.
FINISH Genuine dark teak veneer (satin finish).
DIMENSIONS 50½" (1283mm) H by 16⅝" (422mm) W by 24" (609mm) D (with base). Weight: 145.5 lbs (66.1kg).
SERIAL NUMBERS OF UNITS REVIEWED None visible.
PRICE $9000/pair. Approximate number of dealers: 6.
MANUFACTURER Pioneer Electronics USA, P.O. Box 1540, Long Beach, CA 90810. Tel: (800) 746-6337. Web: www.pioneerelectronics.com.

Description

Some months later, two large transit cases, each the size of an armoire, appeared at my back door—along with Andrew Jones, who assisted in unloading them. That task was quite easy, and shortly I was alone with the S-1EXes.

Why they don't bear the TAD badge and its attendant cachet rather than the Pioneer logo with a fancified EX modifier is a long story that involves Pioneer's worldwide marketing decisions rather than any effort to distance themselves from the TAD name. Nonetheless, we've seen many mass marketers try to invade the High End with worthy products, only to fail because the typical audiophile couldn't bear to have a Sony or a Samsung nameplate. Heck, even the Japanese big three auto makers, Honda, Toyota, and Nissan, invented new names and distribution channels in recognition of the need to differentiate their high-end models from their regular lines. Let's hope that the S-1EX will be the exception to the rule; it will be sold through "selected" Pioneer EX dealers and is not simply a gussied-up mass-market box. It's a genuine effort to offer cutting-edge speaker technology at an affordable price. Of course, affordable is highly subjective, but an order-of-magnitude reduction in price from the TAD-1 is significant on anyone's scale.

The S-1EX is a handsome black column with a subtly complex shape. Its cross section is almost trochoid—that is, its curve is generated by a point on the radius of a circle or the radius extended as the circle rolls on a fixed straight line—and the front and sides are gently convex. Jones maintains that the use of curved construction results in greater stiffness than would result from flat panels of the same thickness. The thickness of the panels ranges from 3" on parts of the front to 1.25" on the sides, which are built up from ⅛"-thick layers that are curved before being

ERIC SWANSON

laminated together. The S-1EX comes mounted on a heavy base plate whose adjustable feet give the speaker a wide stance. With its feet flat on the ground, the cabinet leans slightly back and is absolutely stable. In addition, almost the entire front of the cabinet is deeply scooped out from top to bottom, with the drivers mounted in a vertical arc. This is done so that each driver is equidistant from and aimed directly at the listener.

And what special drivers these are! The coaxial tweeter-midrange—or, as Pioneer calls it, the Coherent Source Transducer (CST)—consists of a beryllium-dome tweeter that shares a dual-gapped neodymium magnet with a magnesium-coned midrange unit. (The TAD drivers use beryllium, with its high ratio of stiffness to mass, for both the tweeter and midrange.) The coaxial arrangement means that these two drivers essentially act as a *single* driver that provides controlled and symmetrical radiation for all frequencies from the low hundreds up to 100kHz. The S-1EX also has two 7" woofers with cones made of layers of aramid, carbon fiber, and polypropylene, with neodymium magnets and diecast aluminum chassis—all features of the TAD system as well. The complex, composite crossover uses series and parallel elements to divide the frequencies among the drivers, control their in-band frequency responses, and ensure that the overall system presents a sensible load to the amplifier.

To sum up: The S-1EX has four drivers in three chassis, vertically arranged on the front panel, below them an artfully sculpted 5" port. At the bottom of the rear panel are nice biamp terminals. There are no tone controls or doohickeys.

Sound

My first impression of the S-1EX was of clean, balanced sound, with the exception of some lumpiness in the

MEASUREMENTS

At an estimated 89.5dB(B)/2.83V/m, the big Pioneer's voltage sensitivity was both significantly higher than average and a little higher than the specified 88.5dB. My measurement is close to being within experimental error of the specification, but there is no doubt that the S-1EX will play loud with lower-powered amplifiers. However, its impedance drops to 3.6 ohms in the upper bass (at 115Hz), and there is a demanding combination of 4.36 ohms magnitude and –50° capacitive phase angle at 88Hz (fig.1). As most music has considerable energy in this frequency region, this speaker will work best with a good amplifier rated at 4 ohms. The shape of the magnitude trace in fig.1 suggests that tube amplifiers might well sound both bright and a bit boomy with the S-1EX, due to the usual Ohm's Law interaction of their high output impedances and the speaker's impedance.

