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## BUYER'S GUIDE TO LOUDSPEAKERS

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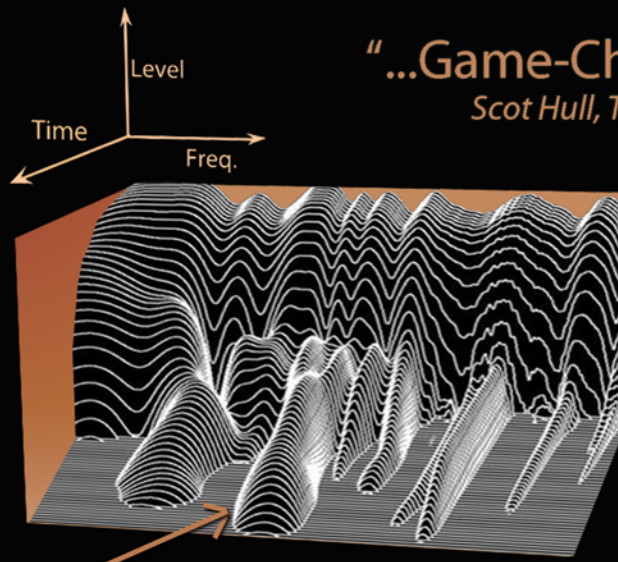
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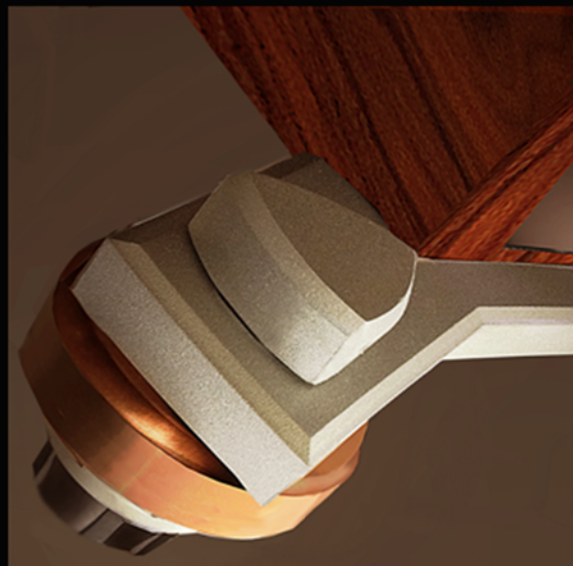
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Wayne Meyers, Home Theater Shack



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# From the Editor

## Welcome to the 2015 Buyer's Guide to Loudspeakers!

Herein the editors at *The Absolute Sound* offer you our most comprehensive on-line guide yet. Not only do we deliver a full roundup of the most recent and intriguing TAS loudspeaker reviews (twenty-nine of them!); we also offer a host of new goodies, such as a lengthy essay on speaker placement excerpted from the latest (fifth) edition of Robert Harley's classic *Complete Guide to High-End Audio*.

In addition to the loudspeaker reviews and Robert's "Speaker Placement Secrets," you'll find:

- "Sneak Previews" of brand-new loudspeakers about to be reviewed in TAS.
- "Further Thoughts" on selected loudspeakers that have been previously reviewed.
- "Our Top Picks," in which our reviewers pick the best loudspeakers in five categories at a wide range of prices.

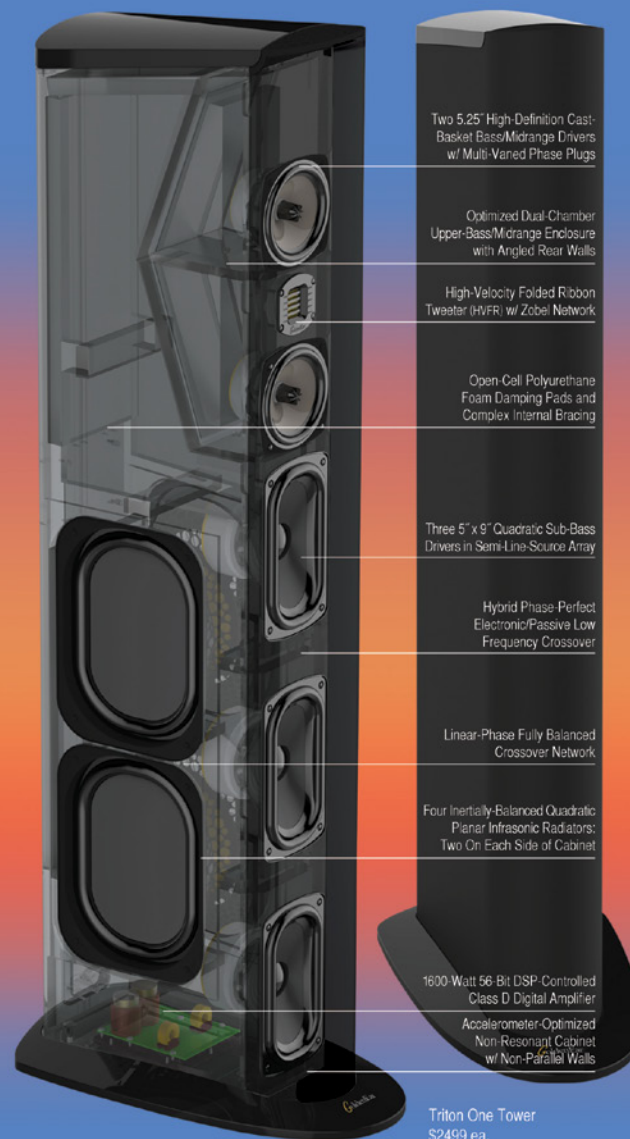
Whether you're new to the high-end scene or a seasoned vet, we think you'll find this guide a fun read and an invaluable resource to help with your purchasing decisions.

Happy listening!

Julie Mullins, Editor

## GoldenEar has Engineered Our New Triton One to Perform Like a \$20,000+ Super Speaker!

### "Product of the Year 2014 – The Absolute Sound"



### "Best Sound for the Money at CES 2014"

– Jonathan Valin, Kirk Midskog and Neil Gader, *The Absolute Sound*

When three of *The Absolute Sound*'s top reviewers all choose the same product for their "Best Sound for the Money at CES" honors, you know it is something very special. And when *The Absolute Sound*'s senior writer, Anthony Cordesman, writes a rave review, calling them, "intensely musical", says that, "You can get lost in the lifelike reproduction" and praises their, "exceptional bass performance" as well as their, "exceptional soundstage and imaging performance." you know we are speaking about a truly epic and iconic loudspeaker.

"An absolute marvel ... shames some speakers costing ten times as much."

– Caleb Denison, *Digital Trends*

Introducing the Triton One, an evolutionary loudspeaker that builds upon all the advanced technologies that have made the Tritons mega-hits around the world. This new top-of-the-line flagship has been engineered to deliver even better dynamics and bass than the extraordinary Triton Two, along with further refinement of all aspects of sonic performance. In the words of HD Living's Dennis Burger, the Triton One, "creates visceral, tangible waves of pure audio bliss" and deliver, "the sort of upper-echelon performance that normally only comes from speakers whose price tags rival a good luxury automobile".

"Extraordinary sound quality and value ... one of the best buys in speakers ... they provide sustained musical pleasure and exceptional realism. Highly recommended."

– Anthony Cordesman, *The Absolute Sound*

Yes, great sound is what it is all about. HiFi+’s Chris Martens raved the One is, "Jaw-droppingly good" and delivers, "a dazzling array of sonic characteristics that are likely to please (if not stun)", calling it, "one of the greatest high-end audio bargains of all time". And *Stereophile* called them, "A Giant-Killer Speaker", with Robert Deutsch writing, "And yet, the mere fact that it's not unreasonable to compare the sound of the \$4999 Triton One with the sounds of speakers costing tens of thousands of dollars more per pair says a lot about the GoldenEar's level of performance." Hear them for yourself and discover what all the excitement is about!

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# On the Horizon

Neil Gader

## Burmester Ambience Series

The Ambience BA 71 is a three-way, bass-reflex floorstander that owes its lean elegance and elemental bass power to its four identical, compact, front-firing woofers that are further supported by a bass-reflex port. Two mid/bass drivers per loudspeaker guarantee tonally well-balanced reproduction up to the treble register, for which a new Air Motion Transformer (AMT) was custom-developed. A second rear-firing AMT on the back of the cabinet optimizes the omnidirectional behavior, bonding the listening room into the sound experience. The front baffle is constructed of rigid, solid aluminum and is decoupled from the elaborately braced solid wood (MDF) body. Both elements are available in a variety of finishes. A diminutive version of the BA 71 Ambience, the BA 31 2.5-way loudspeaker, is also available and is well suited for smaller environments.

**Price:** BA 71, \$55,000/pr.; BA 31, \$25,000/pr. burmester.de



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[www.kef.com/us](http://www.kef.com/us)







### Crystal Cable Arabesque Minissimo

The two-way Minissimo represents a radical departure from the previous plate-to-plate construction of the original Arabesque flagship. Instead, its cabinet is milled from a single piece of metal-loaded polymer, a fully automated process that creates a monocoque enclosure allowing for control over the walls' curvature as well as their thickness. This precision structure further optimizes the resonant behavior of the cabinet and of the volume of air enclosed inside it. Equipped with the identical drivers used in the Arabesque Mini, a new Natural Science crossover topology, an integrated stand, and monocrystal internal wiring, the Arabesque Minissimo achieves unprecedented performance at a lower price. The milled cabinet also allows Crystal to use automotive paint finishes, making the Minissimo as visually versatile as it is attractive.

**Price:** \$19,995/pr. [audioplusservices.com](http://audioplusservices.com)



### Cambridge Audio Minx Min 12 and Min 22

**Micro Minx** redefines what is possible in a compact speaker. The Min 12 and Min 22 speakers are extremely small and stylish, yet both produce the type of huge sound normally associated with much larger, traditional box speakers. At the heart of Minx is BMR (Balanced Mode Radiator) technology that enables treble, mids, and bass to be delivered from just one tiny driver. BMR also delivers a 180-degree sound dispersion and an expanded sound field, so there are no sweet-spots. The Min 12 features a newly redesigned BMR driver that has been significantly improved to deliver far greater clarity. The larger Min 22 uses the same new BMR driver in tandem with a custom, dedicated woofer for improved bass handling.

**Price:** \$TBA (est. Min 12, \$119/each and est. Min 22, \$199/each) [audioplusservices.com](http://audioplusservices.com)



### Bryston Mini A

The Mini A is Bryston's new high-performance, three-way bookshelf model, engineered for superb resolution and balanced off-axis response. At just over 15" tall, the Mini A features a sleek, stylish form factor. Made sturdily from 1/4" MDF, it utilizes a premium quality 6.5" aluminum woofer, 3" aluminum midrange, and 1" titanium dome tweeter. All drivers are designed and purpose-built specifically for the Mini A. Nominal impedance is 8 ohms and sensitivity is 87dB. The Mini A design has benefitted from extensive enclosure vibration analysis, crossover network refinement, and anechoic-chamber testing in order to deliver true high fidelity at an affordable price. The Mini A is available in natural cherry, Boston cherry, and black ash; custom finishes are also available for an upcharge. The Mini A comes with a twenty-year warranty.

**Price:** \$1200/pr. (Optional stands \$299/pr.) [bryston.com](http://bryston.com)



### Legacy Audio V System

The V System advances the art of speaker design in several ways. This full-range system radiates sound in a controlled cardioid pattern to reduce sidewall interaction and sharpen image localization while broadening the sweet spot. The included 56-bit Wavelet processor is a high-performance DAC/preamplifier, a 2/3/4-way crossover with individual driver correction, and a sophisticated room-correction algorithm that reduces resonances out to 40 milliseconds. The dual 12" subwoofers are internally driven with 1400 watts of ICEpower and are capable of 1" of linear excursion. The open-air dipolar section consists of dual 14" mid/bass drivers transitioning to a pair of 6.5" midranges. The treble is handled by dual 4" AMT diaphragms positioned in a "V" pattern within a pocketed lens. The arrangement is strategically optimized to match the forward radiation of the midrange. Each driver element is aligned in the time domain for a coherent launch by the Wavelet processor. A convenient remote control app is provided for mobile devices.

**Price:** \$50,000/pr. [legacyaudio.com](http://legacyaudio.com)





### Magico Q7 Mk II

The new Q7 Mk II is a wide-ranging update of the original Q7 and includes a new diamond-coated beryllium tweeter with an enlarged surface area (28-mm), a new motor system, and an acoustically improved back chamber that together result in the lowest distortion measurements possible today in a high-frequency transducer. The new 6" midrange driver has a Graphene-based cone material which is 30 percent lighter and 300 percent stiffer than its predecessor. The driver has a +/-6mm of stabilized excursion rate at a very high sensitivity, enabling 120dB (at 1m) of distortion-free playback. Improvements to the crossover include state-of-the-art components (MCap Supreme Evo Capacitors) from Mundorf of Germany. Sensitivity is a reportedly 94dB and nominal impedance is 4 ohms. Weight: 750 pounds per speaker.

**Price:** \$225,000/pr. [magico.net](http://magico.net)



### Meridian DSP320

Meridian's DSP320 is designed to be installed as an in-ceiling or in-wall loudspeaker and is voiced to be used with any other Meridian DSP loudspeaker, including the DSP640 and DSP520 in-walls. When used in concert with Distributor3, DSP320's can provide three rooms with Meridian Sound without using a single inch of floor space. Particular care has been taken to ensure very little visual impact on their environment, with installation options including "frameless" as well as "bezeled" grilles. The metal grilles are optimized for sound quality though they can still be painted to suit, further reducing (or perhaps enhancing) their visual impact on the room. In addition to Meridian's full complement of DSP processing and unique Wide Band driver technology, the DSP320 features a long-throw "racetrack" woofer for extended bass, and dynamic range that's perfect for today's high-resolution music and movies. It delivers full DSP loudspeaker performance in a compact design, and it's MQA-ready.

**Price:** \$5000/pr. [meridian-audio.com](http://meridian-audio.com)



### Muraudio PX1 & DA1

Muraudio of Canada has introduced the world's first point-source omnidirectional electrostatic loudspeaker. Available in both passive and fully active iterations, this revolutionary all-aluminum speaker incorporates new, patented, high-output electrostatic technology, precision-engineered low-frequency drivers, superior electrical components, and stunning design. The upper ESL portion is made from three 120-degree perforated aluminum panels (outer and inner stator panels) with a 3.8-micron Mylar membrane between them. The Continuous Curve ESL panels have 5000 square cm of surface area that provides low distortion, high-output sound with perfect coherence and precise response. The lower chamber is a purpose-designed, sealed, 1/4" poured aluminum cabinet that houses three 9" low-frequency aluminum drivers. These carefully engineered drivers are built in a force-neutral, tri-axial position to cancel any resonances. With Muraudio's "Sound is Everywhere" technology, listeners hear the lifelike three-dimensional imaging that only an electrostatic loudspeaker can deliver.

**Price:** \$63,000/pr. (passive, externally amplified PX1); \$69,500/pr. (fully active, self-powered DA1). [muraudio.com](http://muraudio.com)



### Paradigm Prestige Series

Completely designed, engineered, and crafted in its Canadian facility, Paradigm's Prestige Series builds on the company's 30-year history by combining new technologies with smart engineering, harnessing cutting-edge technologies such as the Perforated Phase-Aligning (PPA) tweeter lens that protects the delicate X-PAL tweeter dome and acts as the phase plug, blocking out-of-phase frequencies for smoother, more extended high frequencies with incredible detail and higher output. Hand-built, Prestige embodies a fresh look with clean, sharp lines and close attention paid to the smallest details—from the precise workmanship of the non-resonant cabinets to the beautiful premium-grade finishes. Price: Models range from \$799/each (Prestige 15B bookshelf) up to \$2499/each (Prestige 95F floorstanding). [paradigm.com](http://paradigm.com) launch by the Wavelet processor. A convenient remote control app is provided for mobile devices. **Price:** \$799-\$2499 each. [paradigm.com](http://paradigm.com)





### REL 212SE

REL believes in subwoofers that put musical quality first, rather than simply adding power and boom. One-thousand watts is only desirable if it conveys speed and control—not only making your heart pound and the walls shake, but preserving midrange warmth and high-frequency harmonic structure alongside powerful, rich low end. The all-new 212SE is REL's most comprehensive single-cabinet design, intended for quality systems and great rooms, allowing superior speakers to spring to full voice. Housed in just over 1.5 square feet of floor space are two 1000 watts (1700 watts peak), long-stroke, 12" Continuous Cast Alloy bass engines, partnered with dual 12" passives (down and rear), creating a sound experience far beyond the 212SE's modest footprint. Recommended in singles or stereo pairs for high-end two-channel applications.

**Price:** \$4000. [rel.net](#)

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### Revel Concerta2

The new Concerta2 Series from Revel combines elegant and sophisticated modern design with the acoustical research and technical advances for which Revel is celebrated. This six-model loudspeaker series sports a patented acoustic lens waveguide design that improves tweeter-to-woofer blend and significantly improves off-axis responses for consistent performance over a wide listening area. One-inch aluminum-dome tweeters with phase rings derived from Revel's award-winning Performa3 Series work in conjunction with the waveguide to deliver detailed, articulate high-frequency response. Boasting a beautiful and functional industrial design, the Concerta2 Series (F36 pictured) has curved side panels to improve appearance while also itself decreasing internal standing waves. The clean, modern form features no visible fasteners and magnetically attached grilles. Available in high-gloss black and high-gloss white painted finishes, the Concerta2 Series brings style and sophisticated sound to any space.

**Price:** M16 compact, \$850/pr.; F35 and F36 towers, \$1500 and \$2000/pr., respectively. [revel-speakers.com](#)

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### Spatial Audio Hologram M3

The latest research from Spatial Audio into Open-Baffle (OB) loudspeaker behavior has resulted in the highly advanced Hologram M3. Scheduled for release Spring 2015, this Clayton Shaw-designed 2-way floorstander sports twin 15" high-efficiency woofers and coaxially mounted compression drivers operating above 800Hz. The M3's controlled directivity design greatly reduces room-interaction effects, producing consistently realistic sound even in difficult spaces. The combination of very-high-efficiency professional drivers with the extremely large radiating area of two woofers produces dynamic range and realism unprecedented in its price class. Precision imaging and soundstage reproduction are courtesy of M3's point-source, open-baffle transducer assembly in the upper section of this 42"-tall structure. This remarkable design offers a frequency response of 32Hz to 22kHz.

**Price:** \$1500/pr. [spatialaudio.us](http://spatialaudio.us)



### Spendor D7

The Spendor D7 is an elegant, modern, medium-sized, 2.5-way floorstanding loudspeaker that delivers music with a fresh, vibrant realism. This new level of performance is the direct result of important Spendor innovations. The innovative Spendor LPZ soft-dome tweeter is built around a stainless-steel front plate that forms an acoustic chamber directly in front of the lightweight diaphragm. The phase-correcting microfoil equalizes sound wave path lengths, while generating a symmetrical pressure environment that allows the tweeter to operate in a linear mode. The new D7 mid/bass drive unit has an advanced EP77 polymer cone, and the low-frequency drive unit uses a bonded Kevlar composite. The latest fifth-generation Spendor Linear Flow port features a twin-venturi, tapered baffle element working in harmony with Spendor's proven dynamic damping, asymmetric bracing, and rigid plinth mountings.

**Price:** \$5995/pr. [bluebirdmusic.com](http://bluebirdmusic.com)



### TAD CE1

Designed and developed entirely in-house, the TAD-CE1, a 3-way, bass-reflex bookshelf loudspeaker inherits the groundbreaking technology of the TAD-R1 Reference Series. The SILENT (Structurally Inert Laminated Enclosure Technology) enclosure features a framework of high-rigidity birch plywood combined with MDF to achieve a combination of high strength and low resonance. Thick aluminum panels attached to the sides of the cabinet further reduce resonances, while the horn-shaped openings within these panels serve as a bi-directional port system that smooths airflow and reduces port noise. The heart of the CE1 is the CST (Coherent Source Transducer) with the beryllium tweeter—the same one used in the Reference One—mounted concentrically within the midrange cone. This design provides a point source with matched arrival times from 250Hz to 100kHz. The one-piece woofer cone construction is further strengthened by the TAD-developed process that uses multiple layers of aramid fibers to provide low mass with high rigidity to resist back pressure from the cabinet. Frequency response is 34Hz-100kHz.

**Price:** \$24,000/pr. (stands \$2400/pr.) [tad-labs.com](http://tad-labs.com)



### Thiel TT1

The Thiel TT1 is part of the company's new 3rd Avenue Collection, named after the iconic thoroughfare in Nashville, the city where the company is now located. The TT1 leverages a forward-thinking approach to acoustical design and highly advanced manufacturing techniques, wrapped within an elegant form factor that signifies the revitalization of the brand. The Thiel TT1 utilizes a 4-driver array and a multi-order crossover network in a heavily braced, vented MDF enclosure. The sculpted elliptical side panels of the TT1 are created using proprietary tooling to achieve a refined visual presentation. The rigid baffle construction and midrange mounting architecture have been engineered with a focus on back-wave optimization, resulting in unusually flat response and overall clarity. The TT1 features a ten-year warranty.

**Price:** \$5798/pr. [thielaudio.com](http://thielaudio.com)





#### YG Carmel 2

The culmination of years of research, the Carmel 2 extends the leading-edge technologies of YG Acoustics' Sonja and Hailey to the two-way platform. Carmel 2 delivers the lifelike natural sound of those YG Acoustics' flagships at a price that is within reach of audiophiles who, until now, could only dream of owning a speaker of such ultra-high-end caliber. Carmel 2 proudly incorporates YG Acoustics' ultra-low-distortion ForgeCore tweeter, extremely rigid 7.25" BilletCore mid/woofer, and leading-edge ToroAir crossover inductors. Freedom from resonance, both inside and out, is accomplished with YG Acoustics' well-known aircraft-grade aluminum cabinet and innovative FocusedElimination technologies. At the heart of Carmel 2 is a model-specific DualCoherent crossover for optimal performance in both the time and frequency domains. Usable output extends from 32Hz to 40kHz.

**Price:** \$24,300/pr. [yg-acoustics.com](http://yg-acoustics.com)

# THIS *NEVER* HAPPENS. AMERICA'S TOP DEALERS *ALL* AGREE

“ The PSB Imagine T3 speakers at \$7500 a pair set a new standard for performance that can't be matched without spending more than \$20,000!”

**Brian Hudkins,  
Gramophone**

“ When I first sat down and listened to the PSB Imagine T3 (\$7500/pr.), I thought, wow, these are really good! Dynamic, powerful and effortless. The longer I sat, the more I smiled.”

**Leon Shaw,  
Audio Advice**

“ The Imagine T3 loudspeaker takes PSB to a whole new performance plateau. It's not just 'good for the money' — it's just stunning all on its own.”

**Alan Goodwin,  
Goodwin's High End**

“ The PSB Imagine T3 is truly exceptional in every important way. At \$7500 per pair, our customers will take full advantage of this high end bargain!”

**Ralph Cortigiano,  
Take 5 Audio**

“ With the Imagine T3, PSB now stands for Pure Sonic Bliss. Paul Barton hits another home run with this world-class speaker.”

**Alan Jones,  
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*Oscar Wilde.*



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# Sneak Previews



## Harbeth Super HL5 Plus

**\$6695/pr.**

Harbeth's new Super HL5 Plus speaker is a statement design from Alan Shaw, representing thirty-five years of experience manufacturing loudspeakers to the most exacting standards of accuracy and tonal neutrality as established by the BBC. Unlike all other Harbeths, however, the HL5 exists only in a consumer version (not a studio monitor) because it's Shaw's idea of what a speaker designed for home playback should sound like: frequency response subtly troughed throughout the presence region to compensate for the close miking of virtually all commercial recordings. The result is a triumph of musicality and sheer listenability that has PS so completely seduced that if he were closing up shop as a reviewer tomorrow, this new Harbeth and his beloved Quad ESLs and 2805s would be the only speakers he would hold onto. The Super HL5 Plus may be the most completely fatigue-free loudspeaker he has ever heard, and it is unquestionably one of the tiny handful of the most satisfying and enjoyable.

Review forthcoming. **Paul Seydor**



The Definition of sound.  
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**Definition has evolved.** Tannoy's class-leading contemporary loudspeaker range now offers Ti suffix models with tighter low frequency response, deeper bass and an even more engaging musical timing and coherence. Retaining the Dual Concentric™ drivers, sumptuous style and rich, expressive sound of the original models, the new Definition DC8Ti and DC10Ti floorstanding models raise the bar for acoustic performance. New plinths with integrated energy-grounding stabiliser weight, advance floor coupling system and a revised crossover with upgraded components combine to deliver an even more articulate and dynamic presentation. With birch-ply cabinets, beautiful high gloss finishes and outstanding build quality throughout, Definition Ti evolves the definition of contemporary loudspeaker design.

**TANNOY**®



### Dynaudio Focus 600 XD

**\$12,995/pr.**

In a new direction for Dynaudio, the company has embraced active digital loudspeakers with the introduction of the three-model XD line. Active digital loudspeakers receive digital signals, and incorporate within the speaker enclosure digital-to-analog conversion and power amplification. This architecture has many advantages over passive speakers driven by traditional amplifiers, including digital-domain crossovers that can perfectly tailor the signal feeding each driver while removing passive components (inductors, capacitors, resistors) from the transmission path. In the top-model 600 XD previewed here, each of the speaker's four drivers is fed from its own D/A converter, and driven by a dedicated Class D power amplifier (a total of 600W). With the addition of the Dynaudio Hub, you can connect all your analog and digital sources to the Hub, which will then wirelessly stream audio to the 600 XD. You can even add additional XD loudspeakers to other rooms and have an instant multi-room wireless audio system.

Sonically, the 600 XD delivers a rich and robust bottom end with plenty of dynamic punch. An extremely useful feature is the ability to adjust the 600 XD's bass response to your particular room. The midrange has a presence and immediacy rarely heard from passive loudspeakers, and the treble is open and extended. **Robert Harley**



### Kharma Elegance dB11-S

**\$54,000**

Kharma's innovative, new Elegance dB11-S loudspeaker is not only easy on the eyes, it's also a delight to the ears—and a 2014 winner of the CES Innovations Award. In addition to its beautiful form, the polygonal enclosure of the dB11-S is highly effective in minimizing spurious resonances. The front and rear baffles are made of bullet-wood, which delivers natural dampening and helps produce more definition in the bass range.

This three-way floorstander with moderate sensitivity (89dB) also features a "well-behaved" beryllium tweeter and twin 10-inch aluminum woofers that complement the esteemed company's remarkable Omega-7 midrange driver. Although Kharma is a pioneer in the use of ceramic drivers, the new Elegance line features the Omega-7, a 7-inch midrange cone made of strands of the highest-quality carbon fiber available. This special driver is far more costly to produce than a carbon-fiber sandwich configuration, but its superlative performance differences more than justify the means: The high-grade carbon helps eliminate smearing, and related resonances are pushed outside of the frequency range where the driver is asked to perform. This reference-quality midrange cone has stunning clarity and purity with a richer tonal character than Kharma's earlier ceramic midrange drivers. Indeed, it may be the best midrange cone driver JH has heard. If you're in the market for a reference-quality loudspeaker, be sure to audition the Kharma Elegance dB11-S. **Jim Hannon**



### Von Schweikert Audio VR-55 Aktive **\$59,995**

Built from the ground up to replace the decade-old VR-5 series of products, the VR-55 Aktive takes advantage of the latest advances in materials sciences and collaborative component manufacture to create a milestone product. Combining VSA's patent-pending Active Noise Reducing cabinet technology, a host of specially developed, custom-built front-firing drivers from Accuton and ScanSpeak, a rear-firing dipolar ribbon tweeter, a 400-watt Hypex UcD-based woofer amplifier, and an enhanced version of Von Schweikert's Time Aligned and Phase Consistent Global Axis Integration Network crossover, the VR-55 Aktive is said to yield a total system distortion of just 0.5 percent at 90dB.

In the initial auditioning, the VR-55 Aktive exhibits an extended, delicately detailed high end, a rich harmonic balance, a vibrant and expressive midrange, and perhaps the best combination of bass weight with pitch definition GW has yet heard from a loudspeaker. Taken with its almost freakish ability to scale dynamics with a prowess reminiscent of a horn and its striking ability to recreate the space and acoustic signature of the recorded venue, the VR-55 Aktive may be the most significant product release from VSA since the VR-11 was introduced more than a decade ago.

**Greg Weaver**





### Magico Q7 Mk.II

**\$225,000**

The already spectacular Magico Q7 has been upgraded to Mk.II status with new driver diaphragms, an entirely new tweeter, and a revised crossover. Based on a brand-new material, the midrange diaphragm is reportedly 30 percent lighter and 300 percent stiffer than that of the original. The new tweeter is slightly larger (28mm vs. 26mm) and features a new motor and back chamber. The tweeter diaphragm is diamond-coated beryllium; the newly added diamond layer increases stiffness without adding much mass, thanks to an ultra-thin coating technique. The crossovers feature an ultra-exotic new capacitor from Germany's Mundorf, the MCap Supreme Evo.

The Q7 Mk.II is priced at \$225,000, \$40,000 more than its predecessor. Q7 owners can upgrade to the Mk.II for the \$40,000 price difference.

Watch for my full review in an upcoming issue. **Robert Harley**



### PSB Imagine T3

**\$7495**

The PSB Imagine T3 is the Canadian manufacturer's new flagship speaker, replacing its Synchrony 1 at the top of the PSB line. The T3s offer the same neutral sound as the smaller Imagine T2s released earlier, with an essentially flat response—aside from a deliberate slight relaxation of the lower treble, a careful control of radiation pattern for the best possible room interaction and in particular, the special PSB “transitional” bass design that minimizes the floor interaction that troubles so many floorstanders. Compared to the T2s, the T3s have greater bass power and extension, even lower distortion, and expanded dynamic range overall. The T3s also have exceptionally fine “fit and finish” for those who are concerned with such things. Different port-plugging arrangements allow for adjustable bass and, for really boomy rooms, the conversion of the bottom woofer into a passive absorber.

The T3 represents a top-echelon speaker in every respect, and does so at a surprisingly modest price. **Robert E. Greene**

# Further Thoughts

## A Second Look at Recently Reviewed Speakers



### KEF X300A

**\$800**

Over the long haul I've found KEF's perky little plug-in—a nifty self-contained package with its own power and built-in DAC—remarkably talented in both work and play modes. During the week, it serves as an articulate and dynamically punchy desktop system, yet at the drop of a hat (and with a glass of wine in hand) it is easily placed on a pair of stands in the den to be enjoyed purely in a classic high-end-audio setting. The hero is KEF's five-inch Uni-Q concentric driver, a transducer with pinpoint imaging that is also ideally suited for the close proximity of desktop listening. However, the extent to which its sonic character blossoms when the X300A is deployed in a listening room is what impressed NG more. It sings much more freely in open space. Although still a lightly balanced speaker, its bass response deepens, while ambience retrieval and the reverberant cues from acoustic recordings are more clearly defined. More significantly, it has more warmth and less desktop dryness. It also plays surprisingly loudly for a speaker under a foot in height. For NG the X300A remains a loudspeaker that's not only versatile and musically engaging, but flat-out loads of fun. **Neil Gader**

### Legacy Aeris

**\$19,525**

The Legacy Aeris competes in sound quality with far more expensive conventional designs and continues to exemplify what the proper integration of speaker, integrated electronics, and room compensation can accomplish. It's also evolving into an even more sophisticated product in other ways. The Legacy Aeris system that I use ships with a 40-bit Wavelaunch processor that includes a customized crossover algorithm and user-adjustable room equalization. Though it's a highly flexible feature, the fine-tuning either has to be performed by a trained Legacy dealer or by means of sophisticated measurement equipment. Designer Bill Dudleston has hinted that the more powerful 56-bit Wavelet processor—which performs fully automated setup—will soon be available as an upgrade option for Aeris owners. The Wavelet is a preamp with analog and digital inputs that serves as a 2-/3-/4-way crossover and corrects primarily in the time domain. A psychoacoustic algorithm examines room energy out to 40msecs and realigns it in time, which prevents resonances and the associated peaks and dips from occurring in the first place. In short, these developments will make it possible to turn the electronics, the speaker, and the room into an integrated system. **Anthony H. Cordesman**



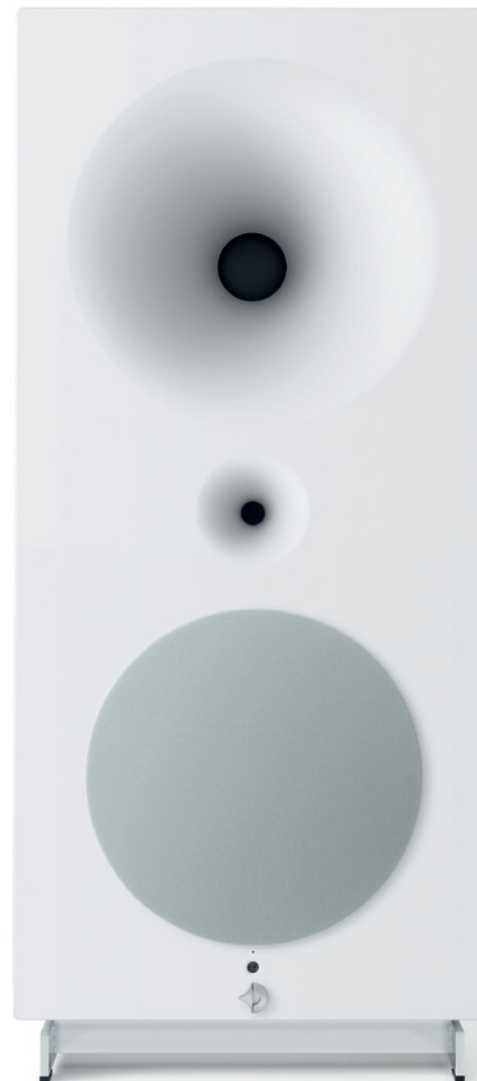
www.theabsolutesound.com





### Raidho X-1 \$6400

This tiny gem from Denmark incorporates the identical hand-made ribbon tweeter found in Raidho's \$220,000 flagship D-5. This ribbon is one of the world's great transducers, reproducing the treble with an astonishing resolution, delicacy, transparency, and finesse that you simply don't hear from dome tweeters. This remarkable driver is mated to a 4.5" woofer/midrange with a seamless blend—a rare feat for drivers of disparate technologies. As you might expect, a 4.5" woofer in a tiny enclosure won't go very low in the bass, play very loudly, or create the physical impact of a larger loudspeaker. But when positioned in a smaller room and driven at appropriate volume levels, the X-1 is transcendent. The speaker vanishes completely, throwing a massive, well-defined soundstage that gives no hint to the location of the sound sources. If you have the appropriate room, musical tastes that don't include heavy metal and organ spectacles, and a judicious hand on the volume knob, you likely won't find a finer sub-compact loudspeaker than the X-1. **Robert Harley**



### Avantgarde Zero 1 Pro \$17,500

Since I wrote my review of the remarkable Avantgarde Zero 1 Pro, my admiration for this stunningly styled, three-way, DSP'd (for ideal phase, time, and impulse response at a listening distance of 2-4m) spherically horn-loaded, fully powered loudspeaker has, if anything, increased. Usually I stop listening to most products immediately after I finish reviewing them (in order to move on to the next assignment). In this case, I not only continued to listen to the Zero 1 Pro; I bought the review pair.

Yes, the Zero 1 digitizes all signals (including analog ones—for which it makes provision), and, yes, that gives it a slightly “digital” sound (in the sense of having somewhat less depth of image, air, and bloom than an all-analog system). But, honestly, the differences between it and a great conventional loudspeaker are small, and don't come close to canceling out what the Zero 1 does extraordinarily well. Here is a beautiful, compact loudspeaker with the disappearing act of a mini-monitor, the transient speed and dynamic range of a horn (without a horn's colorations), and the resolution and tone color of a 'stat. On top of this, here is a full-range transducer that is virtually plug 'n' play. The Zero 1 Pro can be positioned in any room, no matter the size or shape, at virtually any distance from the walls, and because of DSP and horn-loading (which greatly reduce the effects of room reflections), it still sounds neutral, coherent, detailed, and stunningly quick and powerful. Thanks to its three built-in Class A amplifiers (one for each driver), all you have to do is plug in a digital or analog source and you're in business. A marvel of technology, ergonomics, and engineering smarts, the Zero 1 Pro turns the world's oldest transducer into one of today's most advanced and sonically appealing designs. **Jonathan Valin**

# The Six Secrets of Speaker Placement

Robert Harley

*Excerpted and adapted from the new Fifth Edition of The Complete Guide to High-End Audio. Copyright © 1994–2015 by Robert Harley. For more information, visit [hifibooks.com](http://hifibooks.com). To order call (800) 841-4741.*

## Introduction

The room in which music is reproduced, and the positions of the loudspeakers within that room, have a profound effect on sound quality. In fact, the loudspeaker/listening room interface should be considered another component in the playback chain.