The traces in fig.1 are free from the small wrinkles that would imply the presence of enclosure resonances, and despite its size, the S-1EX's cabinet is surprisingly inert. The only vibrational mode I could find was at 289Hz, on both sidewalls, level with the lower woofer (fig.2), but this is well down in level and very probably benign.

The saddle at 33Hz in the impedance-magnitude trace suggests that this is the tuning frequency of the 5"-diameter reflex port at the base of the front baffle. Measuring the port's response in the nearfield—*ie*, with the microphone capsule in the port's opening—gave the curve shown to the left of fig.3. It does peak as expected at 33Hz, with a smooth rolloff above that frequency bro-

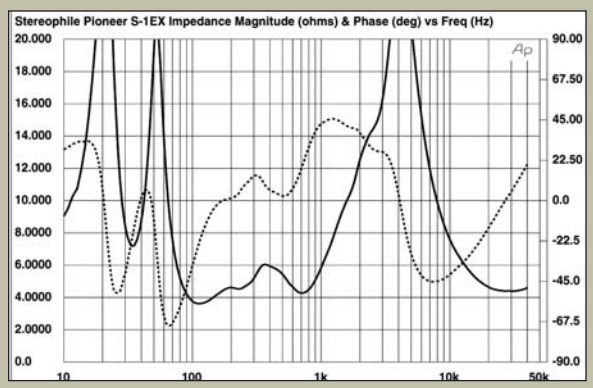

Fig.1 Pioneer S-1EX, electrical impedance (solid) and phase (dashed). (2 ohms/vertical div.)

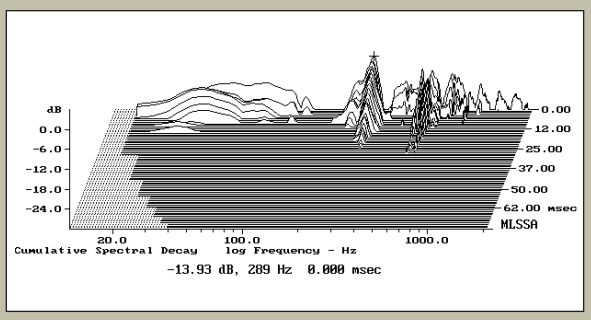

Fig.2 Pioneer S-1EX, cumulative spectral-decay plot calculated from the output of an accelerometer fastened to the cabinet's side panel level with the lower woofer (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

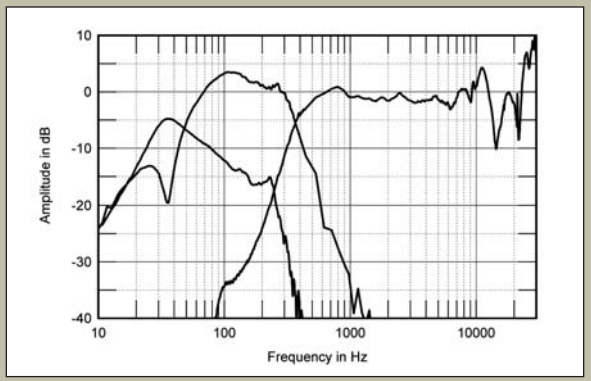

Fig.3 Pioneer S-1EX, acoustic crossover on tweeter axis at 50", corrected for microphone response, with the nearfield responses of the port, woofer, and midrange plotted below 400Hz, 350Hz, and 450Hz, respectively.

bass that demanded that I experiment with the speakers' positions. Andrew Jones assisted with this, and before he left, the S-1EXs were positioned to his liking. However, I now thought they lacked a little in the bass. Over the next week or so, I moved them a bit farther from the sidewalls and toed them in a bit more to reach what sounded to me like smooth neutrality. I listened to them this way for quite a while before realizing that, when listening, I was always sitting much more erectly than mere alertness required. I placed a ⅝"-thick board under the rear feet of each speaker base so that the speakers themselves sat a bit straighter. (I could have adjusted the feet and gotten the same effect, but I'd already packed the provided tool away with the shipping cartons.) At my listening distance of about 14', this placed the axes of the CST drivers exactly at the level of my ears. That was it!