Because every listening room imposes its own sonic signature on the reproduced sound, your system can sound its best only when given a good acoustical environment. An excellent room can help get the most out of a modest system, but a poor room can make even a great system sound mediocre.

Fortunately, you can greatly improve a listening room with a few simple tricks and devices. The possibilities range from simply moving your loudspeakers—or even just your listening seat—a few inches, to building a dedicated listening room from scratch. Between these two extremes are many options, including adding inexpensive and attractive acoustical treatment products.

In this excerpt from the new Fifth Edition of *The Complete Guide to High-End Audio*, I'll show you how to make your speakers sound better than you thought possible—without spending a dime.

## Loudspeaker Placement

The most basic problem in many listening rooms is poor loudspeaker placement. Finding the right spot for your speakers is the single most important factor in getting good sound in your room. Speaker placement affects tonal balance, the quantity and quality of bass, soundstage width and depth, midrange clarity, articulation, and imaging. As you make large changes in speaker placements, then fine-tune these positions with smaller and smaller adjustments, you'll hear in the sound a newfound musical rightness and seamless harmonic

integration. When you get it right, your system will come alive. Best of all, it costs no more than a few hours of your time.

Before getting to specific recommendations, let's cover the six fundamental factors that affect how a loudspeaker's sound can change with their positions. Later we'll look at each of these factors in detail. (Incidentally, you should wait until *after* you've optimized your speakers' placement to install the speakers' spikes.)

**1) The relationship between the loudspeakers and the listener is of paramount importance.**

# The Complete Guide to High-End Audio

Fifth Edition

Robert Harley

Editor-in-Chief  
The Absolute Sound



## Book Excerpt: The Six Secrets of Speaker Placement

The listener and speakers should form an equilateral triangle; without this basic setup, you'll never hear good soundstaging and imaging.

**2) Proximity of loudspeakers to walls affects the amount of bass.** The nearer the loudspeakers are to walls and corners, the louder the bass.

**3) The loudspeaker and listener positions in the room affect the audibility of room resonant modes.** Room resonant modes are reinforcements of certain frequencies that create peaks and dips in the frequency response, which can add an unnatural "boominess" to the sound. When room resonant modes are less audible, the bass is smoother, better defined, and mid-range clarity increases.

**4) The farther out into the room the loudspeakers are, the better the soundstaging—particularly depth.** Positioning loudspeakers close to the wall behind them can destroy the impression of a deep soundstage.

**5) Listening height affects tonal balance.** With some loudspeakers, how high your ears are in relation to the speakers' tweeters can affect the amount of treble you hear.

**6) Toe-in (angling the loudspeakers toward the listener) affects tonal balance (particularly the amount of treble), soundstage width, and image focus.** Toe-in is a powerful tool for dialing in the soundstage and treble balance. Let's look at each of these factors in detail.

### 1) Relationship between the loudspeakers and the listener

The most important factor in getting good sound is the geometric relationship between the two loudspeakers and the listener (we aren't concerned about the room yet). The listener should sit exactly between the two speakers, at a distance away from each speaker that's slightly greater than the distance between the speakers themselves. Though this last point is not a hard-and-fast rule, you should certainly sit exactly between the loudspeakers; that is, the same distance from each one. If you don't have this fundamental relationship, you'll never hear good soundstaging from your system.

Fig. 1 shows how your loudspeaker and listening positions should be arranged.

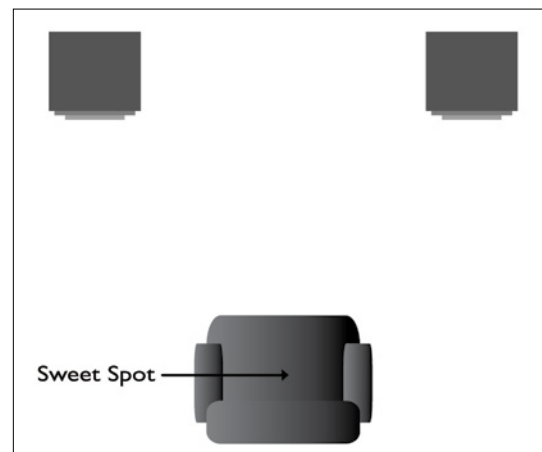


Fig. 1 The listener should sit precisely between the loudspeakers, and at the same distance from each speaker.

The listening position—equidistant from the speakers, and slightly farther from each speaker than the speakers are from each other—is called the "sweet spot." This is roughly the listening position where the music will snap into focus

and sound the best. If you sit to the side of the sweet spot, the soundstage will tend to bunch up around one speaker. This bunching-up effect will vary with the speaker model; some pairs of speakers produce wider sweet spots than others.

Setting the distance between the speakers is a trade-off between a wide soundstage and a strong center, or phantom, image. The farther apart the loudspeakers (assuming the same listening position), the wider the soundstage. As the speakers are moved farther apart, however, the center image weakens, and can even disappear. If the speakers are too close together, the soundstage narrows.

Speakers placed the optimal distance apart will produce a strong center image and a wide soundstage. A musical selection with a singer and sparse accompaniment is ideal for setting loudspeaker spacing and ensuring a strong center image. With the speakers fairly close together, listen for a tightly focused image exactly between the two speakers. Move the speakers a little farther apart and listen again. Repeat this move/listen procedure until you start to hear the central image become larger, more diffuse, and less focused, indicating that you've gone slightly beyond the maximum distance your speakers should be from each other for a given listening position. There will likely be a position where the center image snaps into focus, appearing as a stable and almost tangible presence exactly between the speakers.

### 2) Proximity to walls affects the amount of bass

Room boundaries have a great effect on a speaker's overall tonal balance. Loudspeakers placed close to walls will exhibit a reinforcement in the bass (called "room gain"), making the sound more bottom-heavy. Some speakers are designed to be placed near the room's front wall (the wall behind the speakers); they need this reinforcement for a more natural tonal balance. Such speakers sound thin if placed out into the room. Others sound thick and heavy if not at least 3' from the front and sidewalls. Be sure which type you're buying if your placement options are limited.

When a loudspeaker is placed near a wall, more of its bass energy is reflected back into the room, essentially in phase with the speaker's direct output. This means that the direct and reflected waves reinforce each other at low frequencies, producing louder bass.

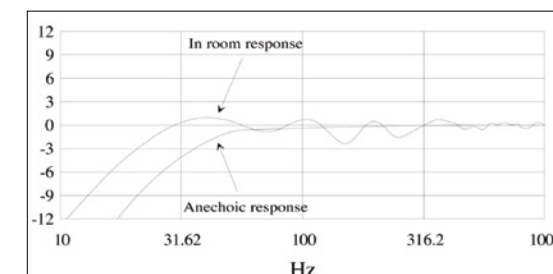


Fig. 2 Comparison of a loudspeaker's anechoic and in-room responses.

Fig. 2 shows the difference in a speaker's frequency response when measured in an anechoic chamber (a room that reflects no soundwaves) and in a normal room. A frequency-response graph plots amplitude (loudness) vs. frequency. As you can see in the graph, not only is the bass

## Book Excerpt: The Six Secrets of Speaker Placement

boosted by the room, the speaker's low-frequency extension is deepened.

Each surface near the speaker (floor, front wall, and sidewalls) will increased the speaker's bass output. The closer to the room's corners the speakers are, the more bass you'll hear. The speaker's position in relation to the front and sidewalls will also affect which frequencies are boosted. Correct placement can not only extend a loudspeaker's bass response by complementing its natural rolloff, but can prevent peaks and dips in the response. Improper placement can cause frequency-response irregularities that color the bass. That is, some frequencies are boosted relative to others, making the bass reproduction less accurate.

The loudspeakers should be positioned at different distances from the front and sidewalls. A rule of thumb: the two distances shouldn't be within 33% of each other. For example, if the speaker is 3' from the sidewall, it should be at least 4' from the front wall. Many speaker manufacturers will specify a distance from the front and sidewalls. When a measurement is specified, the distance is between the woofer cone and the wall. Start with the speakers in the manufacturer-recommended positions, then begin experimenting.

### 3) Loudspeaker and listener positions affect room-mode audibility.

In addition to deepening bass extension and smoothing bass response, correct speaker placement in relation to the room's walls can also reduce the audible effects of your room's resonant modes. Room resonant modes are reinforcements at certain frequencies that

create peaks in the frequency response. Room modes create *standing waves*, which are stationary patterns of high and low sound pressure in the room that color the sound. The standing-wave patterns in a room are determined both by the room's dimensions and by the position of the sound source in the room. By putting the speakers and listener in the best locations, we can achieve smoother bass response.

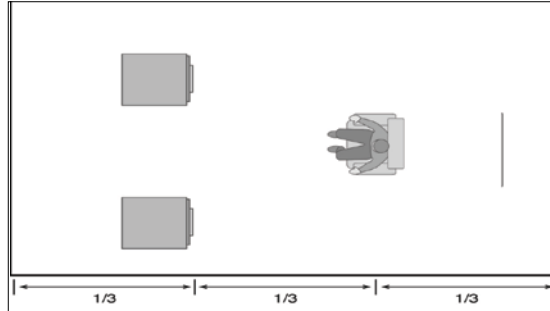


Fig. 3 The "rule of thirds" says to place the speakers and listening position a third of the way into the room. If this isn't practical, try one-fifth of the way into the room.

A well-known rule of thumb states that, for the best bass response, the distance between the speakers and the front wall should be one-third the length of the room (Fig. 3). If this is impractical, try one-fifth the room length. Both of these positions reduce the excitation of standing waves and help the sounds from the speakers integrate with the room. Ideally, the listening position should be two-thirds of the way into the room. Starting with these basic configurations, move the loudspeakers and the listening chair in small increments while playing music rich in low frequencies. Listen for smoothness, extension, and how well the bass integrates with the rest of the

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sound. When you find the speaker position where the bass is smoothest, you should also hear an increase in midrange clarity and definition.

### 4) Distance from front wall affects soundstaging

Generally, the farther away from the front wall the speakers are, the deeper the soundstage. A deep, expansive soundstage is rarely developed with the loudspeakers near the front wall; pulling the speakers out a few feet can make the difference between poor and spectacular soundstaging. Unfortunately, many living rooms can't accommodate speakers far out into the room. If the speakers must be close to the front wall, make that wall acoustically absorbent.

### 5) Listening height and tonal balance

Most loudspeakers exhibit changes in frequency response with changes in listening height. These changes affect the midrange and treble, not the bass balance. Typically, the sound will be brightest (i.e., have the most treble) when your ears are at the same height as the tweeters, or on the tweeter axis. Most tweeters are positioned between 32" and 40" from the floor to coincide with the height of the ears of the typical seated listener. If you've got an adjustable office chair, you can easily hear the effects of listening axis on tonal balance.

The degree to which the sound changes with height varies greatly with the loudspeaker. Some models have a broad range over which little change is audible; others can exhibit large tonal changes when you merely straighten your back while listening. Choosing a listening chair that puts your ears on the optimal axis will help achieve a good treble balance.

### 6) Toe-in

Toe-in is pointing a loudspeaker inward toward the listener rather than aiming it straight ahead (see Fig. 4). There are no rules for toe-in; the optimal amount will vary greatly with the speaker and the room. Some speakers need toe-in; others work best firing straight ahead. Toe-in affects many aspects of the sound, including mid- and high-frequency balance, soundstage focus, sense of spaciousness, and immediacy.

Most loudspeakers sound brightest when listened to directly on-axis (directly in front of the loudspeaker). Toe-in thus increases the amount of treble heard at the listening seat. An overly bright speaker can often be tamed by pointing it straight ahead. Some models, designed for listening without toe-in, are far too bright when listened to on-axis.

The ratio of direct to reflected sound increases with toe-in. That's because a toed-in loudspeaker will present more direct energy to the listener and project less energy toward the room boundaries, where it might reach the listener only after being reflected from those surfaces. In a listening room with reflective sidewalls, toeing-in the speakers can be a

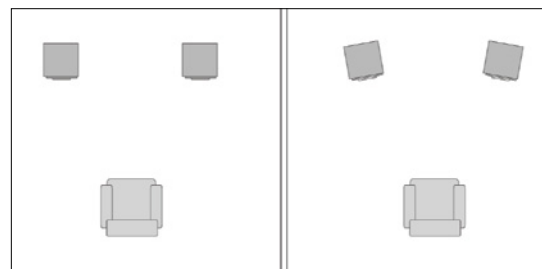


Fig. 4 Loudspeakers positioned with no toe-in (left) and with toe-in (right).

decided advantage. Moreover, the amplitude of sidewall reflections is greatly decreased with toe-in. Conversely, less toe-in increases the amount of reflected energy heard by the listener, adding to a sense of spaciousness and air. Reducing toe-in can open up the soundstage and create a feeling of envelopment.

Similarly, toe-in often increases soundstage focus and image specificity. When toed-in, many loudspeakers provide a more focused and sharply delineated soundstage.

Images are more clearly defined, compact, and tight, rather than diffuse and lacking a specific spatial position. The optimal toe-in angle is often a trade-off between too much treble and a strong central image. With lots of toe-in, the soundstage snaps into focus, but the sound is often too bright. With no toe-in, the treble balance is smoother, but the imaging is more vague.

Toe-in also affects the sound's overall spaciousness. No toe-in produces a larger, more billowy, less precise soundstage. Instruments are less clearly delineated, but the sound is bigger and more spacious. Toeing-in the speakers shrinks the apparent size of the soundstage, but allows more precise image delineation. Again, the proper amount of toe-in depends on the loudspeaker, the room, and personal preference. There's no substitute for listening, adjusting toe-in, and listening again. Identical toe-in for both speakers is essential to soundstaging. A speaker's frequency response changes with toe-in, and identical frequency response from both speakers is crucial to the precise placement of images in the soundstage. Achieving identical toe-in can be accomplished by measuring the

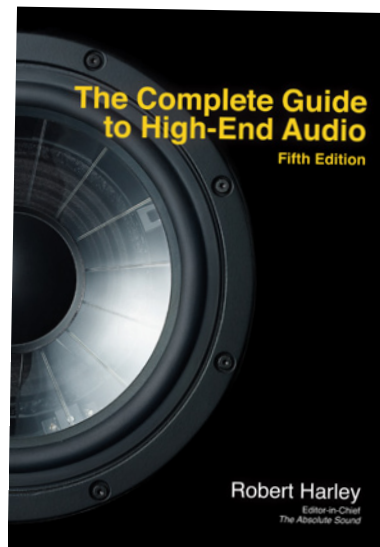
distance from the front wall to both rear corners of one speaker; these distances will differ according to the degree of toe-in. Repeat this procedure on the other speaker, adjusting its toe-in so that the distances match those of the first speaker. Another way to ensure identical toe-in is to sit in the listening seat and look at the speakers' inside edges. You should see the same amount of each speaker cabinet's inner side panel. You can also use a laser-alignment tool to ensure identical toe-in. Substituting a piece of cardboard or similar material for the listener in the listening seat, mount the laser on the top of one of the speakers, flush with one cabinet edge. Mark on the cardboard where the beam hits. Repeat the process with the other speaker and adjust the toe-in so that the beam strikes the same spot as the first beam. The laser alignment tool will come in handy later to verify that each speaker has the same degree of backward tilt (or no tilt at all). The degree of tilt, called the rake angle, can vary if the speaker's spikes are not screwed into the speaker at uniform depths.

Keep in mind that any change in one parameter of speaker placement will affect all other parameters. For example, a wide soundstage can be achieved with narrow placement but no toe-in, or wide placement with extreme toe-in.

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**T**AS' very own Editor in Chief, Robert Harley, has just published the fifth edition of what was, is, and remains the best book ever written about hi-fi, his *Complete Guide to High-End Audio*. Introduced in 1994 (can it have been twenty-one years since this book first came out?), the *Complete Guide* has previously been updated three times—to keep it current with the advances in technology that have occurred over the past two decades. The latest update—the Fifth Edition—adds nearly fifty pages of new material and countless revisions of older entries to accommodate what Robert calls (in his preface) a greater number of “profound changes in audio technology than in any previous decade.”

Music servers, streaming audio, wireless networking, desktop hi-fi's, high-resolution downloads, and the rapid ascent of personal listening via high-end headphones were not yet or just barely on the map when the Fourth Edition of the *Complete Guide* was published a scant five years ago. Today, they are among the hottest tickets on the market.

In the Fifth Edition, Robert covers them all—and the myriad smaller, less attention-grabbing ways that advancing technology has moved the quest for more lifelike musical reproduction forward.

But comprehensiveness is scarcely the only attraction of the new *Complete Guide*. No one—not even the great J. Gordon Holt in his prime—could or can demystify the mind-bogglingly technical

the way Mr. Harley can. It is precisely his ability to explain the thorniest complexities in plain English that has made the *Complete Guide* the enduring classic that it is.

Anyone taking his first steps into computer, desktop, or personal/mobile audio, anyone deeply interested in the current (and I mean right-up-to-date) state of the audio arts, anyone looking for lucid explanations of how amplifiers, preamplifiers, loudspeakers, headphones, even computer servers work (and what to look for when you buy one) would be well advised to purchase the Fifth Edition of *The Complete Guide to High-End Audio*. All your answers are here, written in the graceful, meticulous, easy-to-understand prose of a genuine master. **Jonathan Valin**



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# Desktop and Powered Speakers



# Bowers & Wilkins T7 Wireless Portable Speaker

Grab & Go

Neil Gader

**B**&W touts the T7 as its most portable and versatile wireless system. You sure won't get an argument from me. Not much bigger than a thick, oversized paperback, the T7 is a marvel of design and packaging, easy to palm with one hand, yet replete with enough features to command attention. How the elves at B&W stuffed a pair of 50mm full-range drivers around twin opposing bass radiators, plus DSP and aptX-compliant Bluetooth, plus a pair of 12W Class D amplifiers into a unit this size is anyone's guess, but somehow they did.

In keeping with its premium price, the T7 also looks classy. The sturdy polycarbonate cabinet is stylish, and its edges are neatly rubberized for good tactile feel. Along the top are a line of raised soft-buttons (designed for touch but almost invisible to the eye, unfortunately) designated for Bluetooth connection, pause/play, and volume. A button along the right side powers up the unit and displays a ladder of LEDs signaling the remaining charge in the lithium-ion battery. (When topped off, it's good for 18 hours, says B&W. A universal power supply is included for this purpose.) Around the perimeter

of the inner enclosure is B&W's Micro Matrix—"a rigid honeycomb of interlocking cells" that is meant to reduce vibration and distortion. This is likely the reason why, even at louder levels, the T7 not only doesn't fall apart sonically but also doesn't fall to pieces physically.

Here's why I really like the T7: It works the way I work. I don't have a big desk in my home where I plant myself until a task is complete. I get antsy, and when I do, I grab my laptop and move around to various seating areas and then circle back. In my world the T7 became a constant companion whenever and wherever I decided to go.

Setup is a breeze. Simply choose which laptop or smart device to pair with the T7, and that component becomes the T7's primary device. AptX Bluetooth permits auto-connection each and every time by simply pressing the BT symbol atop the T7 and choosing the T7 from the BT drop-down menu on your Mac. The brief sound of chimes confirms connection. However, the T7 also remembers up to seven other devices including laptops, phones, and tablets. To preserve power, the T7 puts itself to sleep in ten minutes and switches off in twenty.

Keep in mind that as a BT device the T7 doesn't have the same throw distances as portables operating on a wireless network. As a result, it

requires fairly close proximity to the server. On the other hand, wireless networks, particularly those shared by other members of the family, have their own share of aggravating dropouts and are often difficult to configure. Bluetooth setup is pretty much dummy-proof, or as I like to say—*my style*.

The T7's sound is poised and full-bodied with a fluid, rhythmic feel that truly surpassed my expectations. Spoken word from podcasts is articulate, with a warmer hue rather than an overly sibilant edge. I spent a lot of time playing back FLAC files courtesy of Tidal ([tidalhifi.com/us](https://tidalhifi.com/us)). The sound was as engaging as the wireless reception was reliable. Through the T7, my pop and rock playlists maintained a forward balance and a level of presence that framed vocals up front and center, with surprisingly clear backing images. Eric Clapton's "Change the World" had a robust snare sound, good resolution of the backup singers, and a level of tightly defined low-end energy unexpected in a product so diminutive. In addition, Clapton's acoustic guitar solo had genuine transient snap and focus. The T7's real trick, however, is its dynamic performance—the very thing that so often is the first to get tossed from the micro-speaker bus. In this case, the T7 reproduces dynamic gradations with relative sensitivity, on both the micro- and macro-level.

My bona fide enthusiasm aside, the reality is that the T7 is not going to transform your kitchen nook or office picnic into the control room at Abbey Road Studios. But the B&W guys clearly know the musical terrain in this mini segment. I think it should also be said that the T7 proves that portable wireless speakers can be consistent with high-end values. That, and suitable for take-out, too. Grab one. TAS

## SPECS & PRICING

**Input:** One analog via 3.5mm mini-plug

**Dimensions:** 4.5" x 8.25" x 2.13"

**Weight:** 2 lbs.

**Price:** \$349

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# Audience ClairAudient 1+1 Personal Reference Monitor

1+1 = 3

Steven Stone

**A** couple of months ago I reviewed Audience's smallest speaker, "The One" in TAS. I thought it was one of the best desktop/nearfield speakers I'd ever heard, regardless of price or technology. So, when I was offered a chance to review "The One's" bigger brother, the 1+1, I was more than willing. If I had to sum up the 1+1 speaker in a single sentence I'd write, "It's 'The One' on steroids."

For readers who've never heard of Audience or its ClairAudient line of speakers, the company's beginnings go back to 1979 when Audience's president, John McDonald, met the late audio designer Richard Smith. Together they founded Sidereal Akustic. McDonald left Sidereal in 1986, and then teamed up with Smith in 1997 to form Audience. From the beginning Audience's primary goal was to build a full-range-driver speaker without tweeters, woofers, or crossovers. Nine years of research went into developing a driver design that could accomplish Audience's sonic goals. Finally in 2009 Audience unveiled its first product, the ClairAudient 16 loudspeaker. Other models soon followed, including the 16+16, 8+8, 2+2, 1+1, and most recently "The One."

## Tech Info

What does using a single, solitary, driver *sans* woofers, tweeters, and crossovers get you sonically speaking? The answer in one word is coherence. The entire Audience speaker line is designed to achieve this goal. By eliminating a crossover circuit, the sonic issues, such as phase anomalies at the hinge points, vanish. Also the timing and group-delay problems introduced by a crossover's filtering components are no longer an issue.

But there is no "free lunch" in physics. Eliminating the crossover puts greater demands on the full-range driver. It's very hard to produce a full-range driver that has even power-handling throughout its frequency range. It is also difficult for a single full-range driver to create an even dispersion pattern without beaming at higher frequencies.

Although Audience is understandably reticent to release too many specifics on the inner workings of its proprietary "dual-gap motor" A3S driver, according to its Web site, "The A3S has an exceptionally flat response from 40Hz to 22kHz +/-3dB in certain enclosures. No other single driver available today can deliver this kind of performance."

The A3S driver cone is made of titanium alloy combined with a concave dust cap constructed with constrained-layer damping to control high-frequency break-up modes. The total mass of the driver cone is only 2.5 grams. This low-mass cone is coupled to a patented oversize motor structure using neodymium magnets and a large voice coil. According to Audience the A3S has "12mm of usable excursion with less than 1dB compression at levels up to 95dB SPL." To achieve this usable excursion requires an especially oversized spider made of "special materials."

The A3S driver has vents in its pole pieces to allow a more unobstructed airflow to and from the voice coil. This not only aids in cooling but also prevents turbulence created by the driver's large excursions. Other key components in Audience's A3S driver include the proprietary basket design and patent-pending S-shaped speaker-surround. This surround minimizes diffraction and allows for large excursions while maintaining uniform resistance on both sides of travel. The result is lower measured harmonic distortion levels.

As you might suspect from its name, the Audience ClairAudient 1+1 uses two A3S drivers. One faces forward while the other is mounted on the back of the enclosure and fires to the rear. Both A3S drivers are in phase with each other. This bi-pole arrangement offers several advantages over the single-driver "The One." First, having two drivers increases the 1+1's power-handling capabilities and its sensitivity. The 1+1 is 3dB more sensitive than "The One," and can handle twice as much power (50 watts RMS rather than The One's 25-watt suggested maximum). Second, the two-driver configuration extends the speaker's low frequencies. The 1+1 cabinet also has a pair of passive drivers, one mounted on each side of the enclosure, which further augment the 1+1's bass.

The 1+1 cabinet isn't a rectangular box; instead it has non-parallel front and rear baffles as well as angled edges to reduce diffraction. The 1+1's grilles are attached to the enclosure magnetically making them easy to remove and re-attach. Whether the 1+1 sounds "better" with the grilles on or off is a matter of taste, since the grilles have some effect on both imaging and overall harmonic balance.

The overall build-quality of the Audience ClairAudient 1+1 is quite luxurious, with a deep-black gloss finish on most of the cabinet that is

# EQUIPMENT REVIEW - ClairAudient 1+1 Personal Reference Monitor

complemented by the rich wood grain of the side panels. The 1+1 rear panel sports a single pair of five-way gold-plated binding posts (there's no point in bi-wiring a full-range driver). My only quibble with the 1+1's physical configuration is that it would have been a nice option if speaker grilles were available to cover the side-firing passive drivers. The front and rear A3S drivers look just fine without the grille covers, but the side-firing passive drivers are not as well integrated into the side panels. The overall look of the speaker could

benefit from the side-mounted passive radiators being covered by speaker grilles.

## The Setup

Most of my listening to the Audience ClairAudient 1+1 speakers was in my nearfield high-end desktop system. Like its smaller sibling, the 1+1 is small enough that without some kind of stand it will end up well below ear level when placed on a desktop. I used the same pair of closed-cell high-density "stands" that I use with many

## Robert Harley Listens to the 1+1: More Than a Desktop Loudspeaker

I've been listening to the 1+1s on my desktop system and am continually amazed by their midrange transparency, resolution, and naturalness. Many expensive high-end loudspeakers would kill for this kind of midrange performance. In addition to its transparency and lack of coloration, the 1+1s are imaging champs, completely disappearing into the soundfield despite being positioned on either side of a large computer monitor—and I was driving my pair with a \$104 Class D Chinese integrated amplifier.

Just out of curiosity I put the 1+1s on Sound Anchor stands in my main listening room next to the Magico Q7s and drove them with \$300k worth of reference-level sources and electronics. Although positioned well away from any walls in a large room, the 1+1s' bass balance was surprisingly full and warm. Of course, you shouldn't expect deep extension or bottom-end dynamics from this small speaker, but that's not their *raison d'être*. Where the 1+1s excel is in the mids, which can only be described as magical. Reproducing the entire frequency range with a single driver, and with no crossover parts in the signal path, pays huge dividends in the naturalness of instrumental timbre, the sense of hearing nothing between you and the performer, and the ability of the loudspeakers to get out of the way of the music. Vocals were sensational for any loudspeaker, never mind one that costs less than \$2k.

I expected to hear a reduction in top-octave air and extension given that the 3" driver covers the entire frequency range, but the 1+1 had no shortage of treble detail, particularly when I was sitting on-axis to the driver. The soundstage was wide and deep, with pinpoint imaging. I agree with Steven Stone's conclusion that the 1+1 is a superb small nearfield monitor, but it's more than that. As part of a main system in an appropriately sized room I could imagine the 1+1 delivering an eminently satisfying musical presentation, particularly for those listeners who value midrange transparency over the last measures of dynamics and bass extension.

## SPECS & PRICING

**Impedance:** 8 ohms  
**Efficiency:** 87dB/1W/1m  
**Maximum RMS continuous output per pair:** 104dB  
**Maximum RMS continuous power per speaker:** 50 watts  
**Dimensions:** 6" x 8" x 9.75"  
**Price:** \$1795

### AUDIENCE

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### ASSOCIATED EQUIPMENT

**Source Devices:** MacPro model 1.1 Intel Xeon 2.66 GHz computer with 16 GB of memory with OS 10.6.7, running iTunes 10.6.3 and Amarra Symphony 2.6 music software, Pure Music 1.89 music software, and Audirana Plus 1.5.12 music software  
**DACs:** Antelope

Zodiac Platinum DSD, Wyred4Sound mPre, April Music Eximus DP-1, Empirical Audio Off-Ramp 5, Mytek 192/24 DSD DAC  
**Amplifiers:** April Music Eximus S-1, Accuphase P-300  
**Speakers:** ProAc Anniversary Tablette, Role Audio Kayak, Aerial Acoustics 5B, Audience Clair Audient "The One," Velodyne DD+ 10 subwoofer  
**Cables and Accessories:** Wireworld USB cable, Synergistic Research USB cable, AudioQuest Carbon USB cables, PS Audio Quintet, AudioQuest CV 4.2 speaker cable, AudioQuest Colorado interconnect, Cardas Clear interconnect, Black Cat speaker cable and Interconnect, and Crystal Cable Piccolo interconnect, Audience Au24SE speaker cable

of my small desktop monitor reviews, as well as a pair of Ultimate Support adjustable speaker platforms to raise the 1+1 speakers so the center of the drivers were level with my ear height.

Although the 1+1 speakers will produce a remarkably cohesive and well-defined image almost regardless of how they are set up, proper set-up geometry is important for optimal imaging. I recommend using a tape measure to insure that the speakers are precisely triangulated so they are equidistant from your ears. Having one speaker more than an inch closer than the other can have an audible effect on their time-alignment. Also the toe-in between the two speakers needs to match. I used Genelec's free "Speaker Angle" iPod App to put each speaker at exactly the same angle.

With a sensitivity of 87dB at one watt, I found that the 1+1s mated well with a variety of amplifiers. During most of the review I used a single April Music S1 power amplifier, which had more than enough power to drive 1+1 speakers to ear-bleed levels. I also used the 1+1 in a separate system driven by the tiny Olasonic Nanocompo Nano UA-1 integrated amplifier, which puts out only 13 watts into 8 ohms. Even with this small amplifier the 1+1 speaker could play cleanly at satisfying volume levels.

## The Sound of the Audience 1+1

Given that I called Audience's "The One" the best dedicated desktop speaker I'd heard, how much better could the Audience 1+1 be? Much better? A little bit better? No better? Let's see...

First, let me detail how and where the 1+1 bests its smaller sibling. Near the end of the review period I managed to destroy both drivers on my



## EQUIPMENT REVIEW - ClairAudient 1+1 Personal Reference Monitor

review pair of "The One" speakers when they received a dose of ABBA at full level from my Accuphase P-300 power amplifier. Replacing the blown drivers with new ones was an easy job that took less than 30 minutes. But since that experience I've been more careful to check output levels before choosing a source when using "The Ones." With the 1+1 speaker's greater power-handling capabilities I feel a bit more comfortable turning them up to 10 or even 11. And while I never heard "The One" speakers show any audible signs of distress when playing loudly at my desktop, I do feel that on big, dynamic musical selections the 1+1 speakers have a bit better control and finesse during triple forte passages.

Where else does the Audience 1+1 best "The One?" Listening to my live concert DSD5.6 recordings I noticed the 1+1 speakers had slightly better dynamic contrast, principally on peak levels during triple-forte passages. Using the SPL meter in the Audiotools app I noticed that when the low-level outputs were matched between the two speakers the 1+1 produced, on average, a 1.5dB increase in peak volume during the loudest passages.

In imaging precision the 1+1 and "The One" speakers were equals. The 1+1 duplicates "The One's" uncanny ability to disappear while creating a seamless three-dimensional soundstage. And not only do the 1+1 speakers disappear when you're sitting in their sweet spot, their sweet spot is large enough that no amount of chair-based gyrations will alter their imaging. The only "tricks" needed for optimum soundstaging are that the two speakers should be equidistant from your ears and raised up off your desktop so that the center of the drivers is at or very near ear height.

The 1+1 do deliver more midbass energy than "The One" speaker, and for some listeners they may have sufficient bass extension so that they could be employed without a subwoofer. But for anyone who requires a true full-range desktop or nearfield system, a subwoofer is recommended. I used a Velodyne DD+ 10 subwoofer crossed over at 65Hz into the 1+1 speakers. Besides the additional low-frequency extension, using a subwoofer also relieved the 1+1 speakers of low-bass duties, which allowed them to play louder than they could when fed a full-range signal.

### 1+1 = 3

When I finished my review of the Audience ClairAudient "The One" I was convinced it was one of the best nearfield monitors I'd ever heard. My time with the larger Audience 1+1 speakers hasn't reduced my positive impressions of "The One," but it has induced me to place the 1+1 above the "The One" at the top of my own personal "best" nearfield loudspeaker list.

Just like "The One," the Audience 1+1 creates a three-dimensional soundstage that allows an audiophile to easily listen into the subtle low-level nuances of a mix or live performance. Also, like all Audience speakers, the 1+1 provides a seamless, phase-coherent, crossover-less, sonic presentation that makes it very hard to go back to listening to a conventional multi-driver speaker without hearing the sonic discontinuities caused by the crossover design and its components.

If you are planning to assemble a high-performance nearfield listening system I urge you to audition the Audience 1+1 (or if your budget is tighter, "The One"). They are both superb transducers that show that the right technology in the right application creates magic. tas

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# Audioengine A2+ Desktop Speakers and D3 DAC

A Perfect Starter Combo that Sports an Easy Entry Fee

Spencer Holbert

**T**hough they weren't that long ago, I haven't owned a pair of desktop speakers since my college dorm days. Space was at a premium back then, and the hi-fi system that I loved had to stay at home and collect dust until I moved into larger accommodations. Once I got my stereo back, I never thought twice about computer speakers—that is, until I learned I would be reviewing Audioengine's A2+ Powered Desktop Speakers and D3 DAC. It was with a mixed sense of excitement that I opened the door a week later and found a box from Audioengine on my front porch. I mean, they're *computer speakers*; how good could they really sound? But then again, if *The Absolute Sound* wanted a set of desktop speakers reviewed, then they must be decent, right? It was time to discover the truth.

The first thing I noticed when I opened the box was the amazing amount of care Audioengine takes packaging this system. Each speaker—as well as the power supply and cables—is placed in its own microfiber bag, and everything in the box fits snugly together in such a way that it seems almost impossible for shipping damage to occur. The Audioengine A2+ is as turnkey as it gets; the speakers will accept virtually any high-level source you can throw at them, as long as that source outputs via RCA, USB, or 3.5mm. If you are in the market for some affordable powered desktop speakers, that means you will be able to connect all of your source components to these bad boys with nary a worry: TVs, computers, iDevices, Blu-ray players, external DACs, Betamax, five-second anti-skip CD players...er, childhood flashback. They even have a variable RCA output so that you can connect a subwoofer (maybe Audioengine's S8 powered sub?) or one of Audioengine's wireless streaming devices. Included in the box are two meters of 16AWG speaker wire to connect the left and right channels (the binding posts also accept banana/spade-terminated speaker cables), a 1.5-meter 3.5mm mini-jack audio cable (for those iDevices and Walkmen), a 1.5-meter USB cable, a power supply, and all necessary documentation. Short of a puppy with a red bow, the A2+ Powered Desktop Speakers come with everything you need to start rockin' in no time flat. An extra surprise was also shipped along with the A2+ speakers—the Audioengine D3 DAC, which I will discuss in a bit.

The only source I used with the A2+ speakers—except for a stint with rabble-raising friends who took turns playing iPod DJ via the 3.5mm input—was my MacBook Pro, which is presumably the kind of source most consumers of Audioengine

products will use. I definitely ran the gamut of digital audio quality, from lossy MP3s to hi-res WAV files, Netflix streaming movies to DVDs, and even Pandora. I also tested every possible combination of audio format with the stock cables all the way up to audiophile-grade connections and speaker wire, just for the fun of it. But let's stick with what comes with the A2+ speakers and go from there.

Starting with USB input (which is a new feature that the last version, the Audioengine A2, does not have), I connected my laptop directly to the A2+ using the stock USB cable, launched iTunes *sans* any third-party audiophile software, and played one of my favorite "soundstage test tracks," Radiohead's "Everything In Its Right Place." I love this track, not only because it's great music, but also because the way Thom Yorke plays with phasing and the soundstage. But when the track started, my heart sank: It sounded as if I were listening in a phone booth, plus there was some serious cone breakup and distortion coming from the left channel (the channel that houses the amp and inputs). I checked all my settings and everything looked correct, so I decided to step away for an hour, let the speakers break in for a bit, and come back for another listen. Interestingly enough, that did the trick; after only an hour on repeat, the speakers sounded much better, and the left-channel distortion had vanished. The lesson is to let these speakers play for a while before judging them (Audioengine allows for a 30-day audition, lucky you).