At every musical task I set it, the S-1EX was simply outstanding. Most important, it was devoid of any identifiable tonal coloration through the mid to high frequencies. That, coupled with its great transparency and crisp transients, made it sound more like a full-range

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ken only by a slight discontinuity at 200Hz, this coincident with a similar small discontinuity at the same frequency in the woofer's nearfield response (fig.3, top trace at 100Hz, which shows the sum of the individual woofer outputs). The traces in this graph are plotted in the ratio of the square root of the radiating diameters; the port's level is a little lower than required to fully support the output of the twin woofers, which I assume is why KR felt the S-1EX sounded a touch bass-shy at times. But like Kal, I feel that this kind of reflex tuning actually serves music better because of the relative lack of boomy overhang, while the usual boundary reinforcement will extend the low frequencies in a typical room.

Looking higher in frequency in fig.3, the crossover from the woofers to the midrange unit takes place just below 400Hz, with close to symmetrical third-order slopes (though the woofers' ultimate rolloff is faster than that). The coaxial HF-and-midrange drive-unit is impressively flat through most of its passband, but there are the inevitable on-axis peaks and dips in the top audio octave, due to the tweeter's symmetrical acoustic environment. These smooth out at 30° and more to the sides, as shown both by my own measurements (see later) and by Tom Norton's measurements for our sister website *Ultimate AV* (www.ultimateavmag.com/speakersystems/1006piosex/index5.html) . Note that the tweeter's output continues to rise out to this graph's upper limit of 30kHz. This unit really does have extended ultrasonic response.

Fig.4 shows how these individual responses add up in the farfield, averaged over a 30° horizontal angle on the tweeter axis. The top-octave interference effects in the tweeter's output can still be seen, though I doubt they will be audible, unless the radiation pattern reinforces their effect (see later). The overall balance is smooth, with no hint of problems in crossover integration. Still, I wonder if the slight peak visible in the upper midrange is associated with the slight lack of image depth noted by KR. The treble region is also plateaued down by a couple of dB, which might make the speaker sound a bit polite. The lower midrange and upper bass do feature a rise in level; while some of this will be due to the nearfield measurement technique, some is indeed real, and possibly contributes to the speaker's occasionally "puddingy" low frequencies. But the S-1EX does offer impressive low-frequency extension overall.

Comparing the response above 10kHz in fig.4 with the plot of the speaker's lateral dispersion (fig.5; only the

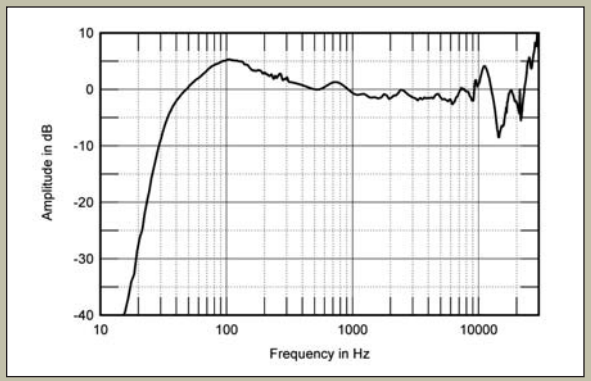

Fig.4 Pioneer S-1EX, anechoic response on tweeter axis at 50", averaged across 30° horizontal window and corrected for microphone response, with the complex sum of the nearfield responses plotted below 300Hz.

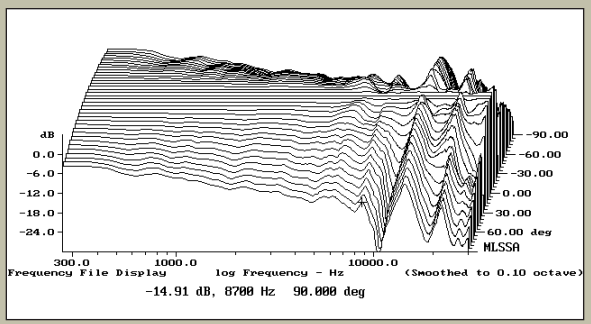

Fig.5 Pioneer S-1EX, lateral response family at 50", normalized to response on tweeter axis, from back to front: differences in response 90–5° off axis, reference response, differences in response 5–90° off axis.

planar than a conventional box speaker. Like planars, it seemed to be able to throw the music into the room rather than let it expand backward behind the speaker plane. Unlike most planars, it was as good with the precision imaging of a single instrument—a solo violin, say—as with a full orchestra or choir. Whether the violin was off to the side, as in the opening solo in Fritz Reiner and the Chicago Symphony's recording of Rimsky-Korsakov's *Scheherazade* (SACD/CD, RCA Living Stereo 66377-2), or dead center, as in Julia Fischer's spectacular new performance of Tchaikovsky's Violin Concerto with Yakov Kreizberg and the Russian National Orchestra (SACD/CD, Pentatone PTC 5186 095), it was both dead stable in position and full-bodied in tone.

The S-1EX's large soundstage representation was wide and tall, though less deep than a warmer, richer speaker would make it, and at first I missed that depth. However, I have no way of knowing *exactly* how far behind the orchestra the choir stood during the recording of, say, Sibelius' *Kullervo*, by either Sir Colin Davis and the London Symphony (SACD/CD, LSO Live LSO0574) or Robert Spano and the Atlanta Symphony (SACD/CD, Telarc SACD-60665). In the former, the entry of the men's chorus in Part 2 is thrilling, the deep voices spread broadly across the back of the soundstage just behind the detailed and somewhat sleek strings and winds. The Spano at first seemed even more spectacular in its greater depth for both chorus and orchestra, but over time I realized that the prices paid for that depth were wind placements that were less than natural and slightly muted upper strings. The Pioneers made explicit all the spatial and tonal differences between these two recordings while

measurements, *continued*

changes are shown, which means that the on-axis response appears to be a flat line), the on-axis dip and peak between 10kHz and 20kHz both smooth out to the speaker's sides, meaning that the energy in-room will be smoothly balanced in this region. Below 10kHz, the contour lines in this graph are extraordinarily smooth and even, correlating with the stable and accurate stereo imaging noted by KR. In the vertical plane (fig.6), the S-1EX's balance doesn't appreciably change over quite a wide angle, meaning that the Pioneer should be tolerant of listener ear height—a good thing in a speaker whose tweeter is placed a high 42" above the floor. However, I note that Kal did have to experiment with vertical listening axis.

The Pioneer's step response on the tweeter axis (fig.7) indicates that all four drive-units are connected with the same positive acoustic polarity, this confirmed by looking at the individual steps (not shown). Despite the tweeter's setback, its output arrives first at the microphone, followed by the midrange unit's output, and finally by the woofer output. In each case, the step of the higher-frequency unit smoothly hands over to that of the next lower in frequency, this correlating with the excellent frequency-domain integration seen in fig.4. The S-1EX's farfield cumulative spectral-decay plot (fig.8) is generally clean, with some ridges of delayed energy apparent in the top octave, these perhaps associated with the on-axis interference noted earlier.