Actually, the A2+'s sounded really good. *Really* good. I would have never thought that 6" desktop speakers could sound like this, except for maybe those studio monitors that call themselves desktop speakers. But these are actually *designed* for use with your computer, hence Audioengine's



## EQUIPMENT REVIEW - Audioengine A2+ Desktop Speakers and D3 DAC

tagline, “Join the computer audio [r]evolution.” Okay, where do I sign? I suddenly had that ole music-lover’s itch to play as much music as possible (the best kind of itch, I might add), and selected numerous tracks from downtempo-ambient artists on the Ultimae record label. Want to really test a speaker’s capability? Then choose any album in Ultimae’s catalogue (ultimae.com) and be prepared to stretch for the highest highs, lowest lows, and widest soundstage you could possibly imagine. Well, the A2+ speakers performed beautifully. Not only did they provide enough bass extension to satisfy any bass head (65Hz response seems a lot lower when speakers are so close; then there’s that S8 powered sub you can add on), they proved extremely forgiving in the set-up department. I set mine at arm’s length (roughly 25" from ear to tweeter) and toed-in directly at the flanks of my ears, which provided the best soundstage. Did I mention they were forgiving? Whether I hunched over my computer, slouched in my chair, rested my head on my hand (à la a tired college student), or sat up in that sonic sweet spot, the A2+ speakers sounded great. Let’s check that price tag again: Yep, for \$249 you can’t ask for any better than this.

Okay, now for some music that most readers of TAS will recognize: Leonard Bernstein’s classic rendition of *Le Sacre du Printemps* in 24-bit/96kHz from HDtracks. Uh-oh. Twenty-four-bit is a no-go via the USB input on the A2+ speakers, which is a somewhat disappointing, yet very understandable exclusion, as most people who buy the A2+ powered speakers won’t have a large collection of high-res audio files. If you have a bunch of high-res files and want to use these speakers at work or elsewhere, you’ll need an external DAC capable

of 24-bit audio. Luckily, I also received the Audioengine D3 DAC, but hold your horses; we first need to test the 3.5mm analog-input mini-jack. Just as you might expect, sound quality took a step back, but this seemed to be an across-the-board decrease, which is less grating than a sudden drop within a certain frequency range. Still, the 3.5mm mini-jack input is great for plugging in that iDevice and rockin’ out while working in the garage or having friends come over and connecting their phones. And at 15W RMS, these puppies can crank. They were loud enough to fill my house with music and drown out the clang of pots and pans as I cooked breakfast, or, if you’re so inclined, the noise of dorm- and roommates.

During this first stage with the A2+ speakers—i.e. without a DAC—I was breaking in the sleek Audioengine D3 24-bit/96kHz USB DAC with a pair of Grado PS500s. This thumbdrive-sized aluminum-shell DAC is very pretty to look at, and matches surprisingly well the look of my aluminum-cased MacBook Pro—something that might be attributed to the designers’ days at Apple. I was at a coffee shop with the D3 when someone tapped my shoulder and asked, “Why are your headphones plugged into your thumbdrive?” Thirty minutes and a quick audition later, the D3 had successfully converted the inquirer into a freshly minted junior audiophile, flush with excitement and on a quest to listen to high-quality music. If that’s not a litmus test, then I don’t know what is. For a piece of audio equipment—whether the \$189 D3 or the \$110,000 dCS Vivaldi—to have the ability to cause even the most curmudgeonly people to spontaneously combust with aural happiness is really what counts. No, I’m not saying you’ll get dCS-level performance for \$189; I’m saying that

for \$189 you’ll have something with the power to inspire that fits in your pocket.

I really wanted to hear that Stravinsky, so let’s get back to what the combination of the A2+ speakers and D3 DAC sounded like. With Amarra Hi-Fi turned on and the D3 DAC plugged into my computer (connected to the A2+ speakers via the 3.5mm mini-jack), I played the 24/96 version of *Le Sacre du Printemps*. All right, I’ll admit that this might be cheating; there’s no way that such little speakers could recreate the power of a live orchestra, but they still elicited an “air-conductor” session where I threw my arms around Bernstein-like. The D3 DAC did exactly what it’s supposed to do—make digital audio sound great. At \$189, the D3 DAC is a must-have piece of the A2+ puzzle. Plus, it comes with a nice adaptor cable, so you can plug in those beefier headphones and enjoy all the music you’ve been missing because of that sorry built-in computer DAC.

I’m not going to go audiophile on you and describe the minutest nuances of the speakers, because that would completely miss the point: these are desktop speakers and are only \$249, and for \$249 you get such quality sound it’s ridiculous. They sounded so good that I started listening to them *instead* of my main stereo—that’s how much I liked the A2+ Powered Desktop Speakers. As aforementioned, I even went a little crazy and switched all the stock cables with audiophile-grade versions from AudioQuest and Wireworld. Unnecessary? You bet. But I mention this because how many 6" desktop speakers have USB, RCA, and 3.5mm inputs, RCA output, can accept banana, spade, or bare speaker wire, *and* sound this good for only \$249? At that price, the A2+ speakers seem like the perfect gift for the recent high

school graduate, or college student, or really anyone who needs great sound in a small form factor. Sprinkle a little sugar on top with the D3 DAC, and you’ve got a winning combination that can now improve on-the-go sound for grand total of \$438. *Ahem*, I have USB cables that cost more than that. Now if only I had had a pair of these when I was in college, life would have been sweet. **tas**

### SPECS & PRICING

#### A2+ Powered Desktop Speakers

**Inputs:** USB (up to 16-bit/48kHz); RCA; 3.5mm mini-jack

**Outputs:** Variable RCA Out

**Drivers:** 2.75" Kevlar woofers, 0.75" silk dome tweeters

**Frequency response:** 65Hz-22kHz +/-2dB

**Power:** 15W RMS (60W Peak)

**Dimensions:** 4" x 6" x 5.75"

**Weight:** 10 lbs.

**Price:** \$249

#### D3 24-Bit DAC

**Frequency response:** 10Hz-25kHz +/-0.5dB

**USB transfer mode:** Asynchronous (dual clock)

**Input:** Up to 24-bit/96kHz

**Output:** Analog audio mini-jack

**Price:** \$189

#### AUDIOENGINE

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# KEF X300A Digital Hi-Fi Speaker System

Plug-in!

Neil Gader



**K**EF's versatile coincident driver, the Uni-Q, has been cast in a new role—a part, in my humble opinion, it has always been destined to play. It's the X300A Digital Hi-Fi Speaker System. I've admired this unique transducer for some time but most recently when I evaluated the KEF LS50 (awarded a Golden Ear in Issue 235). I continue to feel it's one of the most satisfying compact two-way speakers I've encountered in the last couple years. The speaker is not only visually arresting; it also boasts superb midrange sonics, full-bodied presence, and potent midbass punch. I always thought it could be the basis for an outstanding nearfield or portable monitor. And whaddya know—with the X300A KEF engineers have taken that next logical step and reimagined the LS50/Uni-Q for desktop duty and the world of computer media.

The speaker may only be eleven inches tall, but pint-sized or not, the X300A is no toy. The cabinet has been reduced in volume and trimmed in a more utilitarian finish. Visually immaculate it's as clean as a whistle—with a front baffle with no visible hex-head mounting bolts or other distractions, just the anodized, aluminum Uni-Q (5" midbass and 1" tweeter) with its "tangerine" waveguide and uniquely ribbed surround and stylish trim ring. However, now it's powered by two built-in Class D amps that generate 50W for the mid/bass driver and 20W for the tweeter. The whole shebang is currently \$599, less than half the price of the LS50. (A wireless version of the X300A is available for \$999.)

So far so good. But what makes the X300A a "Digital Hi-Fi System" relevant for the new breed of desktop recording engineers, music downloaders, and computer-media enthusiasts is the inclusion of a full-time, 24-bit/96kHz USB DAC. The takeaway is that all incoming signals are digitized, effectively making the X300A a self-contained stand-alone system that only requires a computer source to be complete. Tweakers may quibble, but users who want to get up and running with a minimum of hassle will celebrate.

## Koincident and Klever

Setup is easy thanks in part to the supplied cables, which include a pair of two-meter USB-to-mini-USBs and the twin power cords required to power the internal amplifiers. All connections are secured from the back panel of the X300As. The left and right speakers serve specific functions. The left channel acts as the "parent," the right channel as the "child." One USB cable connects the computer source to the left channel; the other connects left and right channels together. A rear-panel knob on the left speaker controls volume, while another knob on the right channel handles balance. Just why the connections are buried on the back panel beats me. I would have been happier if the volume/balance adjustments were on the front.

In addition to the USB connection there is a 3.5mm auxiliary input on the back of the left channel for a personal player like an iPod/iPad. All incoming signals are then digitized via the X300A's internal ADC, and later reconverted to analog.

A slider switch on the back of the left channel allows the user to optimize the X300A for two listening environments. In the "desk" position the X300a is set for nearfield desktop listening



## EQUIPMENT REVIEW - KEF X300A Digital Hi-Fi Speaker System

by rolling off the bass to alleviate potential boominess. When in the “stand” position the X300a is optimized for open-field listening and bass response is flattened out. Foam port plugs or “bungs” are also supplied for smoothing bass response to accord with wall/shelf placement. An optional five-meter USB-to-mini-USB cable is manufactured by Wireworld, and offered for conventional in-room positioning. I evaluated the X300A in two configurations—as desktop monitors and on floorstands in a traditional in-room configuration.

### The Power of One

In desktop mode, the X300A L/Rs were poised about thirty inches from my seat, angled inward a few degrees, and tilted up slightly. From the moment I cued up Stravinsky’s *Pulcinella* [Argo] with its vivid palette of short themes and quirky rhythms it was clear that nearfield listening is an ideal mission for the Uni-Q design. The immediate effect was a speaker system that was well balanced and dynamically adept, with a strong midband balance and a firm presence range. The X300A is nicely graduated across the macro/micro-dynamic landscape with an image stability and pinpoint focus that are only approached by true single-driver designs.

Timbrally, the X300A reproduces music with a slightly cooler, forward tilt. It’s not a laid-back, cool-your-heels kind of speaker. It’s pacy, with a jump factor that should get your trackball and paperweights dancing. A cut like Steely Dan’s “Hey Nineteen” is all about the groove it establishes, and the X300A sets it beautifully. The track is reproduced with terrific dynamic snap, crackling transient action off the snare,

and a sensation of weight and impact unusual in a desktop speaker. The background vocals featuring the soulful Michael MacDonald are stunningly articulate.

As a result of the system’s proximity in a nearfield setup its sonic personality has a more upfront character—and a drier one. Because of its intimacy, I perceived more of the inner workings of a recording like Norah Jones’ *Not Too Late* [Blue Note] and less of the reverberant layering from the ambient environment of the listening space. The tiniest instrumental details take on greater immediacy, as transient attack and other low-level dynamic information tend to step forward. The presentation is not always strictly natural in my view, but it is addictive and allows music to attain a clarity and specificity that are more akin to headphone listening but without the bullet-to-the-brain oddities of most cans.

Much of this impression owes to the fact that bass response is punchier and better defined than truly extended; in a desktop setup, low-end response never descends appreciably below the upper midbass regions. As a result a cello, for example, sounds a bit more sinewy than warmly reverberant and reveals more bite off the bow than resonances from the instrument’s body. Similarly on vocals, choral groupings, and massed strings, a hint more of the tweeter is unmasked by the lighter tonal balance. More so, for example than it is with KEF’s own LS50.

In terms of scale, no one is going to be fooled into thinking that the London Symphony Orchestra is actually playing on the desktop. But even at this reduced size, the soundstage and image proportion are so complete, layered,

and stable, that it’s like observing an impeccably detailed, highly resolved miniaturized performance. If you’re unaccustomed to high-end desktop listening, it’s actually an amazing experience to enter the world that the X300A creates.

When the X300As are lifted onto floor stands and set out into the room, their sonic character shifts dramatically. Bass response deepens. Ambience retrieval and reverberant cues from acoustic recordings are heightened. A greater degree of warmth is introduced and some of the desktop dryness is reduced. The key is wall/corner positioning. The farther the distance from those boundaries the greater the reduction in low-frequency reinforcement. On the other hand, close proximity can thicken bass output and create soupy incoherence. In my setup, “just right” happened to be about eighteen to twenty-four inches (measured at the front baffle) from the back wall. Here, the X300A created a more lifelike impression of orchestral scale and an immersive surrounding acoustic that was both riveting and realistic. In SPLs there’s little need to coddle the X300, but keep in mind that a five-inch transducer does have its limits. On a punishing track like the Copland *Fanfare for the Common Man* [Reference Recordings] I could get reliable output into the lower-to-mid-90dB range at roughly six feet or so (higher in the nearfield), but I backed off above that when a flurry of tympani concussions caused an occasional *bbbuuurrp* from the Uni-Q.

I cannot avoid a quick comparison to its passive/analog cousin, the LS50. In tonal balance they are clearly cut from the same cloth. But in output and dynamic gradients the LS50

offers a larger, warmer canvas. It also creates a more convincing illusion of soundstage scale and dimension, as it should for roughly twice the price—DAC and amp not included.

How good is the internal DAC? Hard to say since the X300A allows “no substitutions.” But it is certainly more than up to the task and further grousing would be missing the point concerning the lengths KEF has gone to make listening to the X300A a seamless experience. The versatile X300A creates two distinct listening options and both are loads of fun. Whether you’re a computer enthusiast or an old guard high-ender, I can’t imagine you not falling in love with KEF’s perky little plug-in. *tas*

## SPECS & PRICING

**Type:** Two-way, powered loudspeaker in bass-reflex enclosure  
**Drivers:** Uni-Q array, 1" tweeter, 5.25" mid/bass  
**Frequency response:** 79Hz-28kHz (47Hz-45kHz -6dB)  
**Internal amplification:** 50W, mid/bass; 20W, tweeter  
**Dimensions:** 11.1" x 7.1" x 9.6"  
**Weight:** 16.5 lbs.  
**Price:** \$599

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# Our Top Picks in Desktop and Powered Speakers

## Audioengine A2+

**\$249**

Easily one of the best deals in high-end audio, the Audioengine A2+ powered desktop speakers are simply incredible. How is it possible to get such low-end extension, wide soundstaging, pinpoint imaging, and smooth sonics from tiny desktop speakers that cost \$249. Perfect for the workshop, bedroom, desk, or dorm room, the A2+'s should be at the top of everyone's small powered-desktop-speaker list. USB, RCA, 3.5mm inputs, and subwoofer-out make these speakers as plug 'n' play as they come. SH, 241

## B&W T7

**\$349**

B&W touts the T7 as its most portable and versatile wireless system. You sure won't get an argument from our reviewer NG. Not much bigger than a thick, oversized paperback, the T7 is a marvel of design and packaging, easy to palm with one hand and bolstered with enough features to genuinely impress. How the elves at B&W stuffed a pair of 50mm full-range drivers around twin opposing bass radiators, *plus* DSP and aptX-compliant Bluetooth, *plus* a pair of 12W Class D amplifiers is anyone's guess, but

somehow they did. While the T7 is not going to transform a kitchen nook or office picnic into the control room at Abbey Road studio, the B&W guys clearly know the musical terrain in this mini segment. NG concluded that the T7 proves that portable wireless speakers can be consistent with high-end values—that, and suitable for take-out, too. "Grab one!" is what he said. NG, 252

## KEF X300A

**\$800**

Take KEF's brilliant Uni-Q coincident, add Class AB bi-amplification, and slip in a 24-bit/96kHz USB DAC, and you've got a recipe for desktop distinction. This diminutive two-way, bass-reflex design is pacey, with a jump factor that should get your trackball and paperweights dancing. The X300A also has an image stability and pinpoint focus that are only approached by single-driver speakers. Whether you're a computer enthusiast or an Old Guard high-ender, you will find it hard to resist KEF's perky little plug-in. NG, 238

## Audience ClairAudient The One

**\$999**

The One, as you might infer from its name, is a single full-range driver shoehorned into a small box. The driver itself is the same unit, the A3A, that Audience uses in its flagship \$72,000 16+16 speaker. According to Audience, the A3A has exceptionally flat response, claimed to be +/-3dB from 40Hz to 22kHz. Be that as it may, until he auditioned the Audience 1+1, the One was the best desktop speaker reviewer Steven Stone had heard. SS, 236

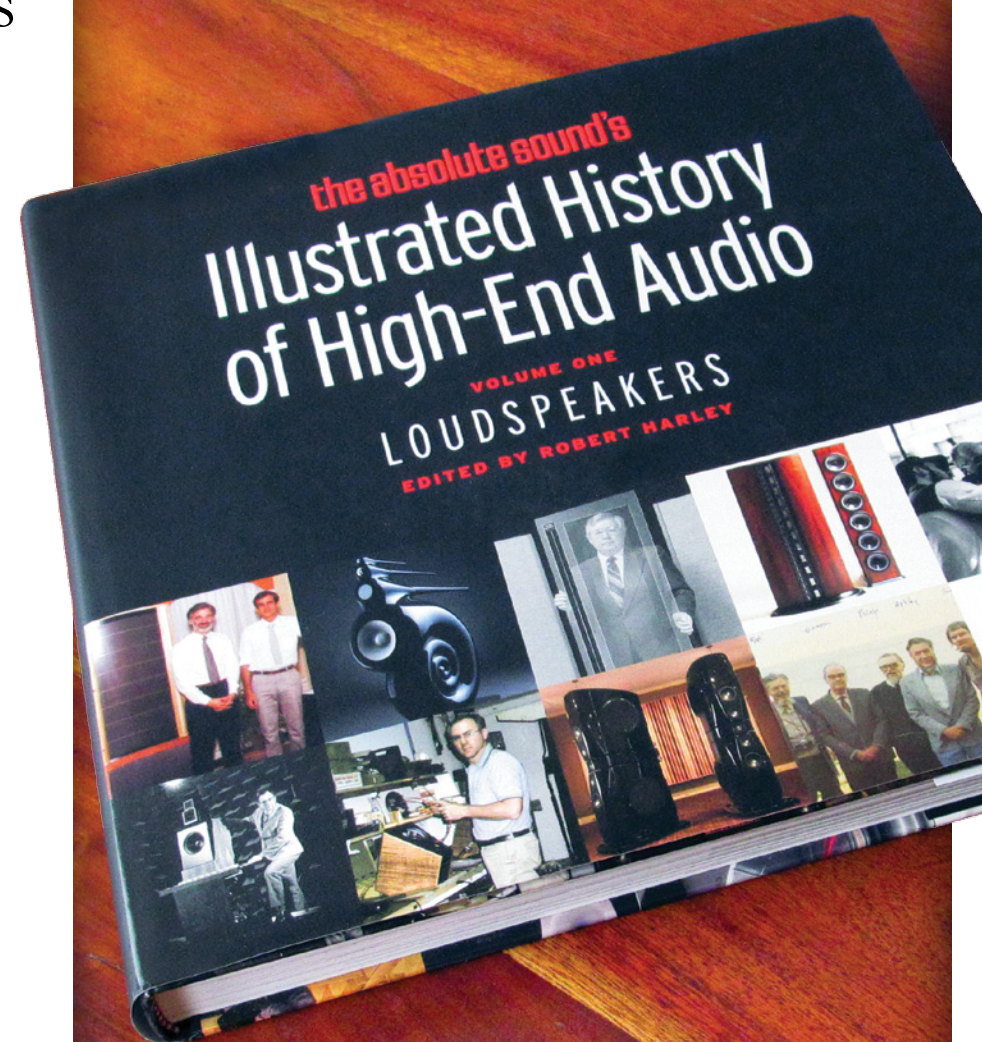
## Audience ClairAudient 1+1

**\$1800**

When SS reviewed the single-full-range-driver Audience Clair Audient "The One" speakers, he was convinced that they were the best nearfield monitors he'd ever heard. His time with the larger Audience 1+1 speakers has led him to place the 1+1 above the "The One" at the top of his own personal "best" nearfield loudspeaker list. Just like "The One" speakers, the Audience 1+1 creates a three-dimensional soundstage that allows you to listen deeply into the nuances of a mix or a live performance. SS, 246

"Staggering speaker read. . . If you love loudspeakers, you will enjoy this book."

*ToneAudio*, Issue 65



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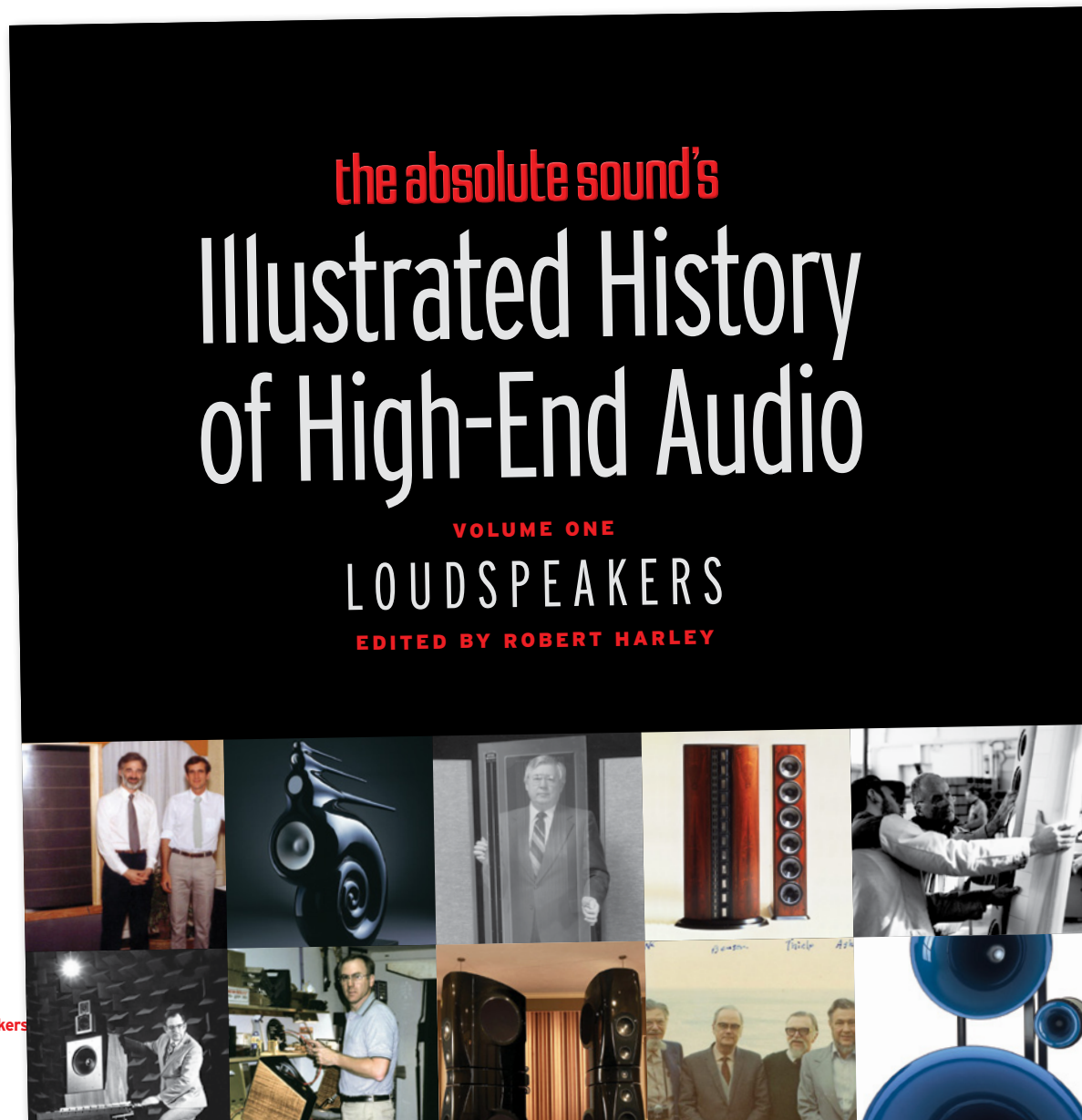
# The Absolute Sound's Illustrated History of High-End Audio is Now Shipping

**The Absolute Sound's Illustrated History of High-End Audio, Volume One: Loudspeakers** brings to audiophiles and music lovers the behind-the-scenes stories of high-end audio's most iconic companies and their legendary products.

This lavishly produced large-format book features never-before-published interviews with the founding fathers of the high-end loudspeaker industry, informative profiles of their companies, timelines detailing the most significant advancements in each company's history, classic and contemporary TAS commentary on each company's landmark products, and an overall assessment of each company's contributions to the high end. The company profiles are chock-full of fascinating details, nearly all of them new. The stories of how these legendary pioneers overcame technical and business challenges to create the high-end industry as we know it today are riveting.

33 The Absolute Sound's Buyer's Guide to Loudspeakers

◀ PREVIOUS PAGE



## The BBC Monitor Birth of a Legend

BY PAUL SEYDOR

**T**he BBC Monitor is a speaker so iconic that it has become a household name. It's a speaker that has been around for over 50 years, and it's still going strong. The BBC Monitor is a speaker that has been around for over 50 years, and it's still going strong. The BBC Monitor is a speaker that has been around for over 50 years, and it's still going strong.



It's a speaker that has been around for over 50 years, and it's still going strong. The BBC Monitor is a speaker that has been around for over 50 years, and it's still going strong. The BBC Monitor is a speaker that has been around for over 50 years, and it's still going strong.



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NEXT PAGE ▶

In addition to these in-depth profiles, we've included shorter pieces on many other companies that have helped shape the high-end industry, including those at the forefront today. And to make the book definitive, we've added a series of features on landmark technological developments and trends, and on the overall history of high-end loudspeakers. We trace the loudspeaker's development from its earliest incarnations in 1874 all the way through to today's high-tech marvels. This is truly a monumental project that tells the complete story of high-end loudspeakers.

The 320-page deluxe hardcover book is nearly the size of an LP cover, and is richly illustrated with rare archival photos of the company founders, their workshops, and early products. No expense was spared in this book's production, from its UV-coated hardcover format, to its deluxe dust jacket, to its ultra-premium paper and made-in-the-USA quality.

I encourage you to visit our Web site for *The Absolute Sound's Illustrated History of High-End Audio* at [tasbook.com](http://tasbook.com). There you'll find sample page layouts, the table of contents, and a complete description of the project. We've also set up on-line ordering so that you can be among the first to receive a copy of this landmark book. **tas**



Robert Harley takes you on a guided video tour of the *Illustrated History* from his listening room.

## Advent and KLH

BY DICK OLSHER

High end audio was indeed fortunate to have had Henry Kloss (born February 21, 1929, died January 31, 2002) connect with Edgar Villchur in the early 1950s. As fate would have it, Kloss happened to be attending an evening course taught by Ed Villchur at New York University on the subject of high fidelity. The two befriended each other and that eventually led to a commercial partnership. Without Kloss' manufacturing skills and business savvy it's unlikely Acoustic Research would have materialized in 1954. And Villchur freely admitted that Kloss had a significant hand in the development of the AR-1, the first acoustic suspension speaker.

When Henry Kloss left Acoustic Research in 1957 to found KLH with partners Malcolm Low and Tony Hofmann, the E and H initials in the name, the new venture opened the door for a decade of Kloss innovation in the realm of audio golden age. The goal, as Kloss said in a 1992 interview, was to make a better speaker via development of superior drivers, and in particular to extend the upper range of a woofer by tuning its breakup range in the 1 to 2kHz range. The first thing KLH did was to work with a paper consultant in order to set up a paper-making laboratory for the production of paper cones. Kloss got good at this and was able to experiment with various fiber formulations, creating finished samples in about two hours for testing.

The first three models from KLH, the One, Two, and Three, were woofer only acoustic suspension designs engineered to mate with an external Jantzen tweeter; the best tweeter money could buy in those days. The model Four was KLH's first full-range design and used a tweeter sourced from GE. The breakthrough product that put KLH on the map was the model Six which was introduced in 1958 and stayed in production for over 15 years. It was a two-way design featuring a 10-inch woofer and a cone tweeter. Both drivers were manufactured in-house giving KLH complete control over performance and quality, allowing for the maintenance of very tight tolerances. The tweeter was unique, being a wide range design with a one-piece cone construction without a dust cap and with the voice coil glued directly to the apex. Voice coil excursion was robust enough to permit operation down to 1.5kHz which eased integration with the woofer, making for a more perfect union in the transition region. The pricing and voicing of the Six were such that it became an instant commercial success and the gold standard for future box speakers at KLH. There was a model Five actually two versions of the model five were manufactured. The chronological Five was not a major product, but the second Five, designed by Kloss will alter the Six, was a three-way design with greater bass extension and an even deeper midrange.

For many years this second model Five was KLH's most expensive box speaker. Pundits at the time found the Six, and the new Five, to be similar sonically to the AR line but with greater bass range, warmth and treble extension. Both the Five and Six were prime examples of KLH box speaker technology during the 1960s, and were undoubtedly some of the best sounding acoustic suspension designs of their day.

### Did You Know?

Henry Kloss founded AR, co-founded seven audio companies over a 35-year career: Klipsch Industries, Acoustic Research, KLH, Advent, Kloss Video, Cambridge SoundWorks, and Tripath Audio.



In addition to introducing the audio industry Henry Kloss co-edited and authored popular articles.

However, KLH is best remembered today for the model Nine, a full-range electrostatic speaker that went into production circa 1960 (\$195 per pair in 1975). It was a product that Kloss admitted he didn't have anything to do with. Arthur Janzen, who joined the KLH team as a fourth member, designed the bare panels for the Nine and integrated the tweeter and bass panels into a coherent two-way speaker system. Each channel comprised multiple bare panels surrounding a single Jantzen electrostatic tweeter mounted roughly in the center and crossed over at about 2kHz. It was clearly a contender for state-of-the-art houses in the late 60s. It went deeper in the bass than the QUAD ESL and excelled in clarity, transient response, tonalstage transparency, and detail resolution. To be sure, it wasn't perfect. It was truly bad luck and coincidence, and it didn't quite equal the QUAD's natural voicing in the midrange. Most frustrating was its bulky treble range. Entry-level audiophiles seemed to using a double Nine



man who delighted in designing cost-effective products with mass appeal.

Both Advent loudspeakers were two-way acoustic suspension designs, and in particular, the large Advent comprised directly with the tweeter AR-3s but cost just under half as much. Though outside in the bass range, it measured well and scored high in musicality. It was the kind of speaker that didn't necessarily impress in the showroom but satisfied music lovers in a domestic setting. Known specifically as the "Large Advent" after introduction of the smaller Advent, it was this model that caught the attention of Harry Pearson who featured a stacked large Advent system in the inaugural issue of TAS (1973). HP reported that "it's only when you double up on the Advents, that you begin to get the sort of authoritative performance that comes strikingly close to the real thing...the spaciousness of the two working in tandem suggested that of a single Beoak system, but without its considerable frequency deviations. The bass, if anything, had that certain low-end rock you hear in a good hall, and the upper strings, muted values in particular, began to sound like massed violins." HP noted that the Advent loudspeaker "has several

things going against it with most cabinet loudspeakers. First, it has been a huge commercial success. Second, it is easily available. Third, it is not backbreaking, either in cost or in weight. Perhaps worst of all, it contains no 'radically new principles.' His conclusion was that "the Double Advent system suffers when compared in first one area, then another, to individual speaker systems costing many times more, but overall, more puts it to shame."

After leaving Advent, Kloss went on to found Kloss Video and fulfilled a prolific audio career, spanning nearly 50 years, by co-founding Cambridge SoundWorks (1988) and Tripath Audio (2000).

### Advent in The Absolute Sound



Harry Pearson's iconic legendary review of the "Double Advent" system in the first issue of *The Absolute Sound* put the magazine on the map. TAS allowed Advent to reprint tens of thousands of copies of the review provided that the reprint include subscription information. Cambridge SoundWorks naturally, and *The Absolute Sound* never looked back.

The Absolute Sound's Illustrated History of High-End Audio 10 Advent and KLH

The Absolute Sound's Illustrated History of High-End Audio 10 Advent and KLH



## MartinLogan

BY DICK OLSHER

### The

power of two is in no greater evidence than in the founding of MartinLogan. Gayle Martin Sanders and Ron Logan Sutherland met in Lawrence, Kansas, during the late 70s and managed to convince each other that they could not only build an electrostatic speaker but could better previous designs such as the KLH Model 9 and Quad ESL when it came to bass extension and dynamic range. Needless to say, that was an ambitious vision and one only likely to succeed through the blending of these two men's talents.

Even though electrostatics are conceptually simple to understand, basically a stretched Mylar diaphragm sandwiched between two stators, reliability and ultimate performance reside in the engineering details. The early years were focused on experimentation with conductive coatings, insulation, adhesives, perforated steel stators, and, of course, the ever-elusive line-source panel (LSP). The LSP was a conceptual breakthrough none a feature in every MartinLogan electrostatic design. Some said that a curved panel wouldn't work, but we're all grateful to MartinLogan for exploring the road less traveled.

Over the years MartinLogan moved to improve its own technology, the electrostatic transducer, by researching new materials and methods to improve conductive coatings, insulation, adhesives, and assembly processes. This continuing evolution has resulted in improvements to bandwidth, efficiency, contrast, and reliability. The electrostatic panel of 1983, while looking similar, is vastly different from its contemporary counterpart. For example, in 1983 conductive coatings were hand applied with a conductive slurry. Today, conductive coatings are applied to the diaphragm through a proprietary vapor deposition process in a state-of-the-art vacuum chamber that allows the diaphragm to maintain a 5000-ohm charge.

What motivated all this experimentation was that audiophiles wanted (and still want) full-scale reproduction of both dynamics and bass. After significant experience with all variations of both ESL and dipole technology, MartinLogan had to face the reality that dipoles, and ESL in particular, are challenged when asked to reproduce both large-scale dynamics and low-frequency information at the same time. So ML decided early on to design a high efficiency electrostatic transducer to be integrated into a hybrid system. That first speaker was the MeroSL and it launched the company following an encouraging reception at the 1983 CES. Sales took off in 1985 placing the company on a firm financial footing; that was also when Ron Sutherland departed MartinLogan to pursue his first love, electronics.

The first full-range electrostatic speaker, the CL2, arrived in 1986. But it was the Sequel, a smaller hybrid introduced in 1987, that resulted in explosive sales. During the 70s product releases came fast and furious and included some of MartinLogan's classic models such as the Quest, Avion, and SL3, and to top off the product line with a claim on state-of-the-art houses, the massive Statement 2 loudspeaker was released in 1988.

The release of the Summit in 2005, followed by the Summit X in 2009, heralded the arrival of the most advanced hybrid yet, combining dual independently-powered woofers with MartinLogan's most advanced electrostatic transducer to date, the XStat. The CLX Art, unveiled in 2010, is its most advanced full-range electrostatic to date. Though co-founder Gayle Sanders left MartinLogan about the same time, it was acquired in October 2005 by Rose View Industries. MartinLogan is still today a growing company with an internationally recognized brand, and a first-class design and manufacturing team.





# Bookshelf and Stand-Mount Speakers





## ATC SCM19

Where the Drivers Do the Talking

Neil Gader

**F**or the past forty years, British loudspeaker-maker ATC has forged an enviable reputation in recording/mastering studios, concert halls, and post-production facilities worldwide. Its professional active monitors are akin to precision tools, as faithful to the source as they are indestructible. Though not as well known in the high end, the same bloodline holds true in ATC's consumer line of mostly passive loudspeakers. The company's across-the-board excellence has never been more evident than in its latest offering, the SCM19.

The SCM19 is the largest of three two-way compacts that make up ATC's new HiFi Series. All passive, acoustic-suspension designs, and affordable (by ATC standards), the line also includes the SCM7 and SCM11. The cabinets are conservatively tailored yet elegant—ATC has never been prone to flights of whimsy in its enclosures. Viewed head-on there is no extraneous hardware; even the unique metal grilles attach via hidden magnets. Notable are the curvilinear side panels that arch toward the back panel, a design known to reduce internal standing waves.

The look and selection of materials remains traditional, even Old School some might say—MDF enclosures, doped-fabric mid/bass diaphragms rather than the latest exotic craze in cone materials. If anything, this is entirely consistent with the stated philosophy of ATC's founder and chief designer Billy Woodman, who said in a TAS interview [Issue 117]: "It is our aim to produce loudspeakers of a neutral fidelity, with no particular signature, and capable of wide dynamic range when driven by a suitable amplifier. We try to produce the best loudspeakers in the world, not by breaking new ground, but by the application of better engineering to established principles."

Actually, it's more accurate to characterize ATC as, first and foremost, a transducer company. Other loudspeaker manufacturers typically source their drivers from third parties; ATC doesn't. Its transducers are still engineered, tested, and assembled as they have been for decades in the same, small facility in Stroud, England. And they remain exclusive to ATC. Don't bother looking for ATC drivers on other consumer brands; you won't find them.