I have followed Andrew Jones' career since his days working with Laurie Fincham at KEF in England, and I am not surprised that the Pioneer S-1EX measures so well. Its owner gets a lot of loudspeaker and a lot of excellent speaker engineering at a very competitive price. *—John Atkinson*

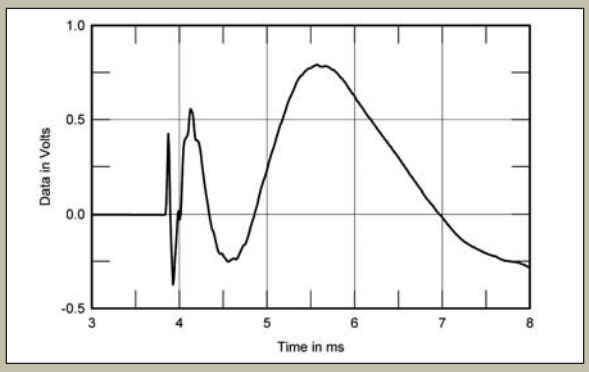

Fig.7 Pioneer S-1EX, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

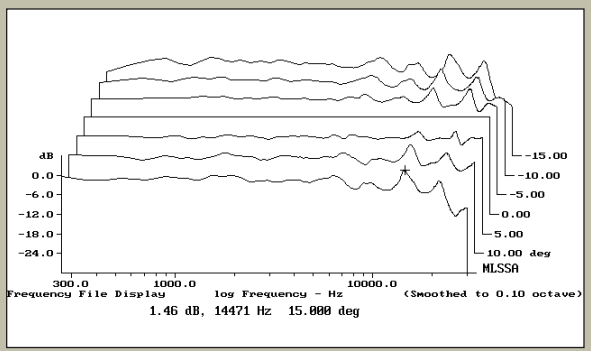

Fig.6 Pioneer S-1EX, vertical response family at 50", normalized to response on tweeter axis, from back to front: differences in response 15–5° above axis, reference response, differences in response 5–15° below axis.

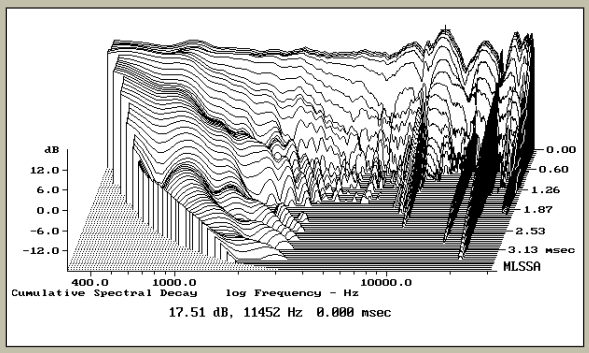

Fig.8 Pioneer S-1EX, cumulative spectral-decay plot at 50" (0.15ms risetime).

also making both quite satisfying. With such variables, it was hard to find fault with the S-1EX.

With smaller-scale recordings, the S-1EX did everything I asked. In fact, it was eminently clear that Patricia Barber's voice on *Modern Cool* (SACD/CD, Mobile Fidelity UDSACD 2002) should not be softer or louder than one specific volume setting, and at that setting the piano, bass, and all the stars were in perfect alignment for a stunningly realistic presentation. Solo guitar, too, was clean and ripe, with all the details of fingers on strings in appropriate measure. In fact, I found myself gravitating toward music rich in transients so that I could revel in the Pioneer's abilities to reveal all the details.

Listening to a new reissue of the 1973 Decca/HEAD recording of Roberto Gerhard's brilliant and blistering adaptation of Camus' *The Plague*, with speaker Alec McGowan, Antal Dorati, and the National Symphony Orchestra and Chorus (CD, Explore EXP0005), I was continually startled by the intimacy of the vocal parts and the power of the orchestra. McGowan's matter-of-fact narration was chilling—through the S-1EXs, he seemed to speak to me from a seat in my own room, as all the plague-driven panic and chaos raged outside. The S-1EX's midrange and treble are great.