There was, however, one exception to ATC's house-designed rule—tweeters. For years they were sourced from SEAS to ATC's specifications. No longer. Following some lengthy R&D ATC began producing its own soft-dome tweeters. The tweeter, designated model SH25-76, represents a jewel in the crown of ATC transducer design. This 25mm soft dome is a short-coil, long-gap, dual-suspension design, like ATC's famous 3" soft-dome midrange. According to ATC, the configuration "ensures pistonic motion and suppresses rocking modes even at high output levels." ATC reports that its diaphragm "is based on a complex geometry which maximizes power transfer from the former, extending the high-frequency response and giving a smooth off-axis response." The design also enables the use of a narrow magnetic gap and negates the requirement for ferrofluid—and the potential negative effect of the fluid drying out over time. The tweeter is set in a resonance-free, machined-alloy waveguide that's been calculated for optimum dispersion and the flattest possible on-axis frequency response. Later this year a high-efficiency "S" version of this tweeter will debut on pro and select consumer models.

Midrange and bass frequencies are handled by ATC's top-rung 6.5" Super Linear mid/bass unit—a driver with a sophisticated diaphragm structure that integrates the dual profiles of a traditional cone with a 75mm soft dome. Per ATC tradition, it features a short coil in a long gap, a massive ceramic magnet, and long-throw suspension for linearity at extreme dynamic levels. The ultra-rigid basket construction is so sturdy it appears ready to launch into space. Given the output levels that are expected of these pro transducers, space-launch is not far



# EQUIPMENT REVIEW - ATC SCM19

from the truth. At 85dB sensitivity, however, power is what the 19s require. They gobble it up like candy, and won't be in full song at less than moderate volume levels.

I've owned ATCs for years, a relationship that began with the classic SCM20SL, later the SCM20-2—both direct descendants of ATC's active studio monitor. The SCM20s invariably shared one thing with their pro-monitor progenitors: They never communicated in a passive voice. The ATC sound is fully committed, never retiring. And so it goes with the new SCM19. Its resolution is unstoppable, as if it is on a mission to exploit every single aspect of an amplifier's output. Tonally faithful to the source, the 19 is brimming with midrange power and a single-driver like coherence, challenging if not surpassing its compact predecessors.

The SCM19 is neutral through the broader midband, presence range, and treble, with no energy drop-off as it approaches its 2.4kHz crossover point. Neither is there evidence of suckouts or flagging dynamics that tend to soften and lay back the mids for an unearned depth effect. The 19 is not dry or clinical sounding, either. It has a comforting warmth in the lower mids and upper bass that adds to the impression of musical scale and substance. Also a good part of the 19's opulent character is attributable to the superb on- and off-axis dispersion of the mid/bass unit, i.e., its power response. I never felt head-locked in a tiny sweet spot. Even when I was seated well off-axis, the 19's essential tonality, weight, and body remain consistent. Vocal reproduction—always a point of pride for this brand—has never before been as direct, live, and in-the-room as it is through the SCM19. As I

cued up a cavalcade of singers—from the grit and gravel of Tom Waits to the cut-crystal clarity of soprano Anna Netrebko—my notepad silently fell to the floor, along with my jaw.

The 19's lack of a true bottom octave obviously limits its ultimate bass extension, but the 19 descends into the midbass region with perceivable output into the upper forty-cycle range (piano aficionados take note). Where most compacts come up painfully short in attempting to reproduce the brooding weight and resonance of a cello, the SCM19 captures the most critical aspects of its timbre and dark harmonics. On something like the Ray Brown Trio's *Soular Energy* [Groove Note] this acoustic-suspension design also ensures a tight, tuneful bass that few ported models can match.

While its tonality is admirable, the true greatness of the SCM19—and its most striking feature—

is the lifelike relationship between that tonal balance and the speaker's midband and treble-range dynamic output. Very rarely have I heard a two-way compact of this size that has balanced these twin imperatives—tonality and dynamics—with the ease and precision of the 19. Even as the frequencies dip into the lower mids and descend further into the upper bass—a region where smaller speakers lose their guts—the SCM19 remains undaunted. And this is why the SCM19 can fool a listener into believing it's something more than a two-way. Rather, in these respects it sounds more akin to a small three-way.

The SCM19 benefits greatly from an uncolored enclosure that permits more of the potential of the transducers to be heard. This is a quieter, less-colored box that steps out of the way of the signal and effectively disappears. It results in a speaker that launches transients without hesitation and articulates lower frequencies with greater precision. Midrange timbral information has been clarified, and the hint of nasality that I've perceived in my own earlier-edition ATCs has been eliminated. (ATC engineer Ben Lilly confirmed that mods to the 19 crossover have likely contributed to this improvement.)

If there was one area where I felt that my original SCM20s could have upped its game it was in the upper treble. There was the slightest shroud over orchestral harmonics, an attenuation of air and brilliance that shaded a string section or chorus. However, as I listened to the vast chorale of singers during the Rutter *Requiem* [Reference Recordings], all exquisitely layered and brimming with height information, the new tweeter was a thing of beauty to experience. Revealing and fast and

aided by the new waveguide it just seemed to launch an expanse of air and tone color into the room that was not just laser-guided toward the sweetspot. I noted that during *Les Brown Goes Direct to Disc* [Century] the SCM19 portrayed ride cymbals with a breath of additional top-end air. Trumpet solos sounded a shade quicker and friskier off the mark, a bit more discrete yet fully connected with their ambient environs. And as I listened to the Beatles "When I'm Sixty-Four" my appreciation for the new tweet only grew as I keyed on Ringo's elegantly understated playing, particularly his delicately accented cymbal work.

In low-level resolving power, the SCM19 conveys musical intimacy like few loudspeakers of this class. When I listened to the direct-to-disc recording of classical guitarist Michael Newman [Sheffield Lab] there was a near holographic sense of the artist playing, breathing, inhabiting the listening room. It's a sensation that's eerie in its communication of speed, tonal color, timbre, and ambience. And during Grieg's *Four Lyric Pieces* [Sheffield Labs] the diamond-like transparency and color from the eight musicians of the Chicago Symphony Winds was breathtaking. This disc's imaging has always been pristine, but here there was substance and dimension behind each image.

As I hear it, there's a very short list of rivals that play in the league of the SCM19. And even fewer at this attainable price point. Although this review should speak for itself, let me reiterate: The ATC SCM19 is, without reservation, a superb monitor that should excite and please the most discriminating of listeners. My highest recommendation. **tas**

## SPECS & PRICING

Type: Two-way acoustic-suspension monitor	ATC LOUDSPEAKER TECHNOLOGY LTD.
Drivers: 1" soft-dome tweeter, 6.5" mid/bass	Gypsy Lane Aston Down
Frequency response: 54Hz-22kHz	Stroud, Gloucestershire GL6 8HR, England
Sensitivity: 85dB	www.atcloudspeakers.
Nominal impedance: 8 ohms	co.uk
Dimensions: 17.2" x 10.4" x 11.8"	U.S. Distribution lonemountainaudio.com
Weight: 35 lbs.	(702) 307-2727
Price: \$3695	

# EnigmAcoustics Mythology M1

## Passing the Torch

Dick Olsher

**M**ost of you are probably too young to remember the Spendor BC-1 loudspeaker, a British design that garnered rave reviews in the late 1970s for its musical naturalness and imaging prowess. On cursory examination it seemed to be an ordinary three-way design, but, more to the point, it could best be characterized as a two-way design augmented by a super-tweeter. My initial take on the BC-1 was that the super-tweeter was nothing more than a token driver, a “hood ornament” whose sole purpose was to fill in the extreme treble. Only years later did I come to realize its importance in enhancing midrange transparency. At least conceptually, the M1 from ENIGMAcoustics reminds me of the BC-1, being a compact two-way stand-mounted speaker that is specifically designed to partner ENIGMAcoustics’ Sopranino super-tweeter in the extreme treble. The Sopranino (see review, Issue 235) is a self-biased electret tweeter, which in this application, sits on top of the M1. A cable is provided to connect it to the M1’s speaker terminals. Of course, the M1 easily trumps the venerable BC-1 when it comes to driver technology.

Let’s start with the woofer, a 7-inch custom design that features a polypropylene cone, a 2-inch voice coil, a highly compliant rubber surround, and an exceptionally strong and precise magnetic motor system. Quality control is said to be tight, with each batch of woofers being within 1dB of a standard curve. However, the key to this speaker’s sonic excellence is the tweeter. It’s a 34mm silk dome that was painstakingly developed utilizing considerable modeling, simulations, and much trial-and-error to achieve high efficiency (95dB) and usable bandwidth from 1kHz to 20kHz. The crossover frequency is a re-

markable 1.1kHz, whereas the typical crossover frequency for a 1-inch dome is around 3kHz. This is a big deal in that it allows the M1’s woofer and tweeter to integrate far more smoothly than the average two-way is capable of and significantly improves the power response in the upper midrange. Push a 7-inch woofer to 3kHz and it starts to beam like a flashlight, meaning that its off-axis output drops dramatically. Experience has shown that a uniform power response in the midrange correlates well with perceived tonal-balance accuracy at the listening seat. It should also be emphasized that having what is essentially a



low-mass point source of sound reproduce the core of the midrange and treble range yields an inherently more cohesive and focused presentation than is possible with two dissimilar drivers overlapping at 3kHz. I’ll have much more to say about these performance aspects a bit later.

The tweeter is protected by a third-order, electrical high-pass network, which is said to have been the most time-consuming design task, since the tweeter’s free-air resonance frequency is at 750Hz, less than an octave removed from the crossover frequency. It incorporates a 10dB resistive attenuation network to match

the woofer’s sensitivity. The horn-flared tweeter faceplate compensates for a slight frequency dip in the 2-3kHz range, alleviating the need for a complex correction network. The woofer’s low-pass network is second-order, making the overall crossover an asymmetric type in that it combines second- and third-order networks. The advantage of such a network is that it provides a measure of time delay that is useful for phasing the tweeter and woofer in the crossover region. It is clear that the M1 is “a labor of love,” and this is reflected in the high-quality passive components used throughout: Mundorf EVO and EVO oil ca-



## EQUIPMENT REVIEW - EnigmAcoustics Mythology M1

capitors, Solen MKP capacitors, Cardas internal wiring, and WBT binding posts.

While in theory it's possible to squeeze decent sound out of cheap drivers, my long held view has been that truly great speakers are built on the shoulders of superb drivers. The M1 reaps the benefits of in-depth engineering in the service of an outstanding driver complement. One of the quantitative benefits of this convergence is an exceptionally uniform on-axis frequency response as measured on the tweeter axis. Not only was the measured response exceedingly flat nearfield, but it also continued to behave extremely well when I moved the microphone to the listening seat. That translated directly into exceptional tonal-color fidelity. In-room bass extension measured flat to 40Hz nearfield and reached the mid 30s at my listening seat—superb performance from what is after all a rather small bass-reflex design.

The user manual offers detailed and generally useful guidance on how to set up both the main speakers as well as the Sopranino. The recommendation to align the Sopranino toe-in angle with that of the main speaker makes perfect sense, as does the advice to experiment with depth of placement relative to the front edge of the M1. There is a series of grid lines marked on the top of the main speaker cabinet, spaced about one-quarter inch apart, to aid in front-to-back positioning. Expect the treble balance to shift somewhat as you move the super-tweeter even a single notch along the grid lines, due to acoustic interference in the upper treble range between the silk dome (which isn't electrically rolled off) and the super-tweeter. The manual pictures the Sopranino at its default position, which appears to be with the front edge

of the enclosure's base even with the third grid line. After experimenting with the Sopranino positioned at the first, second, and third grid lines, I settled on the third grid line, which in conjunction with a level setting of -3dB and a crossover frequency of 12kHz, not only measured best but also yielded the most natural overall balance. My ears tell me that the suggested default settings for gain and crossover frequency of 0dB and 10kHz

### SPECS & PRICING

**Frequency range:** 40Hz

-40kHz (w/Sopranino)

**Sensitivity:** 85dB

(2.83V/1m)

**Recommended amplifier**

**power:** 50-200Wpc

**Nominal impedance:** 4

ohms

**Dimensions:** 9" x 15" x 14"

**Weight:** 19 kg (speaker); 20

kg (stand); 2.7 kg (super-

tweeter)

**Price:** \$14,690 w/stands;

\$13,690 w/o stands

#### ENIGMACOUSTICS

11 Chrysler

Irvine, CA 92618

(949) 340-7590

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#### ASSOCIATED EQUIPMENT

Lamm Audio M1.2

Reference and Carver

Cherry 180 monoblock

amplifiers, AYON Stealth

DAC Pre and April Music

Eximus DP1 DAC, Sony

XA-5400 SACD player

with ModWright Truth

modification; Kuzma

Reference turntable;

Kuzma Stogi Reference

313 VTA tonearm;

Clearaudio Da Vinci V2

MC phono cartridge; Pass

Labs XP-25 phono stage;

Pass Labs XP-30 line

preamplifier; FMS Nexus-2,

Wire World, and Kimber

KCAG interconnects;

Acoustic Zen Hologram

speaker cable; Sound

Application power line

conditioners



## EQUIPMENT REVIEW - EnigmAcoustics Mythology M1

sound too bright. There is a clear and present danger in trying to make the super-tweeter do too much. At some point, the balance crosses the line between the real and surreal. For me a bright balance is a serious matter, almost on par with a rift in the space-time continuum. I'm basically guilty of disliking a rising treble response and gravitate toward a mid-hall presentation. If your priorities are aligned with capturing the balance of the real thing, don't be seduced by the dark side of the Force, and do stick with my recommended gain and crossover-frequency settings. Once you've adopted these settings, it may be perfectly fine to move the Sopranino forward to the first grid line. Doing so produces a more prominent treble impression, which may well compensate for treble roll-off induced by power amps with significant internal source impedance (i.e., low damping factor).

Impedance measurements indicate a box tuning of 36Hz. As is usually the case, the impedance magnitude is far from uniform. Significant features are a peak of about 50 ohms at the 1.1kHz crossover frequency and impedance minima of 4 ohms in the midbass and 2 ohms circa 15kHz. The impedance dip in the upper treble proved problematic for tube amplifiers, especially those with a source impedance over 2 ohms. In fact, every tube amp I tried produced some measure of treble roll-off. The best coupling for the M1 turned out to be the Lamm Audio M1.2 Reference mono-blocks. Based on my experience, I'm convinced that the M1 would be happiest when partnered by a high-quality solid-state amplifier.

My first listen to an early version of the M1 was during a Consumer Electronics Show a couple of years ago. I was in for a big sonic surprise. Here was a small stand-mounted speaker, which I fully

expected to exhibit a lack of testicular fortitude, and yet against all odds, it managed to portray the music's foundation with believable authority. Small speakers are not supposed to do that, and none that I've auditioned in the past have done it as well as the M1, which explains my past lack of enthusiasm for this "imaging without guts" speaker genre. For me, a primary ingredient in the enjoyment of music reproduction is a realistic tonal balance, and in particular, a lower midrange weight that does justice to the orchestra's power range. In this, the M1 succeeded reasonably well, to the extent that I was able to embrace its version of symphonic music. Bass lines were tight and free from the sonic muddle that accompanies a resonant enclosure. The M1's rigid enclosure stands in stark contrast to the thin-walled British monitor class, which adds false warmth to the upper bass and lower midrange in the hope that this coloration, or should I say artificial boom, will somehow be consonant with the music. The M1 is serious about bass accuracy. The front baffle is solid aluminum and is mounted to the main enclosure through the use of six stainless-steel pillars screwed to interior reinforced braces. Laminated birch wood is used for the enclosure body. Additionally, the top and bottom are reinforced by 12mm-thick tempered-glass plates, which, in addition to vibration control, add a nice aesthetic touch. The matching stands are also well executed and rigidly couple the main cabinet to the ground plane. The payoff was evident in the M1's majestic reproduction of the doublebass and cello bass-range with excellent pitch definition and timing. The 7-inch woofer generated a fair amount of punch on loud tympani strikes, though don't expect it to equal the slam factor of a much larger woofer.

There was also much to rave about at the other frequency extreme. The treble range was capable of being sweet, cogent, and detailed without a trace of harshness. Struck cymbals shimmered with plenty of air, and massed string sound was simply luscious. Soprano voice was accommodated with superb timbre fidelity. One of my test tracks, and a favorite tweeter test, consists of a poorly recorded violin with occasional overload on loud transients. Most tweeters choke on it and it isn't a pleasant sensation. The M1 did well here, negotiating the overload distortion without introducing any lingering lower-treble sizzle.

The wide-range tweeter facilitated pinpoint imaging that could only be described as spectacular. Image outlines coalesced in space around well-defined spatial coordinates, yet would expand spatially in concert with the ebb and flow of the harmonic envelope. Sitting in the sweet spot, with the speaker axes intersecting just in front of the listening seat, yielded a linear soundstage of remarkable depth and breadth, which was also totally untethered from the speakers. The M1's disappearing act was as good as I've heard. But wait, there's more. Its midrange and treble purity and transient control contributed to a superb sense of transparency. A recording's ambient information was readily discernible as was low-level detail often fuzzed over by lesser speakers. It was this combination of soundstage transparency and palpable imaging that was responsible for the urge to reach out and touch someone. However, as a planar speaker aficionado, I should throw in a couple of caveats at this point. First, I still prefer the image scale, and in particular, the illusion of image height that a good planar

is capable of. Second, I don't find a monitor class speaker with its controlled directivity produces a particularly immersive listening experience. Dipole and omnidirectional radiators do a much better job of that. However, what the M1 did extremely well was to offer a clean and tonally realistic window onto the soundstage.

My initial instinct was to protect, that is to baby, the silk-dome tweeter. But I need not have worried. It could handle loud playback levels with aplomb, that is, with little change in the distortion spectrum. Thus, the M1 should do well even in moderately sized room. The M1's feel for microdynamic nuances and ability to scale the macrodynamic range from soft to loud captured much of the music's dramatic content.

I suspect that the M1 will in due course garner a heap of critical praise, and indeed I'm about to jump on the bandwagon. But before I do, let me verbalize one concern, that is, that a speaker as clean and as tonally accurate as the M1 may fail to appeal to those who are after spectacular sound *per se*. To a great extent, the M1 will reflect the sonic character of the front end and matching amplification. It is extremely revealing of the rest of the chain and will only perform its best with top-notch gear.

With that out of the way, let me emphasize that the M1 Mythology wields considerable emotional power, which combined with exceptional tonal balance and an almost magical sense of transparency make it an insanely attractive proposition at any price point. It is a sure bet for music lovers. And you should know that it has given me many hours of musical enjoyment. The M1 is one of the very few compact monitor speakers that I could happily live with for years to come. **tas**





# MartinLogan Motion 35XT

Sweet and Lowdown

Neil Gader

**I first encountered the MartinLogan Motion 35XT at the California Audio Show in San Francisco last September, and my ears perked up immediately. Even under the less than ideal show conditions, these stand-mounted compacts were engaging, rock-solid performers. So much so that I just had to see how things would shake out in my own listening room, for as every veteran audiophile can attest, sometimes first impressions stick and sometimes they don't.**

The Motion 35XT is a two-way design in a bass-reflex enclosure with a rear-firing port. It's one of two stand-mount speaker options in ML's Motion Series, a "mix and match" collection that also includes three XT floorstanders, a pair of center channels, plus designer FX models, ultra-slim XL models, and even a sound bar, for goodness sake. The one common thread this broad lineup shares is ML's Folded Motion Tweeter—a fairly esoteric transducer in this modest price range but a not entirely surprising feature given that MartinLogan built its reputation on exotic electrostatic designs that harken back to the original full-range CLS from 1986. In many ways the Folded Motion driver is derivative of the classic Heil Air Motion Transformer wherein an ultra-low-mass diaphragm (4.5" x 2.75") is pleated, accordion-style, embossed with a conductor, and suspended in a magnetic field. The diaphragm squeezes the air along the pleats or "folds" and, voila, music. Its virtues are its extremely low mass, tiny excursions, and large radiating surface. MartinLogan has used this design on previous models, but this new generation boasts a 40% larger diaphragm

area. The three XT models (35XT, 50XT, and 60XT) feature this new, larger-diaphragm tweeter; the other four Motion models use the standard Folded Motion driver.

Beneath the aforementioned Folded Motion Tweeter rests a 6" black aluminum cone mid/woofer in a cast-polymer basket. It uses a rigid, structured dust cap to reduce cone break-up modes. Both drivers are bolted securely in place between the underlying baffle and a black-anodized brushed-aluminum outer baffle. The handoff between mid/bass and tweeter occurs at 2.2kHz via a crossover network that features a custom air-core coil, low DCR steel-laminate inductors, polypropylene film capacitors, and high-quality electrolytic capacitors. The tweeter receives thermal/current protection, as well.

The enclosure is a stout construction of MDF; its top panel is raked gently front-to-back presenting a non-parallel surface meant to reduce resonances and internal standing waves. The Motion 35XT is nicely detailed and richly finished in deep gloss—a clear step up from the typical bookshelf. Other features include ML's signature perforated steel grille, which attaches magnetically, and dual custom-angled, 5-way, tool-less binding posts for connection versatility.

The sonic character of the 35XT is first and foremost, refined. And like any contemporary small monitor worth its salt, the 35XT manages to vanish within the soundspace with ease. It has a smooth, neutral to neutral/light character not untypical of compacts that tout a single, smallish, mid/bass transducer and restricted internal volume. But it's not an edgy cold signature, which is often the case. There is a relaxed quality to the 35XT that takes a natural acoustic recording like Stravinsky's *Pulcinella* and delivers wind sections and upper strings with sweetness and

EQUIPMENT REVIEW - MartinLogan Motion 35XT

openness. Transients, low-level resolution, and micro-dynamics are likewise also very good—I always listen for the soft tapping of the keys of the oboe midway through this ballet. The 35XT never missed a cue. The result of ML's efforts are treble octaves that possess an expansive yet precise sound that delivers images with air and substance—a realistic effect that isn't normally captured by a typical dome tweeter, but clearly is by MartinLogan's Folded Motion design. In many ways, solo images have some of the same freely suspended openness and sparkling character that I typically associate with Maggies and Quads, although on a more restricted basis with the 35XT. When I listened to Glinka's song *The Lark*, arranged for piano, the transmission of sound was almost frictionless, with free-flowing, fluttering keyboard trills and little to no smearing.

As I listened to The Carpenters' hit "Sing," the harmonica intro with piano accompaniment

was pristine, the harmonica untrammelled by colorations, just reedy-pure and quicksilver fast. Vocal sibilants were natural—sharp but not spitty. On this high-resolution DSD track I could hear all kinds of minutiae, including the tape hiss softly joining the overall mix when Karen's vocal track is brought up and the accompanying flow of reverb cascading down the soundspace. However, at the upper frequency extremes harmonics seemed to darken slightly. As I listened to Miles Davis' "So What," some of the upper-frequency air and whitish pressure generated from Davis' mouthpiece were hinted at rather than fully realized.

Imaging, on the other hand, was exceptional; the kaleidoscope of panned vocals and images zipping across the soundstage from Yes' "Owner of a Lonely Heart" and "It Can Happen" were startling in their movement and clarity. Soundstage dimensionality—at least laterally—

was well resolved, but depth was a little lacking. The speaker has a tendency to emphasize and press forward a recording's backgrounds—for example, the backing singers, principally Michael McDonald harmonizing behind Steely Dan's Donald Fagen during "Hey Nineteen." Similarly the vast ambience and the depth of the soprano soloist within the Turtle Creek Chorale on the Rutter *Requiem* were not fully revealed; rather everything was pressed forward and flattened slightly.

Outside of the lowest octave—the 20–40Hz range is beyond the grasp of the 35XT—bass response was faithful and tuneful, with good tonality and pitch specificity. And to its credit, the bugaboo of port overhang was all but non-existent at any rational listening level. Predictably, the 35XT had limits on large-scale dynamic shifts in the midbass regions, and its mid and upperbass were a bit shy of ruler-flat. Although the duet for bass violin and trombone from *Pulcinella* indicated some suppressed macrodynamic energy, the 35XT still managed to more than pull its own weight (and that of the instruments)—quite an accomplishment for a compact barely topping thirteen inches.

Keep in mind that the quality of bass response performance will be commensurate with positioning in the room, meaning the 35XT needs the reinforcement of the wall directly behind it. In my room, midbass and upper bass response smoothed out appreciably at a distance of about 28" from the backwall to the speaker's rear panel.

Driver integration, a critical aspect of the listening experience, becomes ever more significant with hybrid designs such as the 35XT. Mixing driver materials, types, and technologies

can be a little like stirring oil and water—the drivers struggling to integrate with each other and to sing with one voice. In other words, the heavier (read: slower) woofer can be heard to be operating at a disadvantage to the feather-light folded diaphragm of the tweeter. Fortunately evidence of this familiar divide was negligible in my listening sessions with the 35XT. The human voice is excellent at exposing inter-driver irregularities, but the 35XT proved its mettle to my ears. It managed to strike a canny musical balance. An impressive achievement, to say the least.

All told, the Motion 35XT offers some stiff competition to battle-hardened rivals like the Sonus faber Venere 1.5 with its espresso midrange, or the Focal Aria 906 with its punchy bass response and all-around dynamism. But of these contenders only the ML has the virtue of its sweet tweet, and offers such a high level of overall transparency and musicality. The 35XT is a worthy heir to the proud tradition at MartinLogan. tas



SPECS & PRICING

Type: Two-way, bass-reflex, hybrid ribbon/cone, stand-mount loudspeaker

Frequency response: 50Hz–25kHz +/-3dB

Drivers: Folded Motion XT Tweeter (4.5" x 2.75" diaphragm), 6" aluminum mid-bass

Sensitivity: 92dB @ 2.83 volts/meter

Impedance: 4 ohms

Dimensions: 13.5" x 7.6" x 11.8"

Weight: 18.5 lbs.

Price: \$1299/pr.

MARTINLOGAN

2101 Delaware St.

Lawrence, KS 66046

(785) 749-0133

ASSOCIATED EQUIPMENT

Sota Cosmos Series IV turntable; SME V tone-arm; Sumiko Palo Santos, Ortofon 2M Black & Quintet Black; Parasound JC 3+ phono, Lehmann Audio Decade phono; MacBook Pro/Pure Music; Lumin A-1 Network Music Player; mbl C51 integrated, Rowland Continuum; ATC SCM20, Kharma Elegance S7 Signature loudspeakers; Kimber Select 6000 Series, Synergistic Tesla CTS, Wireworld Platinum Eclipse 7 speaker cables and interconnects; Audience Au24SE phono & power cords; Kimber Palladian, Synergistic Tesla, power cords; AudioQuest Coffee Ethernet, USB, and Carbon FireWire



# Raidho X-1

## Mighty Mouse

Robert Harley

**R**aidho's X-1 must be the smallest speaker I've ever reviewed. With a 4" woofer/midrange mated to Raidho's ribbon tweeter, the X-1 can nearly be held in an outstretched hand. Obviously, a 4" driver in a tiny enclosure won't go very low in the bass, nor will it play loudly. So what made me want to review the X-1 after hearing it at last year's Newport show? And what could justify the X-1's \$6400 price given these performance limitations?

In a word, the Raidho ribbon. The X-1 brings you exactly the same hand-made ribbon tweeter found in Raidho's \$240,000 flagship D-5 (Jonathan Valin's reference). This is one of the greatest high-frequency transducers yet devised, combining stunning speed, detail, and resolution on the one hand, with a silky smoothness and ease on the other. If you've listened exclusively to dome tweeters for any length of time, the Raidho ribbon arrives as some kind of revelation. Nearly all dome tweeters exhibit a metallic hardness in the top end that fosters the impression of the treble existing independently of the rest of the audio spectrum—as if the treble were riding on top of



the music rather than being an extension of the same musical fabric. There's none of that with the Raidho ribbon. The top end's integration with the upper-midrange is seamless, allowing the speaker to reproduce timbres with a rich density of tone color by virtue of banishing the brittle patina that domes add to instrumental and vocal textures. And then there's the ethereal quality the ribbon brings to instruments and voices, both spatially and texturally. Images seem to exist in space, unencumbered by

the electromechanical contrivance creating them. This is particularly vivid on background vocals, which float behind and, in some cases, seemingly above the lead vocals. Your \$6400 brings you this spectacular driver that covers such an important part of the audioband—but at a price.

That price, as noted and expected, is significantly limited bass extension, dynamic range, and impact. (The X-1 begins rolling off at a highish 80Hz, though Raidho says this is not its -3dB point.) On a desktop or in a bedroom, these shortcomings won't be apparent, but if you're looking for a main speaker in a good-sized living room, the X-1 won't deliver bass fullness and dynamic contrasts. For that, Raidho makes a whole range of larger, yet still compact models, including the C-1.1 (reviewed in Issue 224) and D-1 (Jonathan Valin is currently working on a review of the D-1). Those speakers are considerably more expensive than the X-1, but there's a compelling lower-cost alternative to the X-1 if you need more bass and SPL output while still craving the Raidho aesthetic: the new MB-line from Scansonic, Raidho's sister company. In their lower-priced implementations, the Scansonic speakers use a slightly less elaborate version of Raidho's ribbon tweeter. The Scansonic MB-3.5, for example, costs \$700 less than the X-1, and offers dual 4.5" carbon-coned midrange drivers and dual 6.5" side-firing woofers in a floorstanding enclosure. But that's the subject of a different review.

The X-1 is finished in beautiful black lacquer, which highlights the white 4" ceramic mid/woofer cone. The input terminals are recessed banana jacks. My review samples arrived with the optional stands (\$900), which I used for

part of the review before switching to a pair of Sound Anchors. The Raidho stands, with their gently arcing profile, elegantly showcase the X-1. But the stands are lightweight, and the feet are flimsy. I heard much better performance with the X-1s mounted on the heavy-duty Sound Anchors.

Ever since the Magico Q7s went back to Magico (with a brief stop in Las Vegas for CES), the X-1 has been my primary loudspeaker. The more I've listened to music through the X-1, the more impressed I've become with its great achievement. Although the X-1 imposes certain restrictions in the bass, dynamic impact, and ability to play loudly without strain, it delivers a sound quality through the midrange and treble that rivals that of six-figure megaspeakers. Listening to Ella's gorgeous voice on "Moonlight in Vermont" from *Ella and Louis*, I'd be hard pressed to say that I've heard a more realistic reproduction of a vocalist. The X-1 is so transparent and so resolving that every time I sat down to listen, the speakers seemed to simply disappear, replaced by the semblance of musicians in my room. In addition to disappearing by virtue of their transparency, the X-1s disappeared spatially. The soundstage these tiny monitors threw was startling in its size, depth, solidity of images, and three-dimensional layering; it also extended far above the speaker plane to create an impression of height.

In many cases, you can discern the size of the speaker by the height of the soundstage, but the X-1's stage was more expansive, in all dimensions, than that of many large speakers. Within this massive spatial presentation, the X-1 perfectly resolved very small gradations of instrumental position. I could easily "see"

## EQUIPMENT REVIEW - Raidho X-1

where each performer was located, a quality that contributed to the X-1's realistic spatiality. More than once, I opened my eyes at the end of a piece of music or an LP side and was shocked to realize that these tiny speakers had just transported me to another acoustic space.

The X-1's treble is simply gorgeous—a description rarely applied to a loudspeaker's top end. But there's no other word for it. It's also smooth, liquid, and completely free from etch and grain. Moreover, the treble is beautifully integrated with the upper-mids, sounding like an extension of the musical fabric rather than an appendage to it. Despite this ease through the upper octaves, the X-1 resolves extremely fine detail. It is like a microscope on the music, but not in an analytical way. The presentation of detail is much as you hear it in life—richly textured and nuanced yet relaxed and refined. Similarly, transient information is presented with startling alacrity but, again, without the artificial edge that often passes for “speed.” The ribbon tweeter rendered delicate cymbal work with a lifelike realism that few speakers, regardless of price, could manage.

As noted, the X-1's bass rolls off rapidly below 80Hz. Despite the absence of low bass, the X-1 manages to sound fuller and warmer than that figure would suggest. You don't hear the fundamentals of many notes, but the overtones are reproduced with such outstanding pitch definition and articulation that the brain fills in what's missing. It's when you push the X-1 to louder playback levels, or play music with heavy low-frequency content, that the speaker runs up against the laws of physics. The 4" mid/woofer's excursion is limited, causing

the X-1 to sound congested in the bass when asked to go outside its performance envelope. Similarly, don't expect a sense of physical impact on drums. A moderately sized room and a judicious hand on the volume knob will keep the X-1 within its comfort zone.

### Conclusion

When used as intended, in a smallish room at moderate playback levels, the X-1 is nothing short of stunning. The treble resolution, transient performance, soundstaging, liquidity, smoothness, ease, and freedom from etch are world-class—which is saying a lot in a \$6400 speaker. The X-1's reproduction of the human voice, in particular, is uncannily realistic. If you have the appropriate application and expectations, I don't think that you'll find a finer sub-compact loudspeaker than the Raidho X-1. TAS

## SPECS & PRICING

<b>Driver complement:</b> 100mm (4") ceramic mid/woofer, sealed ribbon tweeter	<b>Price:</b> \$6400 (stands are an additional \$900)
<b>Frequency response:</b> 80Hz–50kHz	<b>RAIDHO ACOUSTICS</b>
<b>Impedance:</b> 6 ohms	co/ Dantax Radio A/S
<b>Crossover:</b> 3.5kHz, second-order	Bransagervej 15
<b>Loading:</b> Bass-reflex	9490 Pandrup
<b>Finish:</b> Piano black	Denmark
<b>Dimensions:</b> 145 x 320 x 230mm (5.7" x 12.6" x 9")	raidho.dk
<b>Weight:</b> 8 kg (17.6 lbs.)	

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# Wilson Audio Duette Series 2

A Serious Problem-Solver

Andrew Quint

**W**hen an audio manufacturer offers a “line” of components, is a more expensive model necessarily better than a less costly one? Not always. The speaker you purchase should be determined less by the heft of your bank account and more by your room requirements, listening style, and taste in music. Taking these things into consideration, I can report that Wilson Audio’s next-to-the-bottom-of-the-line loudspeaker, the Duette Series 2 (\$22,500 the pair), was just what I was after. And I’m telling you this as someone who has owned bigger Wilson speakers—three iterations of the venerable WATT/Puppy system, to be exact.

I bought WATT/Puppy 2/3s over 20 years ago, subsequently replacing them with 6s and, about four years ago, with Sashas. Along the way, I developed an interest in multichannel music that became a driving force in the development of my audio system. At first I complemented the W/Ps with other quality brands for the center speaker and surrounds; eventually I acquired three of the original Duettes for those channels. This all-Wilson configuration did pretty well with the best discrete multichannel recordings, but it wasn’t ideal for my room.

At 15' x 15', my listening space is fairly small, and my devotion to multichannel necessitates a listening position that isn’t too close to the rearwall (and the surround speakers). As a result, I had to sit rather close to the front plane of the Sashas, which need to be positioned at least a few feet away from room boundaries—a location that could make the sound too immediate.

I’ve often wondered if there might be spatial enhancements to be had with both two-channel and surround material if the main speakers could be situated further away and farther apart. Since I had heard that the redesigned Duette was optimized for placement near a wall, when Robert Harley asked if I’d like to review the newer Duettes, I said, “Sure—have them send five.”

David Wilson, who has been manufacturing consumer loudspeakers for four decades, is now 70. He’s in good health and continues to design speakers and run his company. In the words of Peter McGrath, who is the company’s national sales manager and has known Wilson since the early 1970s, “He still drives the bus.” But “succession” is something that has long been discussed in this family business, and Dave and Sheryl Lee’s son Daryl has emerged as the heir apparent.

“I’ve grown up with Wilson Audio,” Daryl told me. “I twisted cable in my parents’ garage back when I was just a little kid, swept parking lots, cleaned



## EQUIPMENT REVIEW - Wilson Audio Duette 2

the fab shop, answered phones...Wilson Audio is a part of me and it courses through my blood. I want not only to sustain Wilson Audio, but to continue to develop products that are state of the art." In fact, of the 50 or so speakers that Wilson Audio has offered over its history, Daryl has worked on 27 of them. Although he is quick to emphasize the team approach to R&D at the company and to gently play down his relative youth, the Duette Series 2 is largely Daryl Wilson's design. "There are a handful of products that I worked on from beginning to end, and my dad just signed off on. The Duette 2 is a special one for me."

The Series 2 differs in a number of significant ways from the original Duette, which was first marketed a decade ago. That speaker was designed for maximum versatility—for use near walls or away from walls, on stands or on a bookshelf, even oriented horizontally. This need for versatile placement drove many design features and made certain compromises necessary. The sides of the enclosure, for instance, had to be flat for bookshelf mounting, while the system for attaching the speaker to a stand (which involved magnets, metal tiptoes, brass discs, and putty) was not only acoustically sub-optimal but also perilous—an enthusiastic pet or five-year-old could easily send a Duette crashing to the floor. Again, due to the need for flexible placement, the front baffle had to be perpendicular to the floor, greatly complicating things when it came to driver alignment in this two-way design.

Daryl and others considered actual customer utilization in redesigning the speaker. They discovered that people were mostly using the Duettes on stands, and definitely were *not* laying them

on their sides. So, although you can still buy Duettes with a free-standing Novel crossover that connects to the speaker via an umbilical cord (at a savings of \$2500), the usual implementation is with a newly designed stand that has the crossover hidden inside it, as well as a pair of threaded bolts to securely bond the speaker to that stand. The most profound advances with the Series 2 probably derive from the decision to always have the speaker oriented vertically. The vertical orientation allowed for variation in the thickness of the walls of the enclosure, which is fashioned from a phenolic-resin-based composite, Wilson's extremely rigid "X Material." This variability in wall thickness has the effect of breaking up persistent resonances identified via Wilson's sophisticated laser-vibrometry technology. The internal bracing has also been reconfigured accordingly, again using X Material.

The front baffle now has a ten-degree slope that results in better sonic integration of the tweeter and the mid/woofer. The Series 2 tweeter, explains Daryl Wilson, is "a modified version of the original Duette tweeter. We learned a lot from the development of the Alexia, and the modifications for the Alexia's Convergent Synergy tweeter. The Duette Series 2 tweeter is *not* a Convergent Synergy tweeter and has the same motor as the original Duette. But the rear-wave control system we developed for the Alexia is utilized with the Duette Series 2 tweeter." This tweeter is a narrow-dispersion driver, in which dispersion characteristics are further improved by the new sloped front baffle. Wilson does supply alternative resistors that allow the user to either boost or attenuate the tweeters' outputs by 1dB (this surgery is easily performed on the Duette's back panel, using a supplied Allen



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# EQUIPMENT REVIEW - Wilson Audio Duette 2

wrench). The mid/woofer in the Series 2 and the internal volume of the box are identical to those of the original Duette—but bass performance is considerably improved thanks to changes in the construction of the enclosure, and revisions to the crossover.

Two other aspects of the Duette Series 2's redesign deserve comment. The first is ergonomic. The binding posts for the connection of amplifiers are located near the bottom of the stand—which, by the way, is also fabricated from X material, with the top and bottom plates machined from aircraft-grade aluminum—and are on a tilted surface that makes attaching speaker cables near a wall much easier, with less chance of kinking wires. The terminals themselves are clearly labeled with large, white “plus” or “minus” symbols. (The binding posts accept spades only, Wilson having long since rejected other designs for sonic reasons.) Also, as was the case with the original Duette, the user must connect the crossover to the tweeter and mid/woofer driver via supplied cables and sets of terminals on the speaker itself. The wires travel through the stand, emerging from a slot close to the top plinth. Since connecting the cables incorrectly can damage the drivers, the wires in the Series 2 are color-coded, making connections pretty much impossible to screw up. (This was not the case with the original Duette.)

The second aspect of the redesign that struck me is aesthetic. Although beauty is, indeed, in the eye of the beholder, I find the new Duette to be the most visually appealing speaker Wilson has ever produced. Because of the sloped front baffle—which allows the drivers to be aimed slightly upward—the stands are shorter, with the form factor of a perfectly proportioned lectern. In addition

to not being box-shaped, the speakers manifest a subtle triangularity on their side panels (a functional reflection of the variable panel-thickness described earlier) that lends an understated elegance to the Duette's appearance.

The Duettes arrived by truck in ten substantial wooden crates. Because of my familiarity with Wilson products, I undertook to uncrate them and roughly position them in advance of Peter McGrath's customary visit, made to ensure that a reviewer has a Wilson product sounding its best.

## SPECS & PRICING

<b>Duette 2</b>	<b>WATCH Dog</b>
Type: Two-way, ported stand-mount loudspeaker	Type: Front-porting passive subwoofer
Driver complement: 1" doped silk fabric tweeter, 8" paper pulp mid/bass driver	Driver: 12.5" dual spider
Frequency response: 33Hz–21kHz (with port contribution)	Frequency response: 17–40Hz
Sensitivity: 92dB	Sensitivity: 89dB
Impedance: 4 ohms	Nominal impedance: 8 ohms
Recommended minimum amplifier power: 20 watts	Recommended min amp power: 150 watts
Dimensions: Duette, 18.5" x 10.5" x 16.2"; stand, 21" x 11.9" x 18.75"	Dimensions: 26.9" x 25.2" x 18"
Weight: Duette, 45 lbs.; stand, 65 lbs.	Weight: 211 lbs.
Price: \$22,500	Price: \$9800
	<b>WILSON AUDIO SPECIALTIES, INC.</b>
	2233 Mountain Vista Lane
	Provo, UT 84606
	801-377-2233
	wilsonaudio.com

The outcome was remarkable on two counts. First, I suffered no injury more serious than a few splinters from manipulating the crates. Second, to my immense pride, McGrath didn't find the need to move the five Duettes at all. (Although Wilson provides step-by-step instructions for the setup of all its speakers, it also requires its dealers to install speakers—something they've been trained to do. Some dealers charge for this service and some don't. It might be an item for negotiation with a purchase of this magnitude.) In fact, there was an eleventh crate sent from Utah, this one a real monster containing a WATCH Dog passive subwoofer. Dialing the sub in, utilizing Wilson's WATCH Controller, took McGrath an hour or so.

As noted above, my room is 15' x 15', though that symmetry isn't nearly as problematic as you might think. A hall opens up close to the right main channel and the wall behind the front speakers is mostly covered, floor to ceiling, with discs of various kinds. The ceiling is high, ranging from 11 to 13 feet. The room has carpet over an acoustically isolating foam/vinyl pad (to protect my downstairs neighbors from Mahler and Mayall), and there's a concrete slab below that. (The spikes on the Duettes and WATCH Dog make it down to the concrete.) You'll find no sound-absorbing pillows, reflectors, or diffusers in my room. Instead, I depend on the software in my Anthem D2v processor to apply room correction all the way out to 20kHz. My usual amplification is four Pass Labs components: a pair of Aleph 0 monoblocks for the main front channels, a 60.8 monoblock for the center, and an Aleph 0s stereo amplifier for the surrounds. A Parasound A23 amplifier, bridged to mono to produce 400 watts, powers the passive WATCH Dog. CDs, SACDs, DVD-As, and Blu-rays are played on

an Oppo 93 that functions as a transport; D-to-A conversion is done via the Anthem. Digital files, both downloaded and ripped from physical media, are managed and played by a Baetis Revolution II media computer.

Initially I plopped the five Duettes down in an approximation of the standard ITU configuration. Preliminary listening revealed a hole-in-the-middle effect that was cured by moving each main speaker about six inches closer to the center. When all was said and done, my ears were ten feet from the right and left front speakers, which were themselves ten feet apart, nine feet from the center channel, and six to seven feet from the surround Duettes.

I assessed the Duette Series 2s as a stereo pair, with and without subwoofer, and in a multichannel system with the WATCH Dog. The first order of business, however, was to compare the Duette Series 2 to the original version of the speaker. I set up both pairs of speakers near each other, with the earlier versions a few feet out into the room and closer together. Levels were matched by ear—the Series 2s have a sensitivity of 92dB whereas that specification for the original Duette is 88dB.

Succinctly put, the Series 2 is a better speaker than its predecessor: It plays louder and lower, and with less of a sense of stress on demanding source material. With a favorite choral recording, Stile Antico singing Thomas Campion's "Never weather-beaten sail" from *Tune thy Musicke to thy Hart*, there was superior resolution of individual voices when the Series 2s were in service, resulting in less homogenization of the ensemble sonority. A recording of Dvorák's *New World Symphony* under Iván Fischer on the Channel Classics label was more representative of the glorious Italian

## EQUIPMENT REVIEW - Wilson Audio Duette 2

Institute in Budapest through the newer Duettes. Electric bass and drums on well-recorded rock and pop recordings were faster and better fleshed-out. I won't belabor the point. I gave the older speakers a fond farewell, crated them, and exiled them to the basement.

Directing my full attention to the Series 2, I first considered how the speaker fared with imaging and soundstaging from their intended position near room boundaries. A couple of classical recordings with small groups of musicians physically removed from a larger ensemble were helpful here. A Gimell audio-only Blu-ray of the Tallis Scholars performing Gregorio Allegri's *Miserere* has a solo vocal quartet located many meters behind the main group of singers. Through the Duette Series 2s, these four voices were heard to illuminate the same acoustic space as the rest of the choral ensemble—but from a more distant location. No mean feat in stereo. Likewise, the beginning of *Tristan und Isolde*'s second act (on Marek Janowski's 2012 release for PentaTone) features off-stage hunting calls played by six French horns that via the Duettes were heard, quite believably, to originate from a space other than the main hall of the Berlin Philharmonie. A recording of traditionally deployed orchestral forces, an early Channel Classics effort with Peter Wispelwey playing works for cello and orchestra, manifested impressive front-to-back layering—the soloist in front without any artificial spotlighting, strings behind him, and winds behind the strings. This layering was also naturally continuous.

Imaging? I tried one of my favorites, an all-Stravinsky PentaTone SACD with Paavo Järvi leading a small German orchestra in Stravinsky's neo-classical masterpiece, *L'histoire du soldat*, scored

for seven seemingly disparate instruments: clarinet, bassoon, cornet, trombone, percussion, violin, and string bass. Recorded on the capacious stage of the empty Großer Sendesaal at Radio Bremen, each instrument was precisely localized in space, correctly scaled, and three-dimensional via the Duette Series 2s. The sense of a performance occurring in real time with interacting musicians was uncanny. In sum, Wilson has delivered on its promise of a world-class spatial presentation from speakers set up close to a wall.

The tonal reproduction of the Duettes was rich and truthful. The two most realistic chamber music recordings I know of are a pair of violin and piano recitals taped by David Wilson in the 1980s. (They are both currently available as DSD downloads from the Acoustic Sounds Super HiRez site.) On these recordings Julie Steinberg plays a Hamburg Steinway, and the consistency of tone across all registers that many aficionados hear as a particular distinction of Steinways manufactured in Hamburg was quite apparent via the Series 2s. The warmly expressive sound of David Abel's 1719 Guarnerius violin was fully audible as well, with the Duettes sensitive to changes in bow pressure and speed.

While it's true that Wilson speakers don't favor any one kind of music, you don't frequently hear reproduction of the human voice singled out as particularly notable. However, the representation of singers is a conspicuous virtue of the Series 2. One indication is how faithfully the speaker reveals changes to famous voices over time. Georg Solti's Decca *Ring* cycle was a seismic event (the greatest classical recording of all time, according to a *BBC Music* readers' poll). But hardcore Wagnerians will tell you there were some serious vo-

cal deficiencies that Solti's incendiary conducting and the glorious sonics couldn't entirely make up for. For instance, Hans Hotter, holding down the critical role of Wotan for two of the dramas, was well past his prime, especially in *Die Walküre*, the last of the operas to be recorded, in 1965. Hotter sounds stressed and tired in his famous aria ("Leb wohl") at the end of the work, as though he just wants it to be over. His once-plush bass is fraying, with a wide wobble. Compare this to Hotter's performance of the same music ten years earlier at Bayreuth on a *Ring* cycle first released in 2008 on the Testament label. There, Hotter's voice is commanding, fully under control to serve the opera's dramatic ends. The Duettes told me, definitely, that this was the same singer on both recordings, but one with very different resources at two points in time. Along the same lines, I could hear Alison Krauss mature from a naïve teen in 1987 to a mature woman in 1994 by comparing two songs—"Sleep On" and "When You Say Nothing at All"—on the SACD collection *Now That I've Found You*. The artist's delivery and technique hadn't changed much; it's her physiology that evolved, and I could hear it with the Duettes.

When it comes to dynamics and bass reproduction, choices of amplification and the use of a subwoofer come into play. On very demanding recordings, I ran the Duettes through their paces full-range—they have a low-frequency cutoff point of 33Hz +/-3dB—and also crossed over at 50Hz to the WATCH Dog. It was surprising to me how well the new Duettes did without the assistance of the sub on "Mars" from *The Planets* (John Eliot Gardiner leading the Philharmonia Orchestra in a DG recording). The bass drum and timpani detonation occurring about halfway through the movement

and the loud organ chords that Holst uses strategically for dramatic effect were far from wimpy. On *Songs of the Police*, recorded by Bill Schnee in 2000, and recently remastered for a JVC XRCD, singer Kevyn Lettau covers The Police's "Wrapped Around Your Finger," backed by a crack group of L.A. studio musicians. Jerry Watts, Jr. is clearly using a five-string electric bass, with the additional low string tuned to B. When Watts lands on that open string (which is frequently—the song is in B minor), there's a center-of-the-earth solidity that is soul satisfying, even without the subwoofer. But though the Pass monoblocks are wonderful amps, they are not brutes in the power department. When I replaced the Aleph Os with a Parasound 23A stereo amplifier, rated at 200 watts into 4 ohms, bass slam and dynamic headroom in general improved significantly on both the Holst and Kevyn Lettau recordings. Best of all was the combination of the Duettes and WATCH Dog with the Aleph O monoblocks driving the main speakers and the Parasound, bridged to mono, powering the sub. The lesson here is this: If you're going to run the Duette Series 2 speakers full-range without a subwoofer, use a beefy solid-state amplifier, especially if your tastes run to dynamically challenging music with important low-bass information. Dave Wilson told me that he and Daryl had recently installed Duettes in the home of a world-famous conductor, someone who knows a thing or two about the sound of a symphony orchestra up close, and he was quite happy without a subwoofer. But lovers of organ music, synthesizer bass, and rock 'n' roll reproduced at neighbor-enraging levels may find the integration of a good sub mandatory.

Now to the culmination, for me, of this consideration of the Wilson Duette Series 2s: the



## EQUIPMENT REVIEW - Wilson Audio Duette 2

application of these loudspeakers in a five-channel, surround-sound system optimized for music. I own around 1700 high-resolution multichannel recordings—SACDs, DVD-As, music-only Blu-rays, rips, downloads—and I hungrily revisited many of my favorites. PentaTone's RQR Series resurrected quadraphonic recordings from the late 1960s through the mid-1970s, offering dozens of programs by major classical artists of the time. None surpasses Neville Marriner's album of Rossini overtures, performed by the Academy of St. Martin in the Fields in Brent Town Hall in London. Through the Duettes there was a powerful sense of sitting close to the ensemble with a large, empty room behind me, the extent of which was illuminated by an orchestral tutti followed by a pause. It was a command performance; the ASMF was playing just for me. The most immersive sort of multichannel recording, such as those from the Norwegian 2L label, were exhilarating in their participatory feel—the Trondheimsolistene charging through Tchaikovsky's *Souvenir de Florence*, for instance. The most challenging recording spaces were captured convincingly. Telarc's *The Sound of Glory* presents the Mormon Tabernacle Choir, accompanied by orchestra and organ, in a program of hymns that is as awe-inspiring as intended, especially when the huge chorus sings full out, energizing the vast space of the church. Moving from a grandiose scale to an intimate one, a holographic rendering of the Mandelring Quartet playing Shostakovich's String Quartet No. 8—a suicide note that, thankfully, wasn't fulfilled—never seemed more edge-of-your-seat intense.

Multichannel productions of rock, pop, jazz, and other genres were just as absorbing. Listen to the way those notorious perfectionists Donald Fagen

and Walter Becker put together the intricate, interlocking parts of a song like "Gaslighting Abbie" from Steely Dan's *Two Against Nature* to see what I mean. Or experience the electric sense of occasion generated by a concert recording like *Alison Krauss + Union Station: Live*. How about the mind-blowing percussion edifices created by one of the Grateful Dead's drummers on a DVD-A, *The Best of Mickey Hart*? Or the ungimmicky but highly involving surround mix of Dylan's *Blood on the Tracks*? Or Frank Zappa's experimental but accomplished *QuAUDIOPHILIAc* 4-channel recordings, produced in Zappa's basement studio in the 1970s, so ahead of their time, as was often the case with that artist? I could go on and on. Which I did.

As I was working on this review, Wilson's updated 2015 retail price sheet became available and, interestingly enough, the Duette Series 2 and Sophia Series 3 speakers are now priced identically, at \$22,500 per pair. These two products should not, as Daryl Wilson put it, "cannibalize each other's sales"—the two speakers are designed for different functions. If you can place your speakers out into the room, get Sophias (they *do* have better bass extension). If you need to have your speakers near a wall, the Duettes, with or without a subwoofer, should be your choice. The Duette is indeed, in the younger Wilson's words, "a serious problem-solver."

Wilson Audio has real competition these days at the stratospheric end of the high-end-loudspeaker market, from marques including Raidho, Magico, and MBL. And the next David Wilson could emerge at any time. That's what makes the audiophile pursuit as thrilling a ride as we enthusiasts find it to be. For now, however, I'm gladly remaining in the Wilson Audio fold. I've moved down from Sashas. I've moved up to Duettes. TAS



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# Paradigm 30th Anniversary Inspiration Monitor

Beauty, Value, and Sonic Excellence

Chris Martens

**T**he year 2012 was Paradigm's 30th anniversary as a loudspeaker manufacturer, and to mark the occasion the firm has chosen to build two very limited edition loudspeakers: a floorstander called the Tribute and a stand-mount monitor called the Inspiration, which is the subject of this review. Paradigm's intent with these models was not necessarily to create statement-class products, but rather to build speakers that would represent the very essence of the company. What is that essence? In distilled form, I would say Paradigm combines one part meticulous design (leveraging design philosophies originating out of the loudspeaker research tradition pioneered at Canada's National Research Council), one part advanced materials science, one part build-quality, and one part (one very big part) value for money.

In practice, this means that the Inspiration monitors combine a mix of technologies drawn from two of Paradigm's Reference Series speaker lines: the top-tier Signature range and the next-to-the-top-of-the-range Studio range. The result is a speaker that merges the sonic identities of these two popular speaker families, yielding a whole that is greater than the sum of its parts. What is more, the 30th Anniversary models are treated to one-of-a-kind finishes with walnut cabinets done up in a translucent garnet-red lacquer—a color that is an exceedingly deep, dark (so dark it at first seems jet black) red, polished to a lustrous shine and breathtaking to behold.

The Inspiration is a two-way, two-driver bass-reflex monitor that uses a 1" pure beryllium-dome tweeter (drawn from the Signature range) plus a 7"

black-anodized pure aluminum mid/bass driver (patterned after drivers used in the Studio range). The mid/bass driver, in particular, bristles with advanced technologies named, typically, with exotic-sounding three-letter acronyms. Thus, it features a patented (NLC) non-limiting corrugated (TPE) thermoplastic elastomer surround said to allow for smooth, precisely controlled, long-throw driver excursions. Further, both the tweeter and mid/bass are mounted to the speaker enclosure using Paradigm's so-called "IMS/Shock-Mount" baffle-less technology. Paradigm describes this technology as "a butyl-rubber driver fastening system in which critically placed isolation inserts and gaskets decouple drivers from the speaker's enclosure." Paradigm makes no attempt to flush-mount the Inspiration drive

units in the speaker's front baffle, but rather allows the drivers' substantial metal frames protrude somewhat from the face of the baffle plate. However, to combat potential diffraction problems, Paradigm provides low-profile speaker grilles that deliberately wrap around the driver frames to provide smooth, diffraction-reducing, almost waveguide-like surfaces, said to enable the speakers to deliver optimal sound when they are played with their grilles on.

Attention to detail is evident throughout the Inspiration. Ducted port openings, for example, are fitted with turbulence-reducing "high-velocity, low-noise aluminum" flanges, anodized in black to match the mid/bass driver cones. Crossover networks receive the royal treatment, too, using polypropylene capacitors, precision high-power ceramic





## EQUIPMENT REVIEW - Paradigm 30th Anniversary Inspiration Monitor

resistors, and air-core and laminated steel-core inductors, with driver connections made via “heavy-gauge HPC high-purity copper wire.” Plainly, Paradigm’s aim with the Inspiration is to give customers a very serious high-end loudspeaker, but at something less than the customary high-end price.

For this review, I used the Inspirations with Paradigm’s matching 30" stands (\$999/pair). The stands are beautiful to look at (they sport etched, “30th Anniversary Edition Paradigm Reference” logos on chrome-plated escutcheons), are very heavily built with provisions for bolting the Inspirations to their top plates, and—most importantly—position the monitors at just the right height for seated listeners. The only caveat is that to assemble the stands you’ll need both metric and English hex-head wrenches, plus a fair amount of good old-fashioned elbow grease. Once set up, however, the stands are sturdy and attractive.

The key question, of course, is this: How do all these technical elements coalesce when it comes time to listen to music? As I said above, the Inspirations merge the sonic characteristics of Paradigm’s Signature and Studio Series speakers in a synergistic way. But let me expand on that comment for the benefit of those who may not have spent much time with Paradigm’s speakers in the past.

Paradigm’s Signature speakers are the firm’s flagship offerings—the speakers that use the company’s most advanced driver materials and technologies and are thought to offer the greatest resolution, clarity, transient speed, and frequency extension. Paradigm’s Studio models, in turn, fall just one click down the line, offering

near-Signature-grade materials and technologies and providing very high levels of performance at sensible prices, while delivering a sound that is Signature-like, but perhaps somewhat more forgiving and thus subjectively more full-bodied. Given these characteristics, you can probably guess where the Inspiration’s design is headed, which is toward a felicitous mid-point that leverages elements of the traditional Signature and Studio sounds. Here’s how that works.

On one hand, the Inspiration’s beryllium tweeter (which is arguably the driver most responsible for defining the revealing sound of Paradigm’s Signature models), serves up extremely high levels of resolution and transient speed, capturing delicate upper-midrange and treble transient and textural details with sophistication and panache. The tweeter, then, is responsible for giving the Inspirations a delicate, tightly focused, and unmistakably high-resolution sound. You can appreciate these qualities whenever you listen to recordings that feature long, lovingly captured echoes or reverb tails, such as the exquisite reverb-haloed vocals you might hear on Mary Chapin Carpenter’s “Come On Come On” from her album of the same name [Columbia]. Similarly, the tweeter enables the speaker to capture the lingering and quite essential hall reverberations heard on Silvestre Revueltas’ *Sensemaya* [Chicago Symphony Orchestra Brass Live, CSO Resound SACD], which establish a realistic 3-D context within which the music can unfold.

On the other hand, the aluminum mid/bass driver gives the Inspiration a full-throated and robust sound—a sound that, while offering substantial amounts of resolution, manages

never to step over the line into clinical sterility. It is great fun, then, to hear the Inspirations hold forth on relatively large-scale and dynamically demanding materials, such as the William Walton *Crown Imperial Coronation March*, also found on the *Chicago Symphony Orchestra Brass Live* disc. When the big brass section swells and the intense low-percussion moments arrive simultaneously, the Inspirations rise to the occasion while keeping faith, in a tonal sense, with the distinctive timbres of each orchestra section. But the Inspirations also work beautifully on pop/rock material as I discovered when listening to the at times blistering track “Satori in Chicago” from Noah Wooterspoon & The Stratocats *BuzzMe* [APO Records]. Something there is in me that loves the sound of a Fender Stratocaster playing the blues at full howl, though it is a sound that is harder to reproduce than you might think (especially for certain “polite” high-end speakers best suited to playing dainty chamber music at no more than moderate levels). The Inspirations, however, never backed down from the challenge, so that as Wooterspoon’s Strat screamed, crooned, stuttered, and snarled, the 30th Anniversary monitors simply followed suit with nary a complaint.

Put these Signature and Studio-like qualities together in one speaker and you truly have a best-of-both-worlds solution, which I think is exactly what Paradigm had in mind. Driver integration in the Inspirations, while perhaps not quite up to standards of certain planar-magnetic or hybrid electrostatic loudspeakers, was generally very, very good. Perhaps the only trace of any discontinuity that I could hear involved scenarios where, when playing less-than-ideally-recorded



### SPECS & PRICING

**Type:** Two-way, bass-reflex, stand-mount monitor  
**Driver complement:** One 1" beryllium dome tweeter, one 7" anodized aluminum mid/bass driver  
**Crossover frequency:** 2kHz  
**Frequency range:** 54Hz-45kHz +/-2dB, on axis  
**Sensitivity:** 92dB (in room), 89dB (anechoic)  
**Nominal impedance:** 8 ohms

**Dimensions:** 8.25" x 14.625" x 13.125"  
**Weight:** 24 lbs. each  
**Price:** \$2599 (optional Inspiration stands, \$999)

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## EQUIPMENT REVIEW - Paradigm 30th Anniversary Inspiration Monitor

material, the beryllium tweeters would somewhat pointedly expose recording flaws for what they were. But frankly, if you want the kind of resolution that Paradigm's beryllium tweeters put at your disposal (and I, for one, certainly do), then this is simply a sonic tradeoff with which the listener must be prepared to make peace.

The Inspiration's imaging and soundstaging capabilities are likewise very good, with particular strengths in rendering soundstage width and depth. For an example of this quality in action, try the track "Tribute" from Ross William Perry's *It'll All Make Sense* [Kid Blue Music], where you may find, as I did, that the guitar sometimes plays from the far left side of the stage and from a position well behind the plane of the loudspeakers. My point is that the Inspirations do—on good recordings—a very fine job of creating a believable sense of place, a stage upon which the music can breathe.

Even so, I still hold some reservations regarding Paradigm's use of diffraction-reducing grilles. My take is that this system works to a point, and better on the Inspirations than on most other Paradigm speakers I have heard, but that there is nevertheless an even higher level of three-dimensionality that might be achieved if Paradigm would explore some of the diffraction-minimization techniques competing speaker manufacturers have found beneficial (e.g., flush-mounted drivers, very gently radiused waveguide flanges where needed, cabinet faces with deeply radiused, smoothly curved, "fall-away" front-baffle surfaces, etc.). To be clear, the Inspirations never overtly draw unwanted attention to themselves, and their drive units

are superb, but they are still not quite class-leaders in the sonic holography department.

Like most Paradigm speakers, the Inspirations are neutrally voiced and for the most part free from obvious colorations. With that said, however, I should add that, while the Inspirations deliver solid and satisfying midbass output, they offer relatively limited deep bass. Depending on your listening tastes and preferred types of music, you might not notice or particularly care about this characteristic. However, if you have your heart set on enjoying bass response reaching into or below the mid-30Hz region, then you might want to step up to Paradigm's similarly voiced, but more full-range Tribute floorstander. (Indeed, a Paradigm marketing team member who shall remain nameless once quipped that the Inspiration, though a fine speaker in its own right, is probably "inspired to grow up to be a Tribute.").

On the whole, I think listeners will find the Inspirations represent an awful lot of speaker for the money. For me, the dead-sure indicator of this was that, whenever I pictured possible sonic competitors for the Inspirations, I found I was automatically thinking of more costly speakers.

The Inspirations do a fine job of representing the whole spectrum of values for which Paradigm stands. They give us advanced materials and technology (e.g., the beryllium tweeter and anodized aluminum mid/bass driver with its distinctive corrugated surround), fine build-quality (the dark garnet-red Inspirations on their matching stands are a sight to behold), and great value for money. But most of all, they provide an accurate, engaging, high-integrity sound, which is what has attracted so many followers to the Paradigm brand for the past thirty years. **tas**

## Air Apparent



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Find out more about Sabrina at [wilsonaudio.com](http://wilsonaudio.com). Click the YouTube icon.



# Von Schweikert Audio UniField Two Mk2

## A Steady Stream of Musical Delight

Dick Olsher

**A**lbert Von Schweikert's design goals for the UniField Two, the middle model in VSA's Studio Signature Series, were rather simple. Many of his customers asked for a small speaker that would work well in both small and large rooms with virtually any amplifier. Specific performance criteria were a large sweet spot, and enough bass output to simulate a larger floorstander. From a distance the UniField Two appears to be a two-driver system, and may well pass for a conventional stand-mounted two-way design. However, up close it is apparent that the upper 7-inch woofer is actually a coaxial design by SEAS of Norway with a 1-inch fabric dome tweeter nestled over the pole piece. So that would make the UniField a three-way design, right? Well, not exactly. The catch is that the upper woofer, featuring a PP/TPX polymer cone, is allowed to work into the deep bass while being augmented below about 80Hz by a 7-inch aluminum coned woofer. The end result is typically referred to a 2.5-way design, basically a two-way with a subwoofer. As Von Schweikert aptly points out, an important advantage of such a design is the elimination of the mid/woofer's high-pass crossover network, and hence no capacitors in series with the critical midband. There has been much ado in recent years over the sound of capacitors with the cost of exotic types easily exceeding that of typical drivers. But it's fair to say that the best-sounding capacitor is no capacitor at all. Instead of capacitive-coupling, the mid/woofer's bass excursion is controlled by sealing it into a small internal chamber densely packed with Acousta-Stuf polyfill.

Coaxial drivers are rare birds in audiophile designs. Tannoy is justly famous for its dual-concentric driver and more recently KEF has made waves with its Uni-Q driver. A coaxial's primary goal is to align the acoustic centers of the tweeter and midrange, "forcing" them to behave as a single driver so as to emulate the performance of a point source of sound. The

payoff is vastly smoother off-axis performance relative to a conventional driver layout and thus a wider sweet spot. And as I'll detail shortly, the SEAS coaxial is indeed capable of remarkable imaging due in great measure to its time-aligned wavelaunch. However, the practical engineering problem all along has always been the tweeter design, the traditional knock against coaxial

tweeters being that they don't measure very well. The fact that the coaxial tweeter is horn-loaded by the midrange-woofer cone makes it difficult to obtain a smooth frequency response. In fact, Von Schweikert considers the SEAS coaxial tweeter to be a bit of an enigma. He is well aware of its frequency-response imperfection, and that it lacks any type of fabric impregnation or fully pistonic motion, and yet despite all that, he finds it to sound wonderful. I was, at least initially, less enamored of this tweeter and can confirm that its on-axis frequency response is not particularly pretty due to a significant response dip in the lower treble and an excess of extreme treble.

On the matching factory stands, the speakers were at first toed in toward the listening seat, but I discovered rather quickly that I wasn't happy listening to the tweeter head on. Since off-axis measurements showed a much more natural balance, I nixed the toe-in idea, pointing the cabinets straight ahead. This placed the tweeters at an angle of about 25-degrees relative to the listening seat and gave me the sort of balance I was after: a smoother lower treble partnered by a naturally rolled-off extreme treble. It should be noted that I'm not a fan of in-your-face treble and much prefer a middle of the hall presentation. With the speakers optimally set up, it became clear that the coaxial principle was working to perfection. Even without any toe-in, the resultant sweet spot



## EQUIPMENT REVIEW - Von Schweikert Audio UniField Two Mk2

was massive—no need to place your head in a vise to enjoy a stupendous stereo experience. When it came to imaging, the UniField delivered the goodies. I was most impressed by its exceptional focus and transparency, making it easy to resolve spatial outlines and subtle image shifts within the confines of a spacious soundstage. Resolution of massed voices was superb, allowing me to follow the ebb and flow of a particular voice in a chorus. After all of the preliminary experimentation, my view of the treble range crystallized sufficiently to pronounce it musical enough to enjoy, though it understandably lacked the transient finesse and purity of ribbons and electrostatic types.

The midrange driver turned out to be a winner, sounding smooth yet detailed, and manifesting a purity of tone which most cone mids would die for. The UniField dug into a complex mix with confidence. In particular, its resolution of artificial reverb launch and decay was scary good. Timbre fidelity was excellent even when scaling the full female soprano range. My only minor criticism had to do with slightly coarse upper-midrange textures, most obvious on violin overtones. This turns out to be the transition region between the midrange and tweeter, the crossover being at 2.2kHz.

The UniField Series uses curved side walls to minimize internal standing waves. In addition, much effort has gone into making the cabinets acoustically inert, which is all about minimizing cabinet-wall vibration. And that means reducing wall flexure by using thicker and stiffer materials. VSA's elegant solution is based on the concept of constrained-layer damping but also strives to eliminate energy transfer from the drivers to the baffle by decoupling them with a 6mm-thick vis-

coelastic clay-polymer gasket. VSA's triple-wall laminate combines three materials of different resonant signatures. The outer layer is MDF which is bonded to a layer of synthetic stone, fabricated from crushed gravel, minerals, and resin binder. The inner layer is hard felt, which is absorptive of sound energy. The total wall thickness is an impressive 2.5 inches and is the type of construction currently deployed in every Von Schweikert Mk2 speaker system. This approach is the antithesis of the British, so called BBC-style, thin-wall speaker-cabinet designs. The notion of "tuning the cabinet to the orchestra" comes to mind, and while it could be argued that some cabinet resonances are less objectionable to the ear and might in fact be consonant with the music, the end result is inevitably a sonic coloration. After auditioning the UniField Mk2, it seems to me that VSA's approach of minimizing all cabinet resonances is the correct one in that it clearly raises the bar in terms of achievable bass precision.

The cabinet is vented which suggests a bass-reflex loading, and that is in fact the case, the box tuning being 38Hz. But this turns out to be no ordinary bass-reflex design. Four internal chambers filled with Acousta-Stuf define a mini-labyrinth, which significantly dampens the twin impedance peaks produced by a typical bass-reflex design. The measured minimum impedance was 3.8 ohms at 100Hz and the impedance magnitude was nearly single-peaked and fairly flat, varying by only a factor of two in the deep bass. VSA refers to this bass tuning as a hybrid reflex/transmission line. I like the idea of contouring the overall Q of the speaker system using acoustic damping. Although conceptually it is still a long ways from a classic transmission-line bass loading, this tuning

works in practice by nudging bass performance toward that of an aperiodic sealed box.

In-room bass extension measured flat to about 38Hz. It was a case of bass reach coupled with a surprising degree of punch. Most stand-mounted speakers are not well suited for reproduction of symphonic music. The UniField Two proved to be a welcome exception. It possessed sufficient bass heft and dynamic prowess for realistic reproduction of an orchestra's power range. The bass balance, usually an issue for stand-mounted speakers, was shifted toward the midbass. There was considerably more midbass energy relative to the upper bass which manifested as a slight emphasis of an upright bass' body tone. Choice of partnering amplifier became an important issue. The UniField boogied superbly when matched with high-damping-factor solid-state amplifiers. It also scored highly in bass precision, a performance benchmark undoubtedly attributable to the combination of an acoustically inert cabinet and an aluminum-coned woofer. However, bass resolution suffered substantially when the UniField was driven by a low damping factor tube amplifier. Lacking amplifier control, the bass range took on a distinctly tubby character. The good news is that there is no shortage of high-damping-factor solid-state amplifiers in the 100 to 200Wpc range.

In the bass range, the UniField Two Mk2 offers impressive performance for a small box speaker. As such, it competes effectively with British stand-mounts from Spendor and Harbeth. Think greater rhythmic precision and bass heft. Its coaxial technology bestows upon it exceptional image focus. In fact, if you like mini-monitor soundstaging, you'll love the UniField Two.

Optimally set up, it will reward you with a steady stream of musical delight. And that's what it's all about. **tas**

## SPECS & PRICING

**Frequency response:** 32Hz-25kHz (-6dB), 40Hz-20kHz (+/- 2dB)

**Nominal impedance:** 4 ohms

**Sensitivity:** 88dB 1W/1 meter, anechoic

**Power rating:** Up to 200 wpc

**Weight:** 51 lbs.

**Dimensions:** 10" x 17" x 14"

**Price:** \$7995 (stands included)

### VON SCHWEIKERT AUDIO

1040-A Northgate St.