The S-1EX also had excellent bass extension and detail, and, when called on, could deliver a terrific wallop. It did sound a bit bass-shy at times, but that was due in part to what I heard as a highly damped tuning of the drivers and cabinet. This contributed in no small measure to the speaker's overall transparency and openness throughout the entire audioband—I wasn't distracted by any spurious muddiness or boom. For example, wide-range organ recordings sounded glorious, with granitic, stygian pedal tones. It was only when I listened to low timpani and bass drums that this overdamping seemed to dull the impact and presence a wee bit. All I had to do was transfer all bass below 50Hz to a JL Audio f113 subwoofer and it was clear that the Pioneers could do a little better. Sure, this wasn't fair—the JL is a dedicated bass transducer with an adaptive room equalizer that has improved the bass of every speaker I've used it with. Still, the best is the enemy of the good, and the S-1EX is better in the bass than underdamped speakers that spew woolly bass all around the room.

A comparison with my resident B&W 802D speakers was interesting. Central imaging and transparency were equally good. The Pioneers threw a wider, more forward soundstage, but one more limited in depth than the B&Ws'. Joel Fan's piano on his eponymous recital disc (CD, Reference RR-106) was pearly clear and fairly forward through the Pioneers, but I heard more of the instrument's body wood and more of the ambient space with the B&Ws. The Pioneer give the impression of greater transient quickness and brilliance, but a careful comparison suggested that this might have been the consequence of its overall balance, which can seem tilted toward a treble balance higher than the B&W's. Despite all these impressions, Julia Fischer's violin sounded remarkably similar through both speakers.

I did most of my listening with a pair of Bel Canto REF-1000 monoblocks that, fortuitously, I'd recently installed in my system. Andrew Jones had used this class-D amplifier for his impressive demos at HE2006, and we agreed that the match was symbiotic. Although I tried other amps with varying degrees of success, I kept coming back to the Bel Cantos. The Classé CA-3200 and the Mark Levinson No.433 provided more midbass slam without adding any bloat, and sweetened the extreme treble, but the basic honesty of the S-1EX's midrange remained unaffected. The downside of both the conventional amps was their emphasis of the S-1EX's slightly puddingy reproduction of bass drums and low electric bass. This was probably the only flaw in the Pioneers' otherwise faultless performance, and mating them with the Bel Canto amps minimized it with no further damping or rolling-off of the bass.

THE S-1EX IS **BETTER IN THE BASS** THAN UNDERDAMPED SPEAKERS THAT SPEW WOOLLY BASS ALL AROUND THE ROOM.

ASSOCIATED EQUIPMENT

DIGITAL SOURCES Sony XA-9000ES SACD/CD player, Bel Canto PL-1A universal player.
PREAMPLIFIER Bel Canto Pre6.
POWER AMPLIFIERS Bel Canto REF-1000 monoblocks; Classé CA-3200, Mark Levinson No.433.
LOUDSPEAKERS B&W 802D, JL Audio f113 subwoofer.
CABLES Digital: Stereovox HDVX. Interconnect: Crystal Cable Cinemax multichannel, AudioQuest Cheetah /DBS balanced. Speaker: AudioQuest Mont Blanc/DBS biwire. AC: JPS Aluminata.
ACCESSORIES APC S-15, Environmental Potentials EP-2450 power conditioners. *—Kalman Rubinson*

Conclusions

I never bought into "trickle down economics" before, but Pioneer and Andrew Jones have applied the audio technology they learned in making the TAD Model 1 to a much less expensive speaker that has retained a disproportionate amount of the TAD's performance. Sure, $9000 is not pocket change. On the other hand, the S-1EX is fully competitive with higher-priced speakers that have spent time in my listening room, such as the B&W 802D ($12,000/pair) and the now-discontinued Revel Ultima Studio ($15,000/pair)—and with anything I've heard in demos. In regard to ease of placement in a domestic room not exclusively dedicated to listening, the S-1EX surpassed all other speakers I've used. This means that anyone who buys the Pioneer is more likely to enjoy optimum results than with more finicky speakers.

If you've read this far, you know that I love the Pioneer S-1EX. It is a full-range speaker with great transparency, dynamic potency, and truly neutral tonality. The speaker's ease of placement and setup are aided by its ability to immediately and easily reveal how it is affected by changes in position—when the Pioneers are in the right places, you'll know it. Then you'll stop thinking about the S-1EX and all its technological features, because you'll be listening to the music. Ladies and gentlemen, we have a winner.