Riverside, CA 92507

(951) 682-0706

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### ASSOCIATED EQUIPMENT

GAS Ampzilla II amplifier modified by Mike

Bettinger of GAS Audio, Lamm Audio M1.2

Reference and Bob Carver Cherry 180 monoblock

amplifiers; Apple Mac BookPro running Sonic

Studio's Amarra Version 2.6 software, EAR DACute

DAC, April Music Eximus DPI DAC/Pre and Stello

U3 digital data converter; Kuzma Reference

turntable; Kuzma Stogi Reference 313 VTA

tonearm; Clearaudio da Vinci V2 phono cartridge;

Pass Labs XP-25 phono stage and XP-30 line

stage; FMS Nexus-2, Wire World, and Kimber KCAG

interconnects; Acoustic Zen Hologram II speaker

cable; Sound Application power line conditioners



# Our Top Picks in Bookshelf and Stand-Mount Speakers

## Pioneer SP BS-22

**\$129**

Designed by Andrew Jones of TAD, this two-way makes few obvious sonic concessions to the budget market. Its puts just enough heft and weight behind vocal and instrumental images to provide reasonable dynamic scale and imparts a flavor of low bass without sounding stressed. One of the most enticing best buys out there. NG, 228

## MartinLogan Motion 35XT

**\$1299**

A two-way compact hybrid, the Motion joins an air-motion-style tweeter, which produces an expansively airy treble, with a perky aluminum cone mid/bass mounted on an aluminum baffle. Midrange sonics are smooth, a bit forward, yet relatively unboxy. Integration, the bane of hybrids, is very good. Careful wall placement enhances bass performance considerably. Visually the 35XT offers a nicely updated form factor and excellent fit and finish. NG, 251

## KEF LS50

**\$1500**

With its pink-gold Uni-Q coincident midrange/tweeter mounted in bulls-eye fashion atop the uniquely arched baffle of its beautifully crafted high-density enclosure, the LS50 is as visually arresting as it is sonically satisfying. Imaging is clean and precise. Neutrality is high with superb midrange sonics, nice presence, potent midbass punch, and very little in the way of port coloration. NG, 231

## Raidho X-1

**\$6400 (stands \$850)**

The X-1 may be the smallest loudspeaker in the Raidho line, but its sound is anything but. Using the same tweeter found in Raidho's mighty \$240k D-5, the X-1 offers a stunningly beautiful midband and treble, blessed with an ease, delicacy, and refinement rarely heard in this category. The very small (4") mid/woofer has limited excursion, bass extension, and dynamic range, limiting the X-1 to smaller rooms. The X-1 is a giant-killer above 100Hz, however. RH, 252

## Von Schweikert Unifield Two Mk2

**\$7995**

The Unifield Two is a 2.5-way design in which a 7-inch coaxial driver is augmented below 80Hz by an aluminum-cone woofer. Internal chambers define a mini-labyrinth, which significantly dampens the vent output. This coaxial technology, along with the Unifield's non-resonant enclosure, yields exceptional soundstaging and image focus. Expect impressive bass-range performance when the Unifield is matched with a high-damping-factor solid-state amplifier, though the bass balance will be shifted toward the midbass. The Unifield competes effectively with British stand-mounts from Spendor and Harbeth, offering greater rhythmic precision and bass heft. DO, 242

## EngimAcoustics Mythology M1

**\$15,000**

The M1 is specifically designed to partner the Sopranino self-biased electret super-tweeter (Issue 235). A critical design factor is its 34mm silk-dome tweeter, which is crossed over at 1.1kHz. The payoff is a midrange that is exceedingly pure, detailed, and transparent. The treble range sings sweetly and without a trace of harshness. Imaging can only be described as spectacular, the soundstage being totally untethered from the speakers. The Mythology's command over microdynamic nuances generates considerable emotional power. Expect exceptional tonal color fidelity, and against all odds, a believable orchestral power range with in-room bass extension of about 40Hz. An insanely attractive proposition at any price point. DO, 246

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# PSB Imagine X2T Tower

## Bring on the Bass

Julie Mullins

**I**magine a company that claims its \$1295 loudspeakers make “real sound for real people,” and what’s likely to be your gut reaction? At the very least, it’s safe to say you wouldn’t expect such a speaker to sound “great.” And as a rule you’d be right.

Well...meet the exception. PSB has created a transducer of incredible value for an incredibly reasonable price: the aptly named Imagine X2T Tower. (Indeed, it is already an award-winner—a Reviewer’s Choice Award from another magazine—and will likely get a Golden Ear from me and earn well-deserved spots in our next Buyer’s Guide and Editor’s Choice lists.)

In appearance, this four-driver three-way is anything but flashy: a slim, compact, dual-front-ported, quasi-D’Appolito (midrange on top, dual woofers on the bottom, tweeter in between) floorstander about three feet tall, with an MDF enclosure that comes in any finish you want as long as it’s black ash. Perhaps the X2T’s main distinguishing feature is the mustard-yellow hue of its twin woofers, whose cones are

made of injection-molded, clay/ceramic-reinforced polypropylene. But what the X2T lacks in eye-catching looks, it more than makes up for in ear-pleasing sound.

Famous for being persnickety when it comes to sonic quality, PSB founders Paul and Sue Barton—the husband-and-wife duo whose initials form the Canadian company’s name—have consistently found ways to bring high performance to lower price points. Their goal for the Imagine X line was simply to offer the most accurate sound for the money. Naturally, various design and build compromises came into play, with careful consideration paid to what could be stripped away from PSB’s more expensive models, and what had to be retained.

Luckily for listeners (particularly those who are just getting started or who might not have the deepest pockets), PSB does its homework. In a pioneering move, in 1974 it became the first loudspeaker company to use the advanced acoustical labs housed at the National Research Council Canada (NRC) for product development. Since that time, the PSB design team has devoted many years to research at the NRC facilities, where the focus has been as much on how we perceive sound, as on what sounds good. PSB’s double-blind testing eliminates listener bias, enabling researchers to gain insight into which sonic characteristics are most important—and which can be more or less left out of the equation.

Beneath its unpromising exterior the X2T is a highly engineered speaker artfully designed to play to the ear. Geared to getting the most out of the midband, this three-way uses a midrange driver that is housed in its own enclosure for ideal dispersion and minimized distortion at high SPLs. Moreover, the driver features an injection-molded, poly-filled carbon-fiber cone designed especially for the X2T. The one-inch tweeter dome is made of pure titanium, with a phase plug that is intended to help extend high-frequency response and control breakup (in addition to protecting the dome).

In part because of their surprisingly powerful bass (which we’ll get to in a moment), the X2Ts should be

placed away from walls by three feet or so—to help minimize room reinforcement, especially in small-to-mid-sized spaces. Solid-state amplifiers probably are the way to go for better grip on the woofers, and (once again) to help offset some of this transducer’s inherent low-end emphasis. For this review, I used the Odyssey Audio Stratos monoblocks fed by an ARC tube preamp and phonostage.

Before delving into my listening notes, I feel compelled to share one of the most striking discoveries I experienced listening to the X2Ts. In spite of their darkish overall balance, these speakers can be quite transparent—that is, they regularly reveal a given recording’s strengths and weaknesses. As a consequence, sound quality varies widely and (naturally) from disc to disc. For example, the X2Ts really elevated their game on certain extremely well-recorded selections, such as the Analogue Productions 45rpm reissue of the Rachmaninov *Symphonic Dances*, where (despite some slight, yet attractive depression of the brilliance range) their beauty, resolution, and power were reminiscent of more expensive speakers.

According to the PSB’s website, the X2T’s new 5 1/4" midrange driver features a novel shape and filleted surround intended to optimize the reproduction of voice. And, indeed, vocals generally proved to be a strong suit. Madeleine Peyroux’s soulful rendition of Leonard Cohen’s tune, “Dance Me to the End of Love,” for instance, had a surprising measure of the smoky sweep and gentle swing that it has through JV’s superb \$220k Raidho D-5s. However, the PSB’s darker, “bottom-up” balance was also evident on occasions, giving something like Pete Seeger’s sunny tenor on The Weavers’ classic “Guantanamera” (from the group’s live 1963 Carnegie Hall reunion LP) a decidedly baritone tint that it doesn’t have on the Raidhos (and didn’t have in life).

On the other hand, Louis Armstrong’s trumpet—which plays into the PSB’s wheelhouse—on “Stars Fell on Ala-



## EQUIPMENT REVIEW - PSB Imagine X2T Tower

bama" from *Ella & Louis* [AP] blew me away. (Then again, it would be a sad speaker day if Satchmo's playing didn't shine.) On this same album, the recording quality of the accompaniment varies, and here it often faded far into the background. (I had the image of Oscar Peterson's piano being played timidly, unobtrusively in a corner, as if he didn't want to detract from the main event.) This wasn't really the speakers' fault; they merely became the "messengers" of what had been recorded. Although such transparency to sources is far from unique, it's still pretty impressive in \$1295 loudspeakers.

The X2T's primary strengths lie in the power range and the bass, where it can really turn heads. This little speaker delivers surprisingly dense tone color and hefty, extended low end—an unexpected feature in such a package at such a price point. Because bass is something audiophiles tend to drop big coin for, the X2T's quality in the bottom octaves is a rare treat that absolutely sealed the deal for me. In definition and solidity, the X2Ts may not deliver the kind of bass you can sit on, but its bottom octaves are still unusually full, powerful, and nicely differentiated in pitch.

Actually, the slight predominance of the two 6 1/2" woofers (each housed in its own separate acoustic chamber) produces what I've already said is a bottom-up sound. Whether or not you like this kind of bass-centric balance, it is hard to deny that it can add lifelike richness and body to the presentation. In general, I found it to be rather pleasing.

I appreciate accuracy, but I also like a little heft and warmth with certain styles of music, some rock 'n' roll or pop, for instance. So I did some 80s throwback listening (and 90s, too). Much

of REM's *Life's Rich Pageant* on MoFi vinyl powered through with exciting energy and drive. On the spare ballad "Swan, Swan, H," Peter Buck's acoustic guitar resonated beautifully with realistic articulation. Marshall Crenshaw's "Someday, Someway" on MoFi was also reproduced with impressive accuracy on jangly guitar, jingly bell, and bass guitar. And in spite of Crenshaw's somewhat limited range, the X2Ts really allowed the emotion of his voice to shine through. On Dead Can Dance's "Spider Strategem," percussion had relatively crisp snap and the tabla beats thrilled, creating a pleasing counterpoint to the ethereal vocals. The track sounded at once heavy and light—and quite agreeably so—despite some murkiness in the bottommost octaves. (I'd estimate that the bass goes down into the upper thirties or low forties before nose-diving.) As I've already noted, some of the X2T's finest moments

arrived with Rachmaninov's *Symphonic Dances* and Earl Wild's piano and Arthur Fiedler's Boston Pops ensemble on Analogue Productions' great reissue of the RCA *Rhapsody in Blue*. (Classical music seemed to be another forte for the X2Ts.) These famously well-recorded masterpiece's strengths were revealed in all their regal glory, though here and there winds, strings, and higher-pitched percussion could have used a little more energy, air, and sparkle in their top octaves.

In staging, the X2T is decidedly upfront, though still expansive. The soundstage might not be the deepest around, but in almost all cases the imaging of singers, instruments, and players was pretty precise, offering greater sonic verisimilitude. The sax, horns, and bass on The English Beat's classic "I Confess" on MoFi vinyl dazzled with full, and quite realistic, exuberance.

As impressive as the X2Ts are, some lambs had to be sacrificed in order to get so handsomely to this price point. Though they don't lack speed of attack, the X2Ts aren't the lightning bolts that some (much pricier) transducers are; nor do they have the same definition and articulation of such big-bucks speakers (although this was more apparent on certain instruments and recordings than others). At times, as I've said, I was a little hungry for more soundstage depth. And the reproduction of upper harmonics left a bit to be desired, with a general feeling of rounded softness in the brilliance range and shading in the treble that made some instruments either fade down or sail past like Macy's Thanksgiving Day floats on an overcast November morning.

But I wouldn't want to dwell on these shortcomings. With the X2Ts, you get your money's worth and then some. Exceptionally well engineered for

their price, these speakers play with a midrange focus and naturalness, and a bass-range power and resolution that simply aren't available in most other loudspeakers at this price. They really deliver the goods, especially on well-recorded music, be it classical, jazz, or rock 'n' roll. Vocals, strings, piano, drums, low-pitched winds, and brass tended to have the greatest accuracy and realism, but the X2Ts provided surprisingly faithful reproduction of most recordings.

As easy as these speakers are to enjoy—and especially given their unbelievably high value—they certainly live up to PSB's marketing message: "real sound for real people." I loved 'em. *TAS*

### SPECS & PRICING

**Type:** Four-driver, three-way, quasi-d'Appolito, floorstanding loudspeaker

**Drivers:** One 1" titanium cone tweeter; one 5 1/4" injection-molded, fiber-reinforced polypropylene cone midrange; two 6 1/2" injection-molded, clay/ceramic-reinforced polypropylene cones woofers

**Frequency response:** 30Hz-20kHz +/-3dB

**Power handling:** 200 watts

**Dimensions:** 9" x 40 1/8" x 17 5/8"

**Weight:** 52 lbs. (each)

**Price:** \$1295

#### PSB SPEAKERS

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# GoldenEar Triton One

## Truly Exceptional Sound and Value

Anthony H. Cordesman

**I've reviewed a number of great speakers over the last few years, all of which have had prices to match. The GoldenEar Triton One is an exception. It provides both extraordinary sound quality and value for money. It does not fall short in a single major area of performance, it is intensely musical, and it sells for a semi-affordable \$5000 a pair. It is also a speaker that has produced an exceptional amount of unsolicited praise from outside listeners, regardless of musical taste—even among the set that regards any visible stereo equipment as an assault on its room décor.**

This doesn't mean that the Triton One is free of sonic compromises or design choices—issues I'll get to later in this review. What is particularly striking about these design choices, however, is their focus on reproducing acoustic music with a natural mix of midrange and treble energy, and deep bass extension.

This focus should be the standard for all loudspeaker designs, but too many competing speak-

ers exaggerate the upper midrange to get apparent detail at the expense of natural midrange warmth and treble air, emphasizing a “forward” sound at the expense of the soundstage perspective of live music. Others exaggerate deep bass energy at the cost of bass detail, as well as added room interaction. In contrast, the Triton Ones are striking to the extent they never emphasize one type of music or approach to recording over musical realism. The end result is long-term listening pleasure.

### Features, Technology, and Their Impact on Core Sound Quality

I did not reach these conclusions without having to overcome some initial prejudices based on reading the manufacturer literature. Too many adjectives and superlatives, too many features, and too much technobabble. Once I began listening, however, I could hear the benefits of the Triton One's design features, and quickly put the inevitable marketing hype aside.

The Triton One's folded-ribbon tweeter provides some of the smoothest, break-up-free, non-resonant upper-octave musical detail I've heard at any price. It also is well integrated with the 5.25" cone midrange drivers positioned above and below it in a D'Appolito configuration. The midrange drivers operate in an unusually large two-chamber enclosure that is sealed off from the enclosure for the bass drivers.

This combination of drivers provides extremely realistic response from the lower midrange up to around 15kHz. It does so without the exaggeration or hardening of the upper midrange that can impress for a few hours or days, but then becomes irritating and creates fatigue when you listen to the upper range of instruments like piano, clarinet, flute, violin, and recorder, or female

voice. The drivers in Triton One also have the clarity, speed, and accuracy necessary to reproduce brush and cymbal detail realistically (as well as applause, if you can treat applause as a percussion instrument for a moment or two).

This may be the result of the fact the Triton One seems to have a slight dip in response in the area where the ear is most sensitive to excess upper-midrange hardness and energy, but its tweeter then has a smoothly rising frequency response from around 7-8kHz upwards to 15kHz, where it then slowly drops back down to flat response at 20kHz. This rise occurs after the limit—or well above the limit—where most people can hear musical detail in the upper frequencies, but below the limit where listeners can detect the presence of high-frequency data as a contribution to musical air and life.

The end result is that the rising response of the Triton One at the higher treble frequencies produces an added touch of life and air that is far more musically realistic to me than “punching up” the upper midrange to get detail that you will never hear at any normal listening position with live music.

The cabinet shape and the location of the tweeter and midrange drivers also help—a result of both the radiation patterns of the drivers and the narrow width of the front of the Triton Ones (a narrowness that is not as apparent from the photos in the manufacturer literature as when you actually see the speaker). Having a narrow front is only one way to produce an exceptional soundstage, and my listening to other speakers with this design feature has taught me that in practice it often does not produce the kind of stable soundstage, low levels of coloration, and uniform radiation patterns that it should in theory. It does so in the Triton Ones, and every outside listener



that I demonstrated the speaker to remarked about some aspect of the speaker's soundstage detail and coherence, and its ability to produce a wide and stable listening area without altering image size or losing musical information.

The rest of the design is equally good in spite of a level of complexity that initially made me wonder whether the number of drivers and passive radiators was more a matter of sales appeal than necessity. The design features for the bass section include three long-throw 5" x 9" woofers in a semi-line-source array, a hybrid electronic/passive crossover at an unusually low 100Hz, and a 1600-watt, 56-bit, DSP-controlled Class D amplifier. There are also two passive radiators on



# Sandy Gross: The Voice of the Triton One's Designer

Some of you may have met Sandy Gross at shows. If you have, I suspect you'll agree that he is one of the many high-end designers and manufacturers who does an excellent job of putting his products in perspective. He was kind enough to send me a note that helps explain the design goals behind the Triton One, and covers some additional features, and as well

"A major design goal of mine with everything, but especially these, was to create a speaker that genuinely could be compared with very expensive super-speakers. In particular, one of my references is the huge SoundLab 845 full-range electrostatic panel. I have always dreamed of creating a little more listener (and significant-other) friendly speaker that could deliver the musicality, imaging, coherence, etc. of a speaker like this, at a relatively reasonable cost, and that could be driven by a large range of electronics. As you may be aware, we demo'd the Triton Ones at CES with Pass Labs. I will listen to mine with a Line Magnetic SET and Atma-sphere OTLs, but they would be happy with a Peachtree integrated.

"We approached the Triton One in the same way as the designers of very expensive products and really focused on all the little details. A lot of these details don't cost more money to get right; you just have to have the expertise, take the time, and care. We put a tremendous amount of effort into voicing the speakers, not just in terms of frequency response and balance, but perhaps more importantly, in terms of driver integration and coherence. For instance, getting the powered subwoofer section to blend well with the rest of the system was a particular challenge. DSP allowed us to exactly match in amplitude and phase the mid roll-off with that of the sealed-box mid/woofer at the crossover transition point. (This DSP does 56-bit math for low rounding errors.) And one of the significant improvements in the Triton One was bringing the crossover down from 160Hz (which is already quite low) to 100Hz, and getting the woofers' sound more completely out of the midrange.

"Our previous flagship, the Triton Two, has had tremendous positive response from listeners and reviewers. For several years I was hesitant to develop a speaker above the Two, but finally got the courage to do so. I had, as my goals, to work on two major areas: to make it even more dynamic and to achieve even more impactful low-frequency performance with greater overall ease, and to work at further refining the subtler aspects of performance.

"Balanced drive is implemented on all built-in Triton amplifiers. What this means is the power amplifier has a differential output so the exact same but opposite signal appears on each driver terminal. So, unlike single-ended drive where one side of the driver is at ground and the other is the audio signal, the Triton system uses a mirror image of the audio on each driver side making the driver signal fully balanced. This is similar to how almost all pro-audio signals are handled in the recording studio. Balanced signals are the norm in pro audio. The speaker input on the Triton One is also a fully balanced differential input, again, to keep the input signal balanced. Even the DSP processor in the Triton One has a fully balanced input and output structure to reduce noise and distortion to as low a level as possible.

"Balanced drive gains its advantage as audio is only passed to the next stage if there is a 'difference' between the two audio leads. So noise from ground, as it appears the same on both leads, is not passed on. The same is true for some non-linear distortion; if the same distortion appears on both sides (and much is the same, as the sides are mirrors of each other), this non-linear distortion is not passed onto the next stage. This makes for an intrinsically cleaner signal path and we design this way as it makes our job of creating a good-sounding amplifier far easier, and the cost hit is not too large. A few very high-end amplifiers on the market are balanced designs, but this has never penetrated into the mass of audio products.

"Other improvements in the Triton One include the DSP, which has moved from 48 bits to 56 bits, and the sample rate from 96kHz to 192kHz. This results in measurably lower noise and distortion in complex filters and limiter functions. Numerical and sampling errors in DSP software are equivalent to noise and distortion. The difference between 48 and 56 bits is really a non-issue for simple amplification, but becomes important in complex functions like our limiter, for the more complex the math the more important numerical rounding errors become in signal integrity. The result is, side by side, the Triton One limiter is measurably more clean and transparent on bass transients than any other limiter we have measured.

"The Triton One amplifier utilizes many small, separate, power supplies for each circuit section to provide isolation, so there is little opportunity for signal-coupling through the power supplies. Past designs relied on single larger supplies to power everything and this can lead to signal-coupling between sections. For the most part, only the very top of high-end amplifiers opt for this small power supply architecture."

each side of the cabinet that GoldenEar states offer some features similar to those of a transmission line.

My initial reaction from just reading about all of the bass features and looking at the complex cutaway diagram of the Triton One was that this was too many elements to be necessary, or to deliver the best bass for the buck. Well...it does help to actually listen.

The Triton's bass quickly proved to be exceptionally deep and detailed, and to have excellent dynamic range. For anyone who intends to preserve his hearing, I doubt whether the specified 14Hz lower limit has any real audible meaning; output at frequencies this low is irrelevant unless you plan to use the Triton Ones to reproduce thunderstorms, enjoy the last possible ounce of bass during a movie involving aliens destroying a major city, or attempt subsonic communication with elephants.

On the other hand, there was really good bass extension and energy output on even the lowest notes in real-world organ music, and low bass that rivaled that of many large separate subwoofers but that was far better integrated and coherent. At the same time, the Triton Ones seem to be designed to produce the best possible transient detail down to the lowest frequencies rather than maximum bass impact. The deep bass roll-off is also unusually slow and extended. The bottom octaves do not have an audible bump or peak in response just before the speaker reaches its low-frequency limit, or a sudden precipitous drop or waterfall effect at some point in the low bass.

I found the end result revealed the lifelike complexity of music from the lower midrange to the bottom octaves far better than speakers designed to emphasize bass power. This helps produce very natural and clearly differentiated

## EQUIPMENT REVIEW - GoldenEar Triton One

bass with organ and electronic instruments. It also produces a more clearly defined bass line with electronic “drums” and synthesizer music, giving the low frequency much more real-world impact when sudden transients or dynamic shift occurred in the music.

Moreover, my sons, whose tolerance for rock, heavy metal, and synthesizer exceeds my own, were equally pleased. Turns out that even the younger generation that has drifted away from jazz and classical music can be as concerned with realistic bass detail and transient impact as a slowly fossilizing music snob.

I have heard many speakers that consistently make the bass seem louder and more persistent at the cost of blurring detail and emphasizing certain parts of the bass spectrum. To my ear, this is a far less musical and involving trade-off than the sound of Triton One. Moreover, bass dynamics are meant to be sudden and exciting; the tight and fully defined bass of the Triton gives them more dramatic and emotional impact.

This came through quite clearly on the Jean Guillou recording of an organ transcription of Mussorgsky's *Pictures at an Exhibition* [Dorian]. It also came through on my collection of Bach organ music, the usual Telarc bass drum spectaculars, and in truly massive and complex orchestral pieces with high levels of deep bass energy such as the Saint-Saëns' Third Symphony.

There is another advantage to the design of the bass system. The 1600-watt bass amplifier does so much of the “heavy lifting” that the Triton One is remarkably efficient. I could drive it easily with one of my own 50-watt tube amplifiers, and the designer uses a 24-watt single-ended triode as one of his references. At the same time, the lower

bass is so well integrated that you can still hear the best sonic qualities of your power amplifier from the upper bass to the upper-frequency limits of your hearing. Because the bass amplifier is tied into an easy overall impedance load of 4-8 ohms, its use largely eliminates power-amplifier damping factor capability as a key factor in lower-octave performance.

In retrospect, I should also note that my experience with the constantly rising prices in the high end has produced a strange kind of bias. In assuming that the Triton One might have too many features for the money, I had taken truly high prices for high performance as a given. As one of my sons later reminded me, \$5000 is not cheap by any standards other than those of a narrow range of high-end fanatics. A product designed for a wider range of audiophiles—and potential audiophiles—should deliver a lot for real money, and \$5000 a pair is very real indeed!

Moreover, as Sandy Gross, the head of GoldenEar, pointed out to me, you can get a lot of product by having a permanent U.S.-Canadian design team covering every aspect of design and production and getting the product manufactured overseas. You can also get a lot of sound quality if you manufacture in larger numbers, standardize on key drivers, and design around a smaller enclosure by using an array of passive radiators and a sophisticated mix of bracing, damping, and upper midrange/bass enclosures.

**Extended Listening**

Even the best-sounding features don't matter, however, unless a speaker is more than the sum of its parts. A really good transducer must achieve the kind of synergy that makes you fo-

cus on the musical performance rather than the speaker, and do so regardless of the type of music or recording, and do so without being “forgiving” or disguising the real-world strengths and limits of given recordings and your front end.

The Triton Ones achieved that synergy with exceptional realism with the best acoustic recordings. They clearly revealed the differences between really good recordings without favoring one type over another. They are also a speaker for someone with a large musical library, rather than a speaker where you need to have a given kind of audiophile recording or music to hear them at their best.

You will hear the impact of close miking, over-complex mixing and mastering, tape hiss, mike differences, and all of the problems in new and older recordings. The Triton Ones do not, however, have some dominating sonic character of their own that emphasizes a given aspect of the music and produces the mixture of sudden insights into a limited group of recordings and listening fatigue with many others that I hear in far too many speakers at any price.

Several weeks of listening showed me that they did an exceptional job of reproducing even the most demanding symphonic, opera, and large jazz-band music. Mahler's *Symphony of a Thousand* and Saint-Saëns' Third Symphony are never going to really fit into a listening room. Neither is Wagner's *Ring Cycle*. As is the case with other truly good speakers, however, this will not prevent you from becoming deeply involved in the music, or from appreciating the fun in the jokes and occasional excesses in a Mozart opera.

At the same time, the Triton Ones provide an exceptional degree of realism with the kind of

great small jazz group and chamber music recordings that actually make music seem to come alive in the face of the real-world size of a listening room. You can get lost in the lifelike reproduction of good recordings of smaller musical groups like *Jazz at the Pawnshop* or the wide range of excellent Accent and Naxos chamber music, solo voice, and instrumental recordings—forgetting the room, the job, and the day with ease.

I could not fault the Triton Ones with any female voice recording in my collection beyond the actual limits imposed by the quality of the mastering. The exceptional freedom from resonant break-up, or boost in the upper midrange, made soprano voice a consistent pleasure with even the most demanding music. The Triton Ones never disguised the sometime eccentric recording styles and musical mixes chosen by female singers like Norah Jones or Jennifer Warnes, but they also never disguised the quality of their voices and singing. Not every speaker can cope with the challenge posed by some Judy Collins recordings. The Triton Ones did more than cope.

I'd also stress their ability to reproduce instruments that can easily induce listening fatigue or even instant irritation in the “hands” of the wrong speaker. These include the recorder (try the *Scott Reiss and Hesperus Baroque Recorder Concerti* on Golden Apple GACD 7550), good but slightly too bright or close-miked clarinet recordings (Martin Frost, Mozart Clarinet Concerto and Quintet, BIS-SACD-1263), or brass chamber music (Wolfgang Bauer, Haydn Trumpet Concertos, MDG 901 1395-6)

The same was true of the all too wide range of piano, harpsichord, and solo violin recordings where miking problems or a hell-driven desire to



## EQUIPMENT REVIEW - GoldenEar Triton One

capture too much detail highlights any midrange edge in the system. I also found the Triton Ones could make even percussion concerts a lot of fun—something I'd again not say of far too many speakers. (Try track four—"Forescore for Percussion"—on *Continuum for Percussion Quartet*, New World Records, 382-2.) Strictly a demo for my musical taste, but one hell of a test of a speaker.)

As I've already mentioned, bass performance was outstanding for any speaker, particularly one this size and price. If you like a strong bass line, you get the bass line on the recording and not the speaker's version—with either too little bass energy or the kind of slightly blurred bass definition and emphasis on one part of the bass spectrum

that otherwise good speakers sometimes provide. The organ reveals its real complexity in the low bass, and sudden spikes in bass energy from a bass drum or synthesizer are tight and clean, and have real dramatic impact.

And yes, you'll have equal pleasure in the bass and in overall musical pleasure if you're a Stones or classic-rock fan. My sons, who are semi-Post Millennials and have the typical semi-Post Millennials' illusion that progress can actually occur in popular music, assure me this is true of more modern popular music, from ZZ Top to synthesizer. Another younger listener told me the Triton Ones do very well with heavy metal as well as grunge and British apocalyptic despair rock.

I can't really go further in verifying its appeal to all musical tastes. I have trouble appreciating any composer more modern than Limenius. I can't find volunteers to test the Triton Ones' performance with disco. And I will not face that challenge on my own. Even the most hardened reviewers have limits when it comes to the aesthetic sacrifices they are willing to make.

### Setup and Compatibility

The Triton Ones have some other practical advantages. They are unusually system- and room-friendly. They are easy to drive with any good amp, do not seem particularly sensitive to speaker cables (although they allowed me to hear the differences between my AudioQuest, Kimber, and Transparent Audio cables quite clearly), and do not seem particularly sensitive to AC power cords or to the ground loop problems that emerge in some speakers with powered subwoofers.

They are less room sensitive in bass performance than most speakers with their deep-bass

energy and extension, but they are capable of exceptional bass performance and well worth tuning in over time to get the right distance from the rear wall. The use of passive radiators and the enclosure design seems to help reduce room interaction, favoring more realistic bass and reducing the peaks and valleys in the bass that are inevitable in any real-world listening room and that appear in some form even with the most musically natural digital room compensation.

As for the other aspects of setup, the Triton Ones can provide exceptional soundstage and imaging focus. I would strongly recommend that you first find the proper soundstage width that takes advantage of their potential to deliver a wide stage, but stop at the point where images become too wide. The Tritons are not as sensitive to sidewall reflections as some, but it is certainly better to keep them away from the sidewalls if possible and to use a moderate toe-in.

One last point. The Triton Ones are also exceptionally revealing of the rest of your audio components. I was upgrading my reference amplifiers from the Pass Labs 160.5s to the 160.8s, and I was struck by how competitive the Triton Ones were with some far more expensive speakers in revealing the improved dynamic detail of the 160.8s, and their better reproduction of lower-midrange musical energy. I was also impressed by their ability to reproduce the different but excellent ability of the EMM Labs Pre-2 SE preamp and the Pass Labs Xs preamp to reproduce the subtlest nuances of very-low-level musical detail in quiet passages without a hint of noise. Both are great preamps, and it takes a really good speaker to reveal the full range of differences between them.

The good news is that the Triton Ones are neither forgiving nor the kind of speakers that require you to choose nuances in the rest of your system to compensate in part for their sound character. The bad news is that they do reveal even slight upgrades in your front end. Beware of the resulting tendency to suffer from "front-end-upgrade disease." The Triton Ones do make improving the rest of your system more tempting.

### Summing Up

The Triton Ones are one of the best buys in speakers I've had the chance to hear at anything like their price. They have all—or more—of the features and technology that anyone looking for specsmanship could want, but their real merit is that they provide sustained musical pleasure with exceptional realism. Highly recommended, and if \$5000 is too much, be aware that the Triton Twos have many of the same design features and share the same tweeter. **tas**



www.theabsolutesound.com

## SPECS & PRICING

<b>Driver complement:</b>	<b>Built-in subwoofer power amplifier:</b> 1600W, DSP controlled
Three 5" x 9" long-throw quadratic sub-bass drivers coupled to four 7" x 10" planar infrasonic radiators; two 5-1/4" high-definition cast-basket MVPP mid/bass drivers; one High-Velocity Folded Ribbon (HFVR) tweeter	<b>Dimensions:</b> 5-3/4" x 54" x 16-1/2"
<b>Frequency response:</b> 14Hz-35kHz	<b>Weight:</b> 80 lbs. (each)
<b>Sensitivity:</b> 92dB	<b>Price:</b> \$4995
<b>Nominal impedance:</b> 8 ohms	<b>GOLDENEAR TECHNOLOGY</b>
<b>Recommended amplifier power:</b> 20-650Wpc	PO Box 241 Stevenson, MD 21153 (410) 998-9134 goldenear.com

# Magnepan

## 3.7i

### Spooky Real

Jacob Heilbrunn

**I**t started well over a decade ago. There I was in audio store listening to a pair of traditional moving-coil loudspeakers coupled to an Audio Research amplifier. The sound was excellent but didn't really move me. Then a pair of Magnepan 3.6 loudspeakers was substituted for the cone speakers. All of a sudden a huge soundstage emerged. The chorus sounded lifelike. I had found my entry ticket into the high end.

So it's with more than ordinary interest that I've followed Magnepan's recent efforts to improve its speaker line. Over a year ago, at the behest of the company's marketing guru Wendell Diller, I traveled to Magnepan's headquarters in White Bear Lake, Minnesota. A summons from Diller, after all, is not to be taken lightly. He's been around the high-end industry for decades, helping a host of fanatics track Magnepan's every move.

In fact, Diller's efforts may have succeeded better than he always finds comfortable. Take a look at the Internet forums and you'll quickly find that almost every aspect of Magnepan loudspeakers is discussed, analyzed, and scrutinized, down to the type of staples and

glues the company employs to construct them.

Everything that goes into a Magnepan loudspeaker matters. A lot. I spent a number of years tinkering with my 20.1 loudspeaker to improve its sound. If you know anything about Magnepan, then you're probably aware that its loudspeakers are very inexpensive compared to the performance they offer, and this is so because the company pinches pennies wherever and whenever it can. My pet peeve had always been that Magnepan has on occasion taken this principle too far, when, for a modest outlay, it could extract even greater performance. But lo and behold, even Magnepan can apparently be prodded to invest more in its hardware. (My understanding is that its longtime neighbor and friend, the Audio Research Corporation, finally drummed it into Magnepan's collective heads that capacitors actually do affect the sound.) When I listened to the company's new flagship 20.7 loudspeaker during my visit to the factory, it didn't take long to hear that upgrading the capacitors and running the midrange panel in phase with the bass and ribbon tweeter had greatly improved the presentation.

This was a big deal for planar aficionados because the blunt fact is that changes at Magnepan don't happen very often. The company has historically moved at a pace as glacial as the weather in White Bear Lake. It thus took more than ten years for Magnepan to move from the 20.1 to the 20.7 loudspeaker. Next Magnepan introduced the 3.7 loudspeaker, which superseded the 3.6. And there matters seemed to rest. Magnepan would sit pat for another decade or so, right?

Well, no. It has now come out with an upgraded version of the 3.7 called the 3.7i (owners of the former can upgrade to the latter for \$500). For

most other loudspeaker companies this fairly rapid shift would be no big deal. But for Magnepan it is tantamount to epic change. To make matters even more mysterious, Maggie won't divulge what upgrade it has performed to the 3.7i. It simply wants you to (gulp) trust your ears.

I'm a fairly trusting fellow, but as a veteran fan of Magnepan I have to admit that I was more than a mite curious to see if the company's claims were justified, or if Maggie were just blowing smoke. So when Diller asked if I might be interested in reviewing the new 3.7i, I bit. A few weeks after I assented, a pair of oblong brown boxes landed on my doorstep. Diller himself showed up a few days later to help set them up, which did not take long at all. We listened to several amplifiers, Diller pronounced himself besotted with the Ypsilon SET 100 Ultimate monoblocks; the overall sound was superb, and that was that.

Or so I thought. What I didn't initially realize was the extent to which the 3.7i has improved its performance when compared to its predecessors. In dynamic power and transient speed, in coherence and smoothness, the 3.7i represents a substantial advance. Despite the glories of Maggie's ribbon tweeter, it has always stuck out a bit, requiring some taming with a resistor. This Band-Aid is no longer necessary. Magnepan has performed some engineering jiggerypook that appears to have banished the sense that the tweeter is just a mite faster and hence edgier than the mid and bass panels. In the bad old days, I would sometimes flinch when a particularly violent transient was sounded in the treble region. No longer. You can listen with pleasure for hours on end to the 3.7i without fatigue. It is a loudspeaker that pulls such a disappearing act that it barely seems to be present.



## EQUIPMENT REVIEW - Magnepan 3.7i

The truth is that the longer you listen to the 3.7i, the more addictive listening to it becomes. I'm not ashamed to confess it. I fell hard for the ethereal sound of this Magnepan. It hit me as I lowered the needle to listen to one of my favorite LPs. All of a sudden the sound just flowed, transmuting the room into a concert hall. The same phenomenon occurred when listening to CDs. It's almost as if an audible tension had been released from the music. This speaker seems to let out a big sigh and just let the music emerge in a holistic fashion.

In fact, one of the most endearing characteristics of the 3.7i is its gossamer-like continuity on acoustic instruments. My chum Jonathan Valin

has written at length about what he likes to call the ability of a stereo system to reproduce the "action" of an instrument. With the 3.7i that quality can almost be taken for granted, so absent is any sense of strain or fatigue. The 3.7i anneals the action of an instrument to a lissome quality, a sense of continuity that is extremely enticing. The remarkable fluidity of the 3.7i came home to me in listening to Murray Perahia playing Handel's Chaconne in G major—there was an emancipation of the sound from mere rote recapitulation of the notes into a realm of sonic bliss. Again, the lissome quality of the 3.7i returned to me on a splendid recording of Bach's flute sonata on the Delos label played by Joshua Smith on flute and Jory Vinikour on harpsichord.

The Maggie's sense of continuity extends to the acid test of any loudspeaker—the reproduction of the human voice. The ease with which the 3.7i reproduces same is simply uncanny. It's not just that you hear a well-defined acoustic space in which the recording took place. It's again—for lack of a better word—that sense of naturalness with which it hovers in the room. On the album *Strike Up the Band* [Roulette], a Count Basie and Tony Bennett collaboration, Bennett's effervescent ebullience came through loud and clear. It was possible to track just about every inflection in his baritone, not to mention the wonderful muted trumpet obbligato by one of my all-time favorite and highly underrated trumpeters, the great Joe Newman.

The continuity, the lack of a sense of one driver handing off to another, is important because music, of course, simply emanates across the sonic spectrum as though it were cut from the same cloth. Musicians rarely talk about the bass

region, let alone the midrange. They don't really think in those terms. At most they might refer to the tessitura region of a coloratura soprano, or brass players might talk about seeking the holy grail of a double high C. The 3.7i offers a reminder of the artificiality of thinking in terms of a midrange or bass (not that audiophiles can dispense with these terms because they obviously serve a descriptive purpose). But it is the great virtue of the 3.7i to dispense, by and large, with these considerations in the listening, and simply pour gobs of music into a room.

None of this will probably come as a great shock to planar fans. But what about the traditional weaknesses of a planar design? How does the 3.7i do with dynamics, imaging, and bass?

I'm not going to tell you that the 3.7i trounces a moving-coil design when it comes to these parameters of performance. That would be nonsense. What I can tell you is that Magnepan has quite audibly improved in these areas. Whether the improvements are enough to banish any lingering doubts is a question that can only be answered by auditioning them yourself.

The weakest point of the 3.7i is clearly its bass response. Bass reproduction is, of course, highly room dependent, but I've always found that Magnepan designs start to roll off pretty quickly in the deep bass. However, the upside of a planar design is that you obtain very quick and accurate bass. On the Ron Carter quartet LP *Parfait* [Milestone], I was impressed by these very qualities. The suppleness of Ray Brown's bass also came through beautifully on the cut "Blues in the Bassment" on an Impulse! LP. In fact, I never felt the need to augment the 3.7i

### SPECS & PRICING

**Type:** Three-way planar-magnetic/true ribbon loudspeaker

**Frequency response:** 35Hz–40kHz

**Sensitivity:** 86dB/500Hz/2.83v

**Impedance:** 4 ohms

**Dimensions:** 24" x 71" x 1.625"

**Price:** \$5995

#### MAGNEPAN INC.

1645 Ninth Street  
White Bear Lake, MN 55110  
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magnepan.com

#### ASSOCIATED EQUIPMENT

Continuum Caliburn turntable with two Cobra tonearms, Lyra Atlas and Miyajima Zero mono cartridges, dCS Vivaldi CD/SACD playback system, Accustic Arts tube hybrid preamplifier and monoblock amplifiers, Ypsilon PST-100 Mk 2 phonostage, Transparent Opus and Nordost Valhalla 2 cabling, and Stillpoints Ultra SS isolation feet



## EQUIPMENT REVIEW - Magnepan 3.7i

with a subwoofer, though Magnepan does offer its own supplementary bass panel. The downside, if you deploy Magnepan's extra panel, is that it will make it considerably more difficult for the amplifier to drive both speaker and bass panel, though most solid-state amplifiers should be able to handle the load.

The places where I feel that the 3.7i has made the greatest strides are dynamics and imaging. Older Magnepan's used to force you, more or less, to remain frozen in your seat, equidistant from the loudspeakers. Somehow—once again I can't tell you how as Diller seems to have taken an oath of omerta about why specific improvements have occurred—you can now listen from a variety of positions without losing a sense of the center image. Depth of image is also more precise, something that manifests itself on things large and small, from a bass drum pounding in back of an orchestra to the clink of knives and forks in the rear of jazz club.

Nor is this all. Let's face it: Planar loudspeakers have always been dynamically challenged, partly because of their low sensitivity. This doesn't mean that they can't play loudly. In fact, they often *have* to be played at the loudest volumes to get them to "come to life." But what they lacked, even at loud levels, was dynamic contrast.

The 3.7i is a dynamic cheetah in comparison to its somewhat lugubrious ancestors. This Magnepan moves so fast on congas, for example, that it creates an indelible whoosh of dynamic alacrity and punch. I never felt the need to crank the 3.7i up. Quite the contrary. It was a pleasure to listen to it at reduced volumes, where it conveyed the emotion of music with great authenticity.

Last but hardly least is that, in audiophile terms, this is a high-resolution loudspeaker. No, it's not going to starkly isolate each note and hold it up for inspection and dissection. But its astounding coherence means that it provides a sense of the gestalt of, say, an actual jazz club venue that is well nigh unsurpassed in my experience.

As you can tell, I'm once again quite smitten by what Magnepan is purveying. The 3.7i is not a perfect loudspeaker, but then again no speaker has attained perfection. And its resolution means that to extract the most from it you're going to need to spend a bit to drive it properly. Diller himself, for all his thrifty propensities was most taken with the Ypsilon monoblocks, which retail for \$125,000. I hasten to add that it's not necessary to go to that length to achieve great sound. I spent a lot of time listening to the Accoustic Arts preamplifier and amplifier, which are much more reasonably priced.

But whatever amp you choose, Magnepan will offer a unique experience, particularly for acoustic music. Listening to the 3.7i reinforced my sense that to listen to a Magnepan loudspeaker is almost tantamount to entering a separate musical reality. Talk about spooky. If a stereo system is about suspending disbelief, then few products suspend it better than the 3.7i. *tas*

# MONITOR AUDIO

## Silver 2

"...the tweeter reveals real delicacy that makes rivals seem rather ragged in comparison."

- Hi-Fi Choice  
Dec. 2014

## Silver 6

**PRODUCT OF THE YEAR**  
- SoundStage, 2014

"You need to hear them. Pronto."

- What Hi-Fi?  
Dec. 2013

## Silver 8

"I've been looking at speakers for \$3,000/pair or less for a while, and have not heard any that I would prefer to the Monitor Audio Silver 8."

- Kalman Rubinson  
Stereophile, Jan. 2015

## Silver 10

"...one of the best \$2,500-and-under full-range floorstanders I've heard."

- Spencer Holbert,  
The Absolute Sound  
Dec. 2014

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# Silver series





# Emerald Physics CS2.3 Mk II

## Genuine Bargain

Paul Seydor

**I**n the Emerald Physics room of the Newport Audio Show the year before last I experienced some of the best sound I've heard at any show in over forty years as an audiophile, the speakers those under review here. This is what I wrote in my report: "The CS2.3 II offered simply the most precise imaging and best soundstaging I have ever heard anywhere; for once and without exaggeration I could use the word holographic. Dynamic range is extremely wide, bass response subterranean, midrange rich and open. Orchestral music is spectacular, while Sinatra on 'Angel Eyes' is palpably present, three-dimensional, and spookily real—also rare at this show, unmistakably a true baritone (it took all of maybe twenty seconds before a smile appeared on my wife's face). If this thing performs in most rooms the way it did here, and given the quality of these hotel rooms that should be practically anywhere else, it may be just about the best performance per dollar I know in high-end loudspeakers."

Hyperbole is a liability of show reports because most of the sound at audio shows is so poor that when one hears something good one tends to overreact, not least because negativity, even when warranted, is so dispiriting. But as the review that follows will reveal, apart from the "subterranean bass" bass observation, which is overstated, I stand by that report.

### The Design

The speaker is a descendent—sort of—of the original Emerald Physics CS2 that my colleague Robert E. Greene reviewed so enthusiastically in TAS. I say "sort of" because when the company was purchased by Walter Liederman a few years ago, the CS2 became the \$5995-per-pair CS2.3 Mk II, which is claimed to share no parts with its forebear and its midrange/tweeter configuration is markedly different. Nevertheless, the two models do share some basic design principles and philosophy: large stacked woofers vertically mounted on an open baffle, and the use of DSP to assist in crossover slopes and equalization. They differ in that the CS2 crossed over the dual 15" woofers to a compression-driver tweeter, with no midrange. The CS2.3's point-source midrange/tweeter is said to improve the speaker's imaging. The design is unusual enough to warrant describing in some detail its components parts and how they're meant to go together.

The drivers, though not manufactured by Emerald, are proprietary. Per side they consist in a pair of imposing 15" woofers that operates below 100Hz and a 12" upper-bass/midrange driver with a coaxially mounted, lens-loaded 1" tweeter (henceforth I shall

refer to this as the midrange/tweeter module even though it handles part of the upper-bass). The speakers operate as dipoles up to the transition to the tweeter. Biamping is required and necessitates either four mono amps, two stereo amps, or one four-channel amp. Per side, one amplifier connects directly to the stacked woofers, the other to the midrange/tweeter module through an outboard crossover box that crosses the midrange to the tweeter at 900Hz. Unlike the woofers and the midrange driver, the tweeter operates in monopole mode (more about the implications of this later).

Also supplied with the system is an outboard digital signal processor called the DSP2.4. (In the original version this was an outboard DSP and equalizer by Behringer, but the current owner and engineers felt that it was too unreliable to be retained and that it wasn't "truly an audiophile product.") Although physically very compact—about the size of a cellphone differently configured and thicker—the 2.4 is a powerful and sophisticated device. Connected between the preamplifier and the power amplifiers, it serves two functions: crossing over between the woofer and the rest of the frequency range, and judiciously equalizing to flatten and smooth the response throughout the upper bass and lower midrange, exactly the region where so many floorstanding speakers exhibit the unfortunate "floor bounce" effect that makes them sound too thin or lean. Note that the CS2.3 doesn't offer full DSP room correction; instead it offers an array of fixed-equalization settings that help to flatten the bass response in a range of listening rooms.

Feature:  
Speaker  
Placement  
Secrets

Preview:  
TAS  
Illustrated  
History

## EQUIPMENT REVIEW - Emerald Physics CS.2.3

Full DSP room correction is usually done with a microphone and several measurements taken *in situ*, but the current CS.2.3 II went a different route. When Clayton Shaw owned the company, he undertook a program of extensive and detailed measurements of speakers in a wide variety of typical listening rooms so as to determine their bass-response characteristics at various distances from front and side walls. Using these he came up with algorithms to flatten the response curves. End users supply Emerald Physics or the dealer with the dimensions of their rooms (preferably with a diagram) and the desired location of the speakers, and the manufacturer programs the appropriate response algorithm into the DSP box. The owner must also supply the sensitivities of the amplifiers to be used. It is not necessary that the amplifiers be the same, but if they are not, the DSP2.4 must be programmed so that the amplifiers' signal *outputs* are identical. I had on hand only two amplifiers of such different characteristics—a Quad 909 and a Zesto Zia—that the good people at Wyred 4 Sound generously lent me a pair of superb ST Series II amps (see sidebar), so the issue of identical sensitivities didn't arise. Emerald specifies the sensitivity of these speakers as 97dB, so quality of wattage matters much more than quantity. Although the sensitivity is 97dB at 1kHz, the separately powered bass drivers' sensitivity is 90dB. As for tubes versus solid-state, bear in mind that each speaker has two large woofers operating in free space, so logic suggests amplifiers with reasonably high damping factors, which most of the time means solid-state.

In addition to the DSP2.4 there is also, as noted, an outboard crossover for each speaker array. The outputs of the bass amplifier connect directly to the paralleled bass drivers, but those of the upper amplifier go through the crossover box, which has separate outputs for the upper-bass/midrange driver and the tweeter (the boxes, supplied with all necessary cabling, are each placed behind a speaker on the supporting platform).

As far as setup goes, the 2.3's manual makes a point of getting the speakers out from the wall behind them. As with, say, Quads and other dipoles or bipoles, one meter is a minimum, and much more is preferred. Being dipole over half their range, the farther the 2.3s are out from the wall the more the first reflection is delayed and thus the more precise the presentation. I set up mine pretty much where my Quads go and even with the assist of measurements couldn't much improve upon the location. While they don't

### SPECS & PRICING

**Type:** Three-way, four-driver, active dynamic loudspeaker

**Impedance:** 4 ohms

**Sensitivity:** 97dB 2.83V at 1m (midrange/tweeter); 90dB (woofers)

**Frequency Response:** 20Hz-22kHz -3dB (with DSP correction) to target curve

**Dimensions:** 8" x 51" x 2.75"

**Weight:** 78 lbs.

**Price:** \$5995

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## EQUIPMENT REVIEW - Emerald Physics CS2.3

## Issues, Options, Pricing, and Other Stuff

The CS2.3 II is a new product to which the company has already added a couple of newer products since—including a dandy smaller model that much impressed my colleague Robert E. Greene at this past spring's Newport Show—and, alas, the growing pains are showing. Nothing to worry about in the way of reliability—the things are ruggedly built and from all appearance bullet-proof—but there are some niggling issues with respect to the DSP settings. It took Emerald four tries to get the settings right in my room. Mark Schifter, the company rep, tells me this has happened only once before, and I believe him. But I think this point needs to be underscored: If you're not getting the sound I am describing here, and if, especially after careful setup, the presentation is in any way thin or lean sounding, then the culprit is almost certainly the algorithm programmed into your DSP2.4. Fortunately, however, you are dealing with a company that is very consumer-oriented and willing to work with you to get it right. In my own case, there was a huge initial mistake that resulted in the first DSP being shipped with a setting -8dB below 0. The sound was gorgeous except that, the visual impression of those 15" woofers to the contrary, they sounded as if they were the size of pistachios. Schifter checked his records, saw the error immediately, and sent out two additional DSPs, one set at -4dB, the other at -2dB. The former was better, but still not right, the latter better still but again not right. Finally, he sent one set at 0dB and raised the output of the lower amplifier by 1dB. This resulted in the musically natural balance I've described. My guess is that the current preference among audiophiles for excessively tight bass and lean mid-bass is so widespread that Emerald is afraid of programming the DSP2.4 units for a naturally full bass. The good news is that the speaker has the flexibility for considerable tailoring,

and the better news is that Clayton Shaw's algorithms work most of the time in most rooms.

I also trust that by the time this appears the company will have gotten the nomenclature clearer and less ambiguous on the outboard crossover, DSP unit, and the speakers. For example, on the back of the speakers, there are three pairs of stacked heavy-duty terminals that are unlabeled. The lowest pair are for the bass; the upper pair are for the midrange and treble respectively. Logical enough, but the settings on the crossover unit are confusing beyond belief: The markings consist of a stick-on "label" that came loose long before the review period was over—and if it becomes detached and lost, then getting the connections right is sheer guesswork—and was of no help anyhow, and neither was the instruction manual. As for the DSP unit, it's a little better in this regard but not by much (and the last unit sent me had the channels reversed at the inputs). Schifter assures me this should all be corrected by the time this appears in print. I hope so, because connecting the system up is not in the least difficult or complicated providing the instructions are clear.

My versions came with the matte-black finish; but the company offers automotive finishes in various colors and also some wood finishes. But that's the front only; the back is nothing more than the backs of the drivers and the wires. In other words, the WAF—wife-acceptance-factor (shouldn't we now be calling this SOAF for "significant other acceptance factor"?)—is pretty low. Danielle, my wife, who is pretty tolerant about this sort of thing, couldn't wait for the review to be over. As much as she liked their sound—it's one of the rare speakers I've gotten in for review of which, after a few days, she didn't ask, "When can you put the Quads back up?"—precisely to the same degree she disliked their appearance.

The price is \$5995/pair, but there is a special going on right now that has them selling for \$4800/pair (matte-black only). I don't know how long this will last, but at that price it's got to be the one of speaker bargains of the new century.

need to inscribe an equilateral triangle between yourself and them, each array must be the same distance from your listening position and their axes should be aimed either directly at your head or intersecting slightly in front or slightly behind it. The manual suggests toeing them in a bit. Disregard that "a bit"—I am reliably informed that "a bit" was just obeisance to inexperienced audiophiles who've been led astray by the soundstaging *über alles* crowd. The truth is, you want to sit on axis because that is where the tonal balance is the most accurate, and, make no mistake, the tonal balance of this speaker is among the most musically natural of any speaker I've heard regardless of price or design type. It exhibits some anomalies, which I'll come to later, but far fewer than most speakers I've listened to, including the vast majority of those costing tens of thousands of dollars and more.

### To Direct Or Not To Direct

Perhaps no other aspect of speaker design excites as much debate among audiophiles and designers as the issue of directivity, that is, wide-versus-restricted dispersion. It is beyond question that, all else being equal, the most accurate reproduction of the source is to be gained from speakers that restrict the dispersion—lateral dispersion in particular—because such restriction tends to involve less of the

sound of the room than wider dispersion. But there are many audiophiles who like the illusion of sound coming from beyond the boundaries of the speakers, even though, if you stop to think about it, this cannot be accurate, however pleasing it may be.

There is a tendency among both audio reviewers and audiophiles to treat the terms "soundstage" and "imaging" as if they're the same thing, but although they are related, they are quite different. When we speak of a soundstage we are talking principally about the apparent width and depth of an aural presentation, how convincingly it seems to present the gestalt of a performing ensemble of whatever size or makeup. I am referring here to music-making for which there is a live reference, not to electronically generated studio recordings as such. Long before Harry Pearson in the early days of *The Absolute Sound* made the concept of soundstaging a central preoccupation in audio commentary and design, it was obvious that many audiophiles wanted reproduction with a greater sense of spaciousness and size, something that extended beyond the confines of both the box that contained most speakers and the boundaries set by the stereo pair itself. (I should point out that Harry himself did not favor bouncing sound off the walls—on the contrary, though he liked the spacious effect of recordings miked like the old Mercuries, he was quite clear

## EQUIPMENT REVIEW - Emerald Physics CS2.3

that these were best heard when speakers were placed out of doors. He had a point: no room reflections.) This could be seen in the popularity of such controversial speakers as the Sonab, the Bose 901, and even the Hegeman. And it persists in the practice of many audiophiles who set up their speaker systems so that the drivers fire straight ahead, the idea being to generate more prominent reflections off the side walls, the better to increase the apparent size of the soundstage. For my tastes, this is precisely the wrong approach. The only reason for listening to a speaker well off its axis is if its frequency response is so poorly controlled that that is the only way you'll hear a reasonably smooth, tonally accurate response. But it is absolutely the wrong way to go about getting precise imaging.

Imaging refers to the ability of a speaker to resolve spatial cues within the soundstage and to locate voices and instruments precisely. When *Consumer Reports* famously observed of the Bose 901 that it had a tendency for the image to wander about the room—or words to that effect, I don't recall the quotation exactly—it resulted in a lawsuit from the manufacturer (which, fortunately, it lost). I seriously question the accuracy of CR's description—even from the poorest speaker I've ever heard, I've never felt that the image wandered around the room (assuming the stereo pair is connected in polarity)—but the idea behind the criticism was and is a valid one: namely, that the more you draw the reflected sound of a room into the reproduction, the vaguer and less precise the

image-resolving characteristics of a speaker are going to be. It is not for nothing the original Quad ESL, almost sixty years after its introduction, or the Quad 63 and its descendants, thirty years after the introduction of the original, still leave most listeners slack-jawed by their imaging precision. Set these things up correctly, seat yourself equidistant from them, and the only way in which you will more precisely located musicians in a soundstage is with binaural recordings over headphones.

But there is a price to paid, or, rather, two prices: one actual, the other psychological. The actual is that the listening window is limited. Please disregard the “head-in-the-vice” metaphor that is often trotted out. I've owned Quads and other speakers that require a restricted listening window for years and the vise metaphor is a demonstrable canard. But the window is undeniably very narrow. The psychological loss is of course the “kick” many audiophiles get from hearing images from beyond the boundaries of the speaker system. This always amuses me, because it's plainly something of a hat trick, an artifact that depends for its full effect upon one's not being fully involved with the music that is playing. In other words, the effect depends upon one's being aware of the place of the speakers in the room and of the sound emanating from beyond their boundaries. Moreover, because this effect depends upon side wall reflections that are obviously mixed into the reproduction, there *cannot* be an accurate replication of the acoustic space of the recording venue. This is another thing that amazes so many listeners about Quads and other speakers of restricted

dispersion: how uncannily they render both the acoustical atmosphere and the physical space of the recording venue or concert hall. Again, there's no mystery about this: what you're hearing is more of what is on the recording and less of the contribution of your own room.

There is obviously no way to resolve this debate to everyone's satisfaction, satisfaction itself being a subjective matter. If you happen to have a very pleasing room, you probably enjoy having some of its sound mixed into that of the recording and reinforcing it. Then, too, unlike, say, Peter Walker, you may not want your sound system to be a *window* onto the concert hall—you might want something more dramatic or interventionist to make up for the lack of the visual component of music making. “Realism,” after all, is not reality; it is merely a construct that expresses an impression of reality. A bad recording accurately reproduced will sound like a bad recording; but a bad recording can be inaccurately reproduced and perhaps sound not so bad or even good, according to one's taste. Another way of saying this might be that speakers which image precisely almost always render the soundstage accurately as well, that is, according to what has been captured by the microphones and recorded, but they don't aggrandize it in any way. As in so many things in audio, you pay your money. . . .

**The Sound**

I don't believe it's necessary for me to run through the usual litany of recordings to describe the sound of this speaker. Let me refer you, once again, to the description from my show report with which I opened this

## Wyred 4 Sound Amplifiers

As noted, since I didn't have identical amplifiers on hand and the amplifiers I did have—one all tube and one all solid-state—were of considerably different characteristics, the good people at Wyred 4 Sound kindly sent me one of their ST-500 MkII amps (250Wpc) and one of their ST-1000 MkII amps (480Wpc) (\$1499-\$2149 each, depending on options). I used the former to drive the midrange/tweeter, the latter for the bottom end. The synergy was outstanding, and I am informed that several dealers carry both brands and are in a position to offer a very attractive package price on the system. When you consider that the speaker pair is now effectively selling for \$4800 a pair, this means that for somewhere around eight grand you can purchase the CS2.3 IIs and the Wyred amps—and I can't off-hand think of anything else that will provide this much sheer musical pleasure, authority, and accuracy for anything approaching that kind of money. Once I was finished reviewing the speakers, I spent some time listening to the ST 500 MkII amp on my Quads 2805 and was rewarded with sound of exemplary clarity and neutrality that I'd describe as tending toward the cool or yang but without ever really getting there. But this impression is no doubt conditioned by the fact that for quite a good while now my Quads have been driven by Zesto's Bia amplifier, which is canted decisively toward the yin. Despite the seductiveness of the Zesto, the Wyred units are almost certainly the more literally accurate, and they performed without flaw during the evaluation period. Highly and enthusiastically recommended.





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## Emerald Physics CS2.3 - **EQUIPMENT REVIEW**

review and suggest that, depending on what you're used to listening to, fairly little in your experience may prepare you for the CS2.3 II's extraordinary imaging capabilities. All kind and manner of orchestral, choral, opera, and other big material is reproduced with a thrilling sense of ease, authority, and truthfulness. As I'm writing this I am listening to the splendid recent recording of *Otello* by Muti and the Chicago Symphony Orchestra and Chorus. The spectacular opening in a thunderstorm through the drinking song that becomes a violent brawl conjures the whole world of Shakespeare's tragedy as expressed in Verdi's brilliant score. A universe and sensibility away from this are the quartets of Beethoven as essayed by the Tokyo Quartet in its second complete cycle, which I reviewed during the evaluation period. As with large orchestras, the impression of the four musicians palpably, holographically present, is all but peerless, instrumental timbre true and the tonal balance convincingly real. *The Christmas Revels*, a pageant staged for recording and based on a live presentation, was brought fully to life in my room, so viscerally you could sense the size of the venue, diagram the movements of the many performers, and hear the hall.

Part of the reason behind this impression of life and lifelikeness is the open-baffle configuration. There is no boxiness to the presentation because there isn't any enclosure. The baffle that holds all the drivers is wide enough at the bottom to provide the necessary reinforcement for the bass so that the presentation sounds realistically full. Indeed, this is one of the characteristics of this speaker

that I like most: the rich lower midrange and full mid-to-upper bass, precisely the spectrum from which orchestras and jazz ensembles derive much of their strength and power. This is one speaker that can render music not just loud but powerful in the way you actually hear it in a good concert hall. I remarked in my show report that—much to my wife's great pleasure—Sinatra actually sounds like the baritone he is, not the tenor wanna-be that we get from so many speakers, especially those narrow-baffled floorstanders with their bass drivers raised off the floor. I get so tired of the current trend in speakers toward a sucked-out upper bass/lower midrange in combination with a projected presence region and a rising top end that makes everything sound unnaturally crisp, overly articulated, and—well, why use a lesser word?—*unbeautiful*.

Nor is it just male singers who benefit from an accurate presentation in this region. Put on Ella Fitzgerald in her prime and you realize that while hers is a light voice it's also got some real body and weight to it. Yet saying that, really light voices, such as the young Barbara Cook on the fabulous original-cast of *Candide*, are presented that way. Or try Mary Costa on the original soundtrack of Disney's animated feature *Sleeping Beauty* for a clear, crystalline voice.

Several musician friends of mine who've listened to this speaker have absolutely fallen in love with its sound the way they typically do when they hear Quad ESLs, Harbeths, LS3/5as, Gradients, early Spondors, and a small handful of other brands known for natural, musical tonal balances. (As I've had occasion to observe

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## EQUIPMENT REVIEW - Emerald Physic CS2.3

before in these pages, when music lovers buy speakers like these, they keep them for a long time—often a lifetime.) In addition to the other virtues I've cited, one big reason my musician friends like these new Emeralds is the top end, which is smooth, sweet, and very natural, but very much not à la the current mode. At first listen, you might even think it a bit dim sounding, but to this I have two responses. First, listen again and then recall what, say, a triangle really sounded like the last time you were at an orchestral concert. One of my listeners—a seasoned audio professional listening to the famous Royal Ballet anthology from Harry Pearson's Super Discs list—made a special point of noting this when he heard these speakers. One recording I made sure I listened to was Boulez's DG performance of his *Pli Selon Pli* with all its high percussion, which the CS2.3 reproduced excellently and very persuasively. (Boulez the composer is not to everyone tastes, to put it mildly, but this piece is a very appealing mid-century classic and often very beautiful in a kind of aural equivalent to Paul Klee-Picasso-like way.) Second, make sure you're listening on axis. If you're not, then the top will sound very dim indeed (more of this further on).

Lest I give the impression the CS2.3 II is perfect, it isn't. Nothing is. So let's start with that tweeter. The lens loading has the desired and desirable effect of directing the response so that you don't get much sidewall reflection. But this also results in a considerably less than uniform power response. In other words, if you sit much off the axis, the extreme highs fall off precipitously and in places can seem to disappear entirely (especially if your room

is well upholstered). Then, too, lens loading affects the radiation pattern in other ways. You can hear this most clearly on spoken word. There are two speeches by John Wayne on the soundtrack from *The Alamo* that were recorded outdoors and that are good tests for coloration. The CS2.3 II does not pass these with flying colors, sounding a little closed in and curiously "hooded." This effect is easily heard by contrast with, say, Quads, which famously exhibit none of it: Wayne's voice sounds literally as free and open and present as if in the room or, rather, as if you were transported to where he is. Other recordings that demonstrate this effect are Derek Cooke's voice in analysis of Wagner's *Ring Cycle* and almost any test record with an announcer on it. When I queried Mark Schifter, Emerald's Engineering and Design Consultant, about this, he remarked, with a candor that is genuinely refreshing, "Yes, that's true. We can't duplicate Quads in this regard." It's hardly necessary to add that most other speakers can't either.

I am at a loss to explain why these effects don't show up on music, including solo voice, but they don't, or at least not nearly to the same degree, whereas they do so clearly on speaking voices, especially speaking voices outside of musical contexts. Probably it has to do with all the emotional and psychological associations we bring to the experience of music, which is one reason among several why Alan Shaw of Harbeth does not use music when it comes to the final voicing of his speakers—neither did Peter Walker of Quad—but instead recordings of people, typically family members, with whose voices he is intimately familiar. Then, too, there

are the differing radiation patterns of the 12" midrange and the 1" tweeter, plus the fact that the tweeter is monopole, the midrange and woofers dipole. Whatever the case, you will not hear these speakers at anything approaching what they are capable of if you listen much off axis.

I said that my show-report observation about "subterranean bass" was overstated. This is true. The bass from these speakers is impressive down into the thirties, and it can be very powerful. But much below that and all you get is a sense of foundation but little in the way of definition and clarity. This is to be expected. As one speaker designer put it—he shall go nameless—"Dipole bass may be very good, but the trouble is, there isn't very much of it." Hence Emerald's heroic measures: two 15-inch woofers per side plus judicious equalization and DSP room correction and separate amplification. Schifter told me that one of his customers, an industry professional who likes to listen to hard-driving rock, is crazy about the speaker but wondered if there was anything to be done to improve the very-deep-bass situation. The candor of Schifter's reply was again refreshing: "Not without otherwise ruining the speaker. Our advice is that you buy yourself a REL." This was offered in all seriousness: the people at Emerald are great enthusiasts for REL subwoofers. Mate the CS2.3 II with a REL (or a pair) and you'll have a true full-range speaker system that for sheer bass extension virtually nothing on the market can touch.

Finally, one last caveat, inasmuch as I am making comparisons on the highest possible

scale: while the CS2.3 II is very accurate, revealing, and lifelike in its presentation, I would not recommend it to the detail-is-everything contingent. Nor does it exhibit the last several degrees of see-through transparency of Quads, some other electrostatics, and a very few of the finest dynamic systems. Saying this, let me add that it is in no way deficient in these areas—indeed, is quite superb—but if that chair squeak in the back row is more important to you than the correct timbre of a violin or a trombone, then you might want to look elsewhere. Otherwise, nothing, regardless of price, is state of the art in every aspect and particular of performance. (I must add here that the vast majority of dynamic speakers, including most of the super-expensive ones, with transparency that approaches Quads, also have a tipped-up tonal balance that I personally find antipathetic.) This speaker excels in so many areas, including those that are central for the truthful reproduction of music in the home, that they warrant the highest recommendation. When you factor in their price—\$4800 a pair in the current configuration (but see sidebar)—then their value is quite off the charts. And even if you're not in the market for speakers, I'd advise you try to audition a correctly set-up pair just to hear what truly precise imaging in its holographic sense really is all about. TAS





# Infinity Primus P363

Technology Make Things Better, and Cheaper

Robert E. Greene

**H**ow well a speaker has to work to be satisfying is not an open-ended question. Eventually, speakers will get to be as good as there is any use in their being and when that happens, technological progress being what it is, it will not be long before they are as good as they can be at low prices.

People ought to rejoice in this, not resist it. Music is for everyone. But however one feels about the idea, in the face of speakers that cost tens or even hundreds of thousands of dollars a pair, the whole point might seem very remote at present.

“And then along came Jones”—or in this case, the Infinity Primus P363—and suddenly the idea seems a lot less remote than before. There have been other inexpensive speakers that were startlingly good. Several times in the history of TAS one writer or another has declared some inexpensive speaker to be good enough or even all but perfect (I recall an early NEAR speaker for example, and Harry Pearson’s reaction to the Sound Dynamics 300ti). Nor am I going to suggest that the Infinities as I shall call them hereafter are perfect. They are built to a price point and there are things one could do a little better by spending more on construction. Indeed, there is a sort of cottage hobbyist industry flourishing of people modifying these speakers for themselves or others. What I am suggesting is that these speakers are both remarkably good and remarkable in the rationality of their design. Infinity has apparently isolated the things that really count about sound and gone after these things while cutting corners—corner-cutting being necessary at the price—in ways that do not matter all that much. The results are startling indeed.

# EQUIPMENT REVIEW - Infinity Primus 363

These speakers are very inexpensive. They are four-driver, three-way floorstanders. And they are currently being offered for sale quite frequently for under \$300 a pair. (Their MSRP is higher but they are being heavily discounted.)

I am well aware that if I just start talking about the sound—although Neil Gader described a somewhat earlier version of the speakers as “amazing” in his capsule review in a survey in issue 149—people are likely to think that this is just REG being an iconoclast or an agent provocateur, doing for speakers what he tried to do for phono cartridges years ago with his review of the Audio Technica ATML170.

## The Technical Story

So I want first to tell you about the technical behavior of the speakers. Lots of you probably think that speaker sound is not well characterized by measurements, but bear with me and perhaps we can clarify this point a bit along the way.

Let’s start with distortion. For all practical purposes, the Infinities do not have any. The distortion is on the order of 55dB down from the signal from 100Hz on up at 90dB (this 55dB down corresponds to around 0.3% or less). The Canadian NRC’s famous speaker-measurement program does not even bother to show in its distortion measurements distortion levels that are more than 45dB down. They clearly think below that level, distortion is inconsequential. On this basis, the Infinities are essentially perfectly “clean,” truly distortion-free. The Eminent Technologies and most electrostatics are even a little lower—maybe 60dB or more down from signal or in the case of the ETs even

better at many frequencies. But the Infinities are running about as well as a box dynamic speaker is likely to run in this regard and better than most. And they sound it. The Infinities are really clean and pure-sounding. You want clean midrange; they give you clean midrange.

Next act: The Infinities are really flat in response. Now here one has to be a little cautious. They are not absolutely as smooth in the midband as some speakers that run a single driver from the bass on up to say 3kHz. The Harbeth P3ESR is smoother from say 300Hz to 1kHz, for example. But not by much! The Infinities have a very smooth, neutral midrange, and the very small measured variations around 600–800Hz are just that, very small.

Now what is true is that, to my ears, the whole region above around 1kHz could be pulled

down by about 2dB to good advantage. As is, the speaker sounds a little midrange-recessed relative to the upper mids and lower treble, above which response is very smooth and flat but slightly up in level. Many audiophile speakers are, in fact, midrange-forward, so this small recession effect may strike you more than it really should. In any case, such a small reduction of the treble is a trivial thing to do electronically. (Buy an NAD and the controls will be right in front of you.)

Now we get to where the Infinities just go romper-stomper over practically all the competition. Namely: The off-axis behavior of the Infinities is just all but perfect in evenness and lack of coloration. The Infinities follow the pattern of rolling the off-axis down starting at a fairly low frequency (as opposed to say the JBL LSR 6332, which also has very smooth off-axis behavior but keeps directivity constant up to around 1kHz and shoves the baffle-step down quite low, by using a wide front cabinet). This is a choice, but it is an essentially perfectly executed choice in the Infinities. And if you stay down where you belong in listening position, (i.e., below the tweeter’s axis), the vertical consistency of the speaker is also superb. (As this listening position is low, it might make sense to lift the speakers up, on cinder blocks say.)

The effect of this is that the Infinities are superbly uncolored and un-speaker like. And they vanish as sources in a way few others can match, presenting a seamless and stable sonic image. This is no-compromise behavior. Not good for the money, not good for two or three times the price, but just plain good, period. You can spend \$90,000 for a pair of speakers and

not do as well in radiation pattern. In fact, most likely if you spend that kind of money that is exactly what you will do—not as well—because, in fact, very few speakers do do as well.

## What Technical Information Means About Sound

So let’s pause for a moment and ask ourselves, just exactly what can be wrong with a speaker that has ultra-low distortion, very smooth and flat frequency response, and extraordinarily smooth off-axis behavior, and which incidentally will play really loudly with rather little power needed. The answer of course is, not much. A speaker like this is bound to sound really good and indeed it does. Floyd Toole has retired from Harman (of which Infinity is a division). But his influence lives on and if he was a bit doctrinaire about flat response, off-axis consistency, wide bandwidth, and low distortion being all that mattered about speakers, that does not mean that these things do not count for a very great deal. And the Infinities are the proof of the pudding.

All right, so there are a few problems. First of all, this is a speaker that I take it is aimed at the home-theater market, and the balance is bass-oriented, or more precisely there is a certain lack of control, even boom, around 100Hz. Presumably people have figured out that every speaker is going to need some fixing up in the bass most likely, and, hey, should have found out that when the frequency response is corrected, the timing (phase behavior) will also be corrected. So this whole bit with the boom in the bass is a sort of non-event. (I know some people are a bit troubled by the idea that fixing

## SPECS & PRICING

Type: Floor-standing three-way loudspeaker	Maximum suggested amplifier power: 200 watts
Driver complement: Two 6" anodized aluminum (Metal Matrix Diaphragm) woofers, one 4" MMD midrange driver, one wave-guided MMD tweeter	Nominal impedance: 8 ohms
Crossover frequencies: 350Hz, 3kHz, 24dB/octave slopes	Dimensions: 8" x 39" x 13"
Sensitivity: 93dB	Weight: 48.5 lbs.
Frequency response: 38Hz-20kHz	Price: \$398 per pair (frequently discounted)
HARMAN INTERNATIONAL (800) 553-3332 infinityspeakers.com	



## EQUIPMENT REVIEW - Infinity Primus 363

frequency response fixes phase response, but it is just mathematics. You can believe in it without worrying about how it works.)

The Infinities have metal drivers (aluminum anodized on both sides to create a coating that supposedly damps breakup modes). Any potentially troublesome out-of-band breakup of metal drivers is well-suppressed here by the steep-slope crossovers. I think the effect of this suppressed breakup behavior is not really going to be audible on music material. I suppose in an ideal world the break-up frequencies would be even further out-of-band. Some manufacturers go to heroic and expensive measures to shove the breakup modes way, way out of band. That is better in theory—but at a certain point it may be only in theory. Phenomena do have thresholds, and it is worthwhile listening to see what one really needs in such situations.

### The Actual Sound

So how good do these speakers sound? With bass adjusted, treble shelved down slightly, speakers positioned so the listener is on the best axis—and incidentally with the listener at least 8 feet from the speakers (which do not integrate correctly very close up), they sound remarkably good, with a neutral character, a remarkable vanishing act as an apparent source, a lot of detail without exaggerated treble (high percussion is really excellent), and enough dynamic capability to deal with large-scale music. My usual orchestral favorites tests pieces—Rachmaninoff *Symphonic Dances* on ProArte, Dallas Symphony, Mata, for example—sound well-resolved, smooth, natural both

in tonal character and stereo presentation, and completely convincing dynamically. The extreme bottom is missing but at the price there will plenty of money left for a subwoofer if you must have pipe organs and earthquakes.

In a dark room, not knowing what was being played, I think few people would be willing to say definitely that they were not listening to a high-priced assault on the higher realms of speakerdom. This probably sounds heretical, for a pair of speakers that costs less than many people spend on a power cord or two. But there you have it. The times, they are a-changin'.

This does not mean that the Infinities are the ideal speaker for any particular listener, though I find it hard to believe that, with the treble tamed, anyone would not like them. For one thing, the choices of radiation pattern that speaker designs make influence how they sound, and any one choice may not be for you in particular. And drivers of other materials have a subtly different character which might lead to a preference elsewhere. But those things are true for speakers that cost a bundle, too.

At the very least, this is a speaker that everyone ought to listen to carefully. At the price, one could almost buy them just to try them out, or a club or group of friends could buy them for the price of a movie ticket for each member. I do not want to appear to be deliberately provocative, but these things are really something. In many fundamental ways they are in the top echelon of anything out there. Hard to believe, perhaps, but have a listen. They do more than sound like a really good speaker. They sound to me like the beginning of a new era in audio. TAS

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- Alan Taffel, *The Absolute Sound*, April 2015



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# Magnepan .7

## Julie Versus the Maggies

Julie Mullins



**L**et's face it: Most audiophiles are into cone loudspeakers. And why not? They're plentiful, good-sounding, and (at least in many cases) quite affordable. Though force of habit is a powerful thing, what if there were an alternative that was every bit as good-sounding (maybe even better-sounding) and just as affordable, only it didn't have cones and didn't come in a box? Although I imagine most of you have already made their acquaintance in previous versions, let me introduce you to Magnepan's latest "mini" planar dipole, the two-way, floorstanding, all-quasi-ribbon-driver MG .7—a speaker that is capable of a more natural and full-range sound than any previous "mini" Maggie, and a more natural and full-range sound than anyone might reasonably expect for the money.

### The .7s Versus Your Room

Let me say right off the bat that these are very impressive speakers offering a practically unbeatable quality-to-cost ratio. Of course, they do have certain peculiarities. For one thing, with Magnepan's proper setup in your room is arguably more critical than it is with most other types of speakers. It certainly took some experimentation with positioning to get the .7s to sound their best (though the result was worth every minute of effort). Happily, these guys aren't too heavy, only 27 pounds each, so they can easily be shifted around to suit your room's needs—even by a gal!

Though small by Maggie standards, the .7s are still four-and-a-half-foot-tall, one-foot-four-inch-wide rectangular panels about the height

of a largish dynamic floorstander, a little wider than same, and, at under an inch in depth, about twenty times thinner. Their figure-8 dipolar dispersion (see below) makes sidewall reflections less of an issue with the .7s than it is with wide-dispersion cones; however, if the .7s (or any Maggies) are toed-in toward the listener rather than made parallel to the backwall, then part of their rear wave *will* bounce off sidewalls, potentially adding (as it does with any loudspeaker) brightness from early-arrival reflections. What this means is that with Maggies you should take some of the same care in placement vis-à-vis sidewalls as you would with any loudspeaker, especially if you toe the speakers in.

The Maggies should also be placed a reasonable distance from back walls, in order to avoid doubling and/or cancellation in the bass from the dipolar .7s' out-of-phase rearwave. (In the end I set them up about three-and-a-half feet from the rear walls.)

Unlike most dynamic loudspeakers, the Maggies can be positioned with their tweeters in different locations—to the inside of the speaker, firing more or less directly at you, or on the outside of the speaker, firing less directly at you. All you need to do to change the tweeter orientation is swap the left speaker for the right one. Obviously the location of the tweeter makes a difference in tonal balance, imaging, and soundstaging. Though JV and I preferred the sound of the .7s with their tweeter to the outside in the room in which we were listening, the inside position did have more presence, image focus, and treble energy. Obviously any decision about tweeter orientation will depend on the size of your room and how far you're seated from the panels.

Once again like all Maggies, the quasi-ribbon panels of the .7s need some break-in before they sound their best. Though quite listenable out of the box, they will sound better (less bright in the upper mids, more filled-out, freed-up, and energetic in the bass) with several weeks of play.

### The .7 Versus the MMG

At 15-1/4 inches wide and 54-1/4 inches tall, the .7s are about an inch wider and better than six inches taller than Maggie's other much-less-expensive two-way "mini," the MMG. However, unlike the MMG, both the tweeter and the midrange/bass panels of the .7s are quasi-ribbons (as opposed to quasi-ribbon and planar-magnetic, for which see JV's sidebar), giving the new Maggie an audible leg up in speed, resolution, bandwidth, and overall coherence over their little brothers. Not only are the .7s more extended in the treble than the MMGs; thanks to their considerably larger mid/bass panels they are also more extended in the low end, which Jon and I judged to go down more or less linearly into the low 50s. Perhaps the best news is that they will only set you back mere pocket-change (for high-end gear): \$1395 the pair.

### The .7s Versus Cones

As you probably already know, planar speakers use a different kind of technology than cone or horn loudspeakers. The most obvious visible difference is that there's no box to "house" the drivers or to damp their backwave—and thus no "box coloration." Planars produce equal amounts of sound front and back, and, at least in theory, use the room (or the distance between their panels and the walls) to "damp" or attenuate their rear wave.

What you can't see in a planar speaker is the



## EQUIPMENT REVIEW - Magnepan .7

drivers themselves, which are also very different than cones. The .7s use ultra-low-mass strips of aluminum bonded to very thin sheets of Mylar as drivers. Suspended between permanent bar magnets, these featherweight “quasi-ribbons” are faster and lower in distortion than much-more-massive cones. (Once again, see Jon’s sidebar for an explanation of how quasi-ribbons work.)

It may be obvious, but a driver’s mass and a speaker’s box inevitably and profoundly affect what you hear. Magneplanars offer the advantages of an extremely low-mass/low-inertia/large-surface-area driver suspended in a more open, unrestricted, less resonant and resonance-prone framework than that of a dynamic loudspeaker’s massive enclosure. All of this results in a boxless “airiness” to the sound and a naturalness of timbre that allow acoustic instruments to shine.

### The .7s Versus Music

In my listening tests, I spun a wide range of LPs and some digital tracks, too. At the risk of sounding cliché, my musical tastes really run the gamut. (If you saw my record collection, you might even wonder whether I had multiple personalities!) Anyway, I’d like to share some listening examples and how the Maggie .7s fared with each.

I knew going in that no speaker is going to be perfect on every kind of music, and that perhaps the most important consideration for a potential buyer is how well his listening preferences match up with a speaker’s characteristics: with what the speaker does well, and what it doesn’t do as well. Magneplanars are famous for their

accurate reproduction of the midrange, so I expected them to deliver impressively realistic sound with almost all acoustic instruments (save perhaps for big bands and very large orchestras). And deliver they did!

On digital tracks from *Temptation*, Holly Cole’s well-known covers of Tom Waits tunes, the “airiness” of the sound of the Maggies was a match made in heaven with Cole’s breathy vocals. “(Looking for) The Heart of a Saturday Night” was a real standout in its faithful sonic reproduction of the entire Holly Cole Trio’s stellar performance. Translation: The recording sounded beautiful and true-to-life. Also, I could swear that the presentation, while open and graced with a striking measure of air and light, felt like it existed within some precisely (almost mathematically) defined soundfield. Quite a large field, but still a space with a specific form and shape that was different than the form and shape of the listening room. I suppose what I’m talking about is a “soundstage,” the

## SPECS & PRICING

Type: Two-way  
floorstanding planar  
loudspeaker with quasi-  
ribbon tweeter and quasi-  
ribbon mid/woofer

Frequency response:  
50Hz-24kHz +/-3dB  
Impedance: 4 ohms  
Sensitivity: 86dB/2.83V/1  
meter, 500Hz

Dimensions: 15 1/4" x 54  
1/4" x 1/2"  
Weight: 27 lbs. (each)  
Price: \$1395

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## EQUIPMENT REVIEW - Magnepan .7

.7s' recreation of which was kind of stunning. When you add this remarkable reproduction of ambient space to the .7s' natural timbre, they are clearly an excellent choice for acoustic music recorded live or in an actual hall.

With *Temptation*, the only time the .7s took a dive was on a few, big, low bass notes in the opening bars of "Jersey Girl," where there was some audible clipping as the .7s reached/exceeded their excursions limit, although the volume I was listening at was fairly substantial.

Which brings me to bass-heavy rock and roll.

Personally, I tend to like a little bit of added color and drama with such music. I enjoy experiencing the weight of a Fender bass guitar and feeling the punch/impact of a kickdrum. And on their own the .7s just don't do this particular trick the way cones do.

So I decided to bring some JL Audio subwoofers into the mix. (It's worth noting that Magnepan offers its own add-on woofer option, the Magneplanar Bass Panel or DWM, which essentially contains two bass drivers on one thin-film planar-magnetic panel. Because they're "all-Maggie," the DWMs might integrate very seamlessly. I would certainly like to give them a test drive when I get the opportunity. Hopefully I'll be able to report back soon.)

With some rock and roll, the JL Audio subwoofers added needed muscle and punch. A high-res digital file of the Stones' "Gimme Shelter," for instance, sounded big, brash, and bold with the subwoofered .7s. And not just in the bottom octaves. You could also better feel the weight and power of Merry Clayton's "backing" vocals—not to mention Keith Richards' driving guitar. A couple of cuts from the Pixies' indie/

post-punk *Surfer Rosa* on vinyl sounded heavier than thou. The insistent throb of "Cactus" and the building, searing strains of "Where Is My Mind?" simply filled the room. This was music you could hear and feel.

That said, weight isn't everything.

On much music the magic of pure, authentic acoustics rang true through these Magnepans to very satisfying effect with no subwoofers required. For instance, "The Girl from Ipanema" from the 1964 eponymous Getz/Gilberto album sounded infinitely more spacious and open without the subs. The song floated and soared in all its subtle, understated beauty. Also on the jazz front, *Coleman Hawkins Encounters Ben Webster* was a captivating experience without subs. The breathiness and buzzy vibrations from Hawkins' tenor saxophone reed sounded incredibly real and present. The soundstaging felt true-to-life. The piano's low notes were clear and warm. You could easily pick up nuances of the recording space.

The bottom line is this: As I spent more time experimenting with the .7 speakers both with and without the addition of subwoofers, I discovered that I definitely preferred some music with them, but many selections without. Generally speaking, I found my preferences fell along lines of musical genres, though sometimes even *those* lines got a little blurred.

Without subs, for example, the acoustic/electric sound of the live version of "Late in the Evening," from *Simon & Garfunkel: The Concert in Central Park* made me want to dance to its catchy salsa rhythms. Closing your eyes you could picture the stage full of instruments in a rich scene that must have been an unforgettable

concert experience.

Even some classic rock tracks (particularly those without big driving bass) worked well without the subwoofers. On David Bowie's "Diamond Dogs," the solid percussion came through vividly and felt balanced against the raw electric guitar and the rocking piano via the .7s all by themselves. (And that cowbell never sounded better.)

## Ribbons, Quasi-Ribbons, and Planar Magnetics

For those of you who don't understand the difference between "true" and "quasi" ribbon drivers, let me explain. In a nutshell the incredibly lightweight foil of a true ribbon is the driver—it simultaneously conducts the signal and vibrates to turn it into sound waves. In a "quasi-ribbon," the foil is not the driver—or not exactly. In a quasi-ribbon, that strip of aluminum foil is itself attached to an extremely lightweight strip of Mylar; the foil, which is suspended between permanent bar magnets, acts as the signal conductor (a planar voice coil, if you will), transmitting the signal to the entire surface of the Mylar, which, in turn, vibrates (together with the aluminum) to produce sound.

As a point of comparison, in a traditional planar-magnetic panel the Mylar driver is not driven uniformly over its entire surface by a foil of aluminum as it is in a quasi-ribbon; instead, it is driven by a latticework of thick signal-conducting wires that are attached to the Mylar itself. The difference in the uniformity of drive and in the relative mass of the driver should be obvious.

Up until the MG-1.7, all Maggie speakers used a mix of ribbon (typically for high frequencies), quasi-ribbon

### The .7s Versus Amplifiers

But before you start thinking we're entering some sort of hi-fi utopia, know that while this design eliminates some variables from the equation, it also brings with it other demands and considerations.

For one, the .7s are a bit power-hungry: They require an amplifier capable of driving a low-sensitivity 4-ohm load. I listened first with a

(typically for high frequencies and upper mids), and planar-magnetic drivers (typically for the lower mids and the bass), which, as I just noted, made for variations in uniformity of drive, uniformity of dispersion, uniformity of moving mass, and uniformity of power-handling that could be heard as discontinuities in the overall presentation. This was particularly true of the transition between ribbon tweeter and quasi-ribbon or planar-magnetic panels, but also of the transition between quasi-ribbon and planar-magnetic panels.

What made the 1.7 (and subsequent .7 Series Maggies) such a landmark—and a departure—is that every driver in it, from its super-tweeter panel to its tweeter/upper-mid panel to its lower-mid/bass panel—were quasi-ribbon, making it the first Magneplanar to use ribbon technology in all of its drivers. Though a two-way and not a three-way like its bigger brother the 1.7, the .7 is the first "mini-Maggie" to use quasi-ribbon technology for all drivers. As was the case with the 1.7, the result is a loudspeaker of superior "uniformity"—a speaker's whose power-handling, dispersion, resolution, and overall presentation are more "of a piece" than any previous miniature Maggie. JV



## EQUIPMENT REVIEW - Magnepan .7

tube amp, but definitely heard better results with a solid-state one. Why? The tube amp gave almost too much leeway to the bass, making it less clearly defined. This also left the upper midrange more exposed (i.e., a shade bright). Some might like the more forward projection (not unlike what you'd hear from horn loudspeakers) of tubes, but I liked the more blended, balanced feel of the solid-state amp, so I stuck with that for most of my listening.

## The .7s Versus You

At a tough-to-beat price point that would make even the thriftiest loudspeaker lovers open their wallets, the .7s become even more attractive when you consider that Magnepan is also offering a 30-day in-home trial and a money-back guarantee. Whether you're in the market for a starter pair of high-quality speakers, or have the proverbial champagne taste on a beer budget (or both!), why *wouldn't* you consider these babies? They're terrific.

## JV Versus the .7s

I don't know how I'm going to improve on Ms. Mullins' review. We are in complete agreement on every point. However, since I'm expected to comment, goes here.

As many of you know, I've heard, reviewed, and owned more Magnepan loudspeakers than any other brand, so, given my recent extended sojourn in the land of ultra-high-end cone speakers, listening to Maggie's latest offering was very much a homecoming. It is easy to forget, given the gorgeous timbre and seemingly unlimited dynamic range of something like Raidho's quarter-million-dollar, multiway, ribbon/diamond-coned D-5s or Magico's near-\$200k aluminum-enclosed, beryllium/carbon-fiber-driver

Q7s, how much sonic realism a \$1395 Maggie can still buy ya, particularly in the midband, where it counts the most. It is also easy to forget that the .7s represent a different sonic paradigm than the exceptionally rich, exciting, "musicality-first" Raidhos or the astonishingly high-resolution, high-neutrality, "accuracy-first" Magicos. The .7s don't sound inherently gorgeous and thrilling, and they don't sound inherently like exact replicas of mastertapes. As has been the case with all Maggies since Jim Winey invented them, the .7s are intended for "absolute sound" listeners—which is to say that they fare best with acoustic music and will appeal most to fans of same.

All you have to do is listen to a voice—be it Thomas Hampson on "Das Trinklied vom Jammer der Erde" from the Tilson Thomas/SFO *Das Lied von der Erde* or Louis Armstrong and Ella Fitzgerald on "Cheek to Cheek" from Analogue Production's *Louis and Ella*—to instantly hear why these plain, rectangular, ultra-thin, boxless, room-divider-like panels have appealed to high-end audiophiles for the better part of half a century. Their sheer openness and wonderfully lifelike midrange timbre and presence will grab you even if you don't know or care about how they work. Voices such as the ones I just mentioned simply sound less like they're coming from loudspeakers and more like they're "there" in the room with you. Ditto for instruments that play primarily in the midrange, like, oh, John Coltrane's bluesy sax or Curtis Fuller's gliding trombone on *Blue Train*. In fact, the Maggies are so good at what they do in the midrange that they don't just sound great in their own right; they also make even the priciest competition sound slightly flord, boxy, and/or analytical by comparison.

Like all Maggies, the .7s crave power and I agree with Ms. Mullins that they sound better defined in

the bass and less forward in the upper mids (albeit also less bloomy and present) when driven by solid-state amplifiers rather than by tube ones. (The .7s are definitely easier to blend with subwoofers when driven by transistors amps, which better damp and control their bottom octaves.) They also sound less bright and more spacious with their tweeters to the outside, rather than to the inside (although inside placement does add pop-out-at-you presence to closely miked voices).

No Maggie, or at least no Maggie that I've heard since the Tympani Series, does the mid-to-low bass with realistic power (multiway cone speakers such as the big Raidhos and Magicos simply stomp them in this area). And though Maggies have always had great depth of field—producing very wide, deep, tall soundstages that are also exceptionally neutral (in the sense of not being darkened, constrained, or otherwise colored or distorted by the sound of a box)—they have never been world-beaters when it comes to depth of image. By this I mean that instruments and voices sound slightly "flatter" in aspect, more one-dimensional (or bas-relief), through Maggies than they do through the best cones.

Like all Maggies the .7s have to be pushed hard (i.e., played loud) to achieve a semblance of the large-scale dynamic impact of well-designed cones. And no matter how loudly you play the .7s (or any Maggies), their bass panels won't match the excursions of really good dynamic woofers and midranges. This doesn't matter as much with the wind, brass, or bowed/plucked string instruments of a symphony orchestra. But with the electronically amplified instruments (and much of the percussion) of rock music, the presentation can sound a bit gutless. The information is there, all right, but the energy that brings it to life (and raises goosebumps) isn't.



## EQUIPMENT REVIEW - Magnepan .7

Of course, the .7s' bottom-end dynamic reticence and reduction of power-range color and oomph is somewhat off-set by their lifelike speed on transients like drum and cymbal strikes and their simply superb reproduction of drumhead textures. (No speaker reproduces the "skin" of a drumhead the way a Maggie does.) On the other hand, the big resonant barrel of a tom goes more than a bit missing with the .7s, as does the kick of a kickdrum or the semi-pulling-away-from-a-curb rumble of a Fender bass or synth.

All of which means that the .7s probably aren't the ideal speakers for much non-acoustic rock

'n' roll or certain kinds of hard-driving jazz. At least, not by themselves.

However, for reasons I don't completely understand, the .7s proved easy to match to subwoofers—which, trust me, has *not* been the case in the past with Magnepan—whether they were JL Audio's very large and expensive Gothams, which are the best subs I've ever heard, or the same company's very small and affordable e110s, which are the second best. Crossed over at about 70-80Hz (24dB/octave), the JL subs provide the bottom-end extension and power that the .7s on their own just don't have, and they do so with relatively minimal

loses in the midrange openness and bloom that Maggies have a patent on. They also virtually eliminate the slight brightness of the .7s by filling out the tonal balance.

No, the subwoofered .7 system is not quite as expansive and completely free of box coloration as the .7s are all by themselves. (I mean you are adding the sound of subwoofer enclosures to the presentation.) And no, you still won't get the upper-bass/power-range density of tone color, three-dimensionality, and sock that you hear with big Raidhos or Magicos. What you will get, however, is the most lifelike, high-resolution, relatively compact, full-range loudspeaker

system I've heard for anything remotely close to this kind of money.

The bottom line here couldn't be simpler. If you like chamber music, small-combo jazz, folk, or acoustic rock, the .7s will satisfy you more completely than any mini-Maggie that has preceded it. If you like larger-scale music and listen at higher volumes, the addition of one or two JL Audio e110s will supply the dynamic range and low-bass extension such music thrives on. Either way, this is a great loudspeaker. Drive it with a pair of Odyssey Audio Strati, and you will have a small, affordable system that approaches the state of the art. TAS





# Revel Performa3 F206 and M106

## Revel's Rockin' Reboot

Neil Gader

**T**he Performa Series is the middle of the three lines from Revel, part of the high-end division of Harman known as the Luxury Audio Group which also manufactures JBL Synthesis, Lexicon, and, of course, Mark Levinson. Now in its third generation, the Performa3 Series includes compact and floorstanding models plus multichannel-specific loudspeakers—that is, center and surround channels. This review considers the meat and potatoes of the Performa3 collection, the mid-sized \$3500 F206 floorstander and its stand-mounted cousin, the \$2000 M106 (see Sidebar).

I have twice toured Harman's extensive R&D facility in Northridge, a community in the north valley region of Los Angeles. I'm familiar with the depth of research and analysis, the rigorous product testing, and the extensive listening that goes on there. Product changes are made after great deliberation, and at a pace that suggests little regard for the hiccups of market trends. Thus models like the Ultima Salon2—the Revel flagship—and the earlier Performa F52 (a personal favorite, see my review in Issue 162) have been perennials on TAS' Editor's Choice list. However, even the most successful products need a reboot from time to time and Revel's latest represents a significant evolution of a proven loudspeaker line.

Visually the look of Performa3 is, indeed, more in tune with today's market. Gone are the square profile and sharp corners of the past. In their place is a softer, more curvaceous enclosure nar-

rowing from the front baffle to the rear panel—a look that bears distinct similarities to Ultima2. Anchoring the enclosure is a flared plinth stabilized by heavy adjustable spiked footers. The Performa3's curved enclosures are inherently stiffer than the box shapes they replace and are formed with contiguous wood layers and modified internal bracing patterns to address the non-parallel-walled construction. The loudspeaker grilles attach magnetically and the enclosures are finished in high-gloss piano black or white or American walnut. Everyone who encountered them in my listening room remarked on the superb finish quality of the Indonesian-manufactured line.

For the record, the F206 is a three-way floorstander in a bass-reflex configuration fitted with a front-firing port. The drivers include a pair of 6.5" woofers and a single 5.25" midrange transducer, both of which employ ribbed-aluminum dia-

## EQUIPMENT REVIEW - Revel Performa3 F206 and M106

phragms with cast-aluminum baskets. They also feature copper Faraday rings that stabilize the flux field during operation, assuring lower harmonic distortion even at high listening volumes. Crossover points are 275Hz and 2.15kHz. The aluminum dome tweeter has been fashioned around a newly designed motor and dome assembly. But the attention-getter is the tweeter's integrated and visually arresting acoustic-lens waveguide, based, in Revel's words, on a "breakthrough mathematical approach." Veteran Product Development Manager Kevin Voecks commented that "the primary point of using a waveguide is to match the dispersion of the tweeter with that of the midrange (or woofer, in a two-way system) over the crossover range. The corresponding challenge is to avoid reducing the tweeter's dispersion above the crossover region." Voecks added that this design actually achieves the hoped for result of "increasing the dispersion of the tweeter above the crossover region while simultaneously decreasing the dispersion in the crossover region." Revel followers will recall that power-response performance (as in total radiated sound—the overall combination of on-axis and off-axis response) has long been a focus of Revel engineering.

One thing is certain, it doesn't take a "golden ear" to be smitten by the prodigious strengths of the F206. In fact, it doesn't even take five minutes. The speaker has charisma pure and simple—and by that I mean it offers such an enthusiastic outpouring of musicality, dynamic energy, and imaging precision that it simply commands its audience's attention.

The F206 is a paradigm of balance—one that doesn't campaign for a specific sonic criterion to the exclusion of others. Tonally there are no broad

flat spots or nasty peaks. Rather, it presents a united front built upon low-frequency dynamic reserves, excellent slam and midrange dynamic presence, and a treble range that's eloquent yet mercifully without the needle of tweeter localization. To some this essentially neutral tonal profile may convey a little bit of the unblinking eye of a studio control monitor. Frankly, compared to the alternative, I consider that a more-than-laudable goal. However, the F206 is better than that; its openness in the treble and general tonal warmth keep accusations of "analytical" at bay. Still, few artifacts or colorations from other elements in the system chain escape the F206's gaze.

Its core strength is the top-to-bottom coherence of its four-driver array. The sound emerges from a firmly rooted low-frequency foundation—an attribute that anchors all the other elements of a symphony orchestra and equally serves small combos, solo piano, or rock/pop chestnuts. There's not a whisper of drivers going rogue or intimations of individual transducers rat-tat-tating as if from a machine gunner's nest. Regardless of the source material, I consistently experienced a sense of densely packed layers of sound, an acoustic fabric of seamless energy unbroken within the sturdy proscenium created by the F206. While only a mid-sized speaker it scales images grandly in the room. As I listened to the now-classic LP *Sussex Overtures* by Malcolm Arnold [Reference Recordings RR-48] I noted the stunning image separation, the contrasting tonal colors of the clashing wind and brass sections, the transient detail flying off the bow of the bass violins during a pizzicato section, the waves of reverberant air generated by the timpanists and percussion

section. (In the interests of full disclosure it was only later, as I was casually scanning this album's liner notes, that I was reminded that Voecks, then of Snell Acoustics, is a credited consultant on this superior album.)

As regards imaging, throughout my sessions with the F206 and M106 I could hear something different about the Performa3 tweeter and waveguide. It was the element that separates Performa3 from its predecessor. Clearly it was integrating smoothly with the mids, as was evident each time I played a choral track like the Rutter Requiem [Reference]. The human voice, solo or in groups, remains for me one of the best means to validate inter-driver coherence. But there was something more. And as I listened to tracks of the Jimmy Cobb Quartet on *Cobb's Corner* [Chesky], it crossed my mind just how well the trumpet was supported from below and how fully integrated it was within the venue. What was different about the trumpet's image, and now as I look back on my listening notes the Revel's imaging in general, was a slightly greater width to individual images—less defined edges and softer, more rounded boundaries. Certainly there was plenty of transient mouthpiece and breath action, but the Revel's treble didn't etch images as forcefully within the soundstage. It more reasonably and, I think, accurately let images open and spread their harmonic wings with minimal constriction. For me, the Revel makes the more authentic interpretation and creates a sound that I expect to hear in the concert hall.

The overall quality of the bass is excellent, honest, and strong. It's virtually billiard-table flat down to forty cycles with solid response smoothly rolling off into the mid-thirties. This is exactly

as stated in the Revel literature, which I later confirmed with an informal RTA sweep in my room—the flattest in-room measurement I've attained outside of the omnidirectional mbl 120 (Issue 228). A hint of midbass warmth conveys weight but also an organic sense of low-frequency air that underscores the natural hall ambience of a recording. The Revel narrowly misses the deepest wavelike rumblings of the pipe organ in Rutter's Requiem—that adrenaline rush of floorboard

### SPECS & PRICING

#### F206

Type: Three-way bass-reflex  
Drivers: 1" tweeter, 5.25" mid, 6.5" woofers  
Sensitivity: 88dB  
Nominal impedance: 8 ohms  
Dimensions: 9.8" x 41.4" x 13.7"  
Weight: 58 lbs.  
Price: \$3500

#### M106

Type: Two-way bass-reflex  
Drivers: 1" tweeter, 6.5" woofer  
Sensitivity: 87dB  
Nominal impedance: 8 ohms  
Dimensions: 8.3" x 15" x 11"  
Weight: 19 lbs.  
Price: \$2000

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## EQUIPMENT REVIEW - Revel Performa3 F206 and M106

and room-rafter excitation that makes the finest hairs on the back of your neck stand up. But there's more than enough bass to satisfy all but the most ardent subwoofer devotee.

The takeaway here is the level of quality and integration, as bass response dovetails into the lower midrange—a quality on display during Holly Cole's "I Can See Clearly." On this track the bass line vamp has a distinctive, almost bouncy up-tempo flavor meant to elicit the optimism that is the song's theme. Each note, as if leaning forward ahead of the beat, should be resolved cleanly and with definition. The F206 nailed them. Additionally there is very little noise from the forward-firing port, and although the bass-reflex configuration of the F206 isn't completely invisible, its impact on the overall pace and flavor of the low-frequency reproduction is minor.

Turning to LP playback I pulled Christopher Cross' eponymous debut album from the rack—a multi-platinum blockbuster back in 1980. Cross nabbed all four major Grammys for his efforts. In any case I hadn't listened to this one in some time and was pleasantly surprised to discover just how much low-level information and timbral detail were left in its grooves. The seamless midrange/tweeter integration of the F206 made child's play of the soaring string charts penned by co-producer Michael Omartian during "Sailing." Not to mention the inner detail and resolution the Revel displayed reproducing the soulful backup singing by former Doobie Brothers' front man Michael McDonald during the monster radio hit "Ride Like The Wind."

Still I have to admit there were moments when I longed for a slightly lighter and faster touch with transients and a more effortless sense of upper-frequency air and extension. Soundstage width is excellent but depth information is only average. The speaker does cry "Uncle" a bit on the deeper rumbles of the last half-octave or so of bottom bass—so I could ask for slightly more resolution of the deepest bass cues. Finally, whether it's the cabinet or the port or a combination of both, midbass information can sometimes sound a mite over-ripe, making symphonic crescendos and heavy percussion lose some definition.

The Performa3 F206 and M106 are segment-defining loudspeakers. And by emphasizing the sonic totality of the listening experience, they have more than exceeded my already lofty expectations. I'm often told that there are no bargains anymore in the high end. Well, naysayers haven't met the F206 and M106. So seek them out. Revel has just given "value-level" a fresh kick in the pants. **tas**

## Performa3 M106: Two Of A Kind

The M106 is the two-way, bass-reflex, stand-mounted little brother to the F206. Visualize, if you will, the identical tweeter and one of the woofers from the F206, lop off about 60% of the cabinet, and, *voilà*, the M106. A difference in this iteration is that the port is mounted to the rear, preserving the short profile. Sensitivity is also down slightly as befits the inefficiencies intrinsic in the smaller cabinet. The 6.5" driver is now assigned a much wider band of frequencies to reproduce. Plus the crossover point is raised to 2.3kHz in comparison to the F206's 2.15kHz.

Sonically there's no doubt that the M106 is cut from the same cloth as the F206, so I'm not going to restate the many similarities. There remains the same wide midrange sweetspot of the floorstander, a vocal lover's dream. There's a rewarding lack of localization and estimable composure under all sorts of dynamic fire—an imperturbable output so that even under punishing conditions (a little Metallica perhaps?) it remains frequency-response linear. There's a cooler cast to its tonal balance, likely due to the lighter bass, but its voice is still unmistakably F206.

The M106 differs significantly in two predictable areas. Dynamically it lacks

the effortless reach of the F206—for example, the piercing high-energy blasts of the trumpet solos in the Jimmy Cobb disc are tamped down somewhat.

It is exceedingly articulate in the 50-60Hz midbass region, but it rolls off fairly quickly below that. And unlike the F206 with its superior extension and more natural, looser feel in the bass, the M106 expresses bass cues with an elevated sense of tension, in the same way the higher strings of a guitar or violin are just a little tauter. So while Shelby Lynne's "Just A Little Lovin" retains the satisfying mallet smack of the kick drum that rhythmically anchors this track, it also doesn't quite reflect the natural decaying ripple of the drum. A lot of initial punch but not the full exhalation of resonance and air on the decay. This sense of control has larger ramifications as the M106 deals with ambient complexities on orchestral pieces like the Rutter Requiem, which features a large chorus and massive pipe organ in an equally massive acoustic space. Here's where even the finest compacts find it difficult to strike the balance between bass extension and scale and ambience retrieval. A prime example is midway through the "Lux Aeterna" theme where the organ stops dead beneath the voices

of the chorale. With the F206's greater extension this moment is heard as a rush of low-frequency air within the hall slowly escaping and wafting into the darkness until all is stillness. With the smaller M106, this decay is accelerated, the hall returning to silence on a much shorter tail of resonance. And on Tom Waits' "Come On Up To The House" from *Mule Variations* [Anti] there's some overall compression that takes away a slight bit of the momentum of the track.

The effect of the tweeter/acoustic lens waveguide is slightly different in the sense that resolution and imaging are somewhat magnified with the M106; the same elements are integrated more organically in the F206 due to its more powerful and extended bass response. But the M106 turns its own innate low-octave limitations to its advantage by unlocking a bounty of midrange detail and by performing a soundstage disappearing act worthy of David Copperfield. Like the F206, the M106 is also a segment-defining product. As the famous board game saying goes: "Do not pass go!" Immediately place the M106 on your short list and seek it out for audition. **NG**



# Dynaudio Excite X34

## Good Vibrations

Neil Gader

**I**f there's anything that gets my back up it's the lament that all the sexiness and excitement in audio resides at the extreme high end of the market. That is just so wrong. In fact so absurdly wrong that I will happily argue that the high end has been enjoying a most Golden Age of affordable gear. Exhibit one: the Dynaudio Excite X34 loudspeaker.

For the uninitiated, the Excite range is the affordable sweetspot of the broad Dynaudio line and a short step beyond the entry-level DM Series. It's also Dynaudio's gateway product to lure enthusiasts along the road to upscale offerings like the Focus and Contour series. Excite is represented by four updated models, the X34 considered here, a larger floorstander the X38, the compact X14, and the X24 center channel.

Even avid Dynaudio enthusiasts might be forgiven for confusing the \$3400 X34 for its predecessor the Excite X32 (reviewed by Kirk Midtskog, Issue 205). Yes, the basic bones are the same. It remains a slim two-way floorstander with crisp, clean understated lines, identical dimensions, and a very small footprint. At a mere 36 inches tall, its silhouette is on the shorter end of the scale for a floorstander. Some visual tip-offs for the updates in the X34

include magnetically attached grilles, a fully veneered natural wood front baffle and plinth, and high-quality Torx metal screws in the same color as the driver frames. Stability has also been enhanced with the addition of die-cast aluminum outrigger feet fitted with integrated damping rings and adjustable spikes.

The latest Excite drivers retain the long-throw woofer and smaller, lightweight voice coil that was featured in the Excite X32 model. Bass port tuning has been updated, and thanks to a more amplifier-friendly crossover the X34 draws less current from the amp. The X34 is now a true 8-ohm impedance loudspeaker compared to the 4 ohms of its predecessor.

Dynaudio has also addressed the X34's directivity—the way in which it disperses sound off-axis. The idea is to reduce coloration caused by floor and ceiling reflections, the prime culprits behind bass cancellations and general image smearing. Dynaudio ameliorates these in the X34 by using a “lite” version of its DDC (Dynaudio Directivity Control), a technology developed at Dynaudio Professional and found on its pro studio monitors and home-audio flagships, like the Evidence Platinum. The process is directed at optimizing the relationship of transducers both mechanically and acoustically, and implementing a proprietary crossover design chosen to reduce, in Dynaudio's words, “sound

reflections from the floor and ceiling of any room by at least 75% through the exact matching of the phase responses of the individual drive units, consequently achieving a sound radiation vertically focused towards the listener.”

In terms of sonic performance, the X34 isn't partial to specific genres of music; from country to classical, it's equally satisfying. For Dynaudio it appears that overall balance trumps any two or three specific criteria. The result is a little tower that within some very acceptable limitations achieves a near full spectrum of spirited output and low-frequency authority. For me, if there is a single word that describes the sonic personality of the X34, it's “Party”! The sound signature is outgoing, with a forward lean and a positively energetic temperament. There are no broad frequency suck-outs, nor does the X34 lay back on dynamics or overly-recess octave ranges to attain an undeserved level of three-dimensionality. The sturdy little towers are also remarkably free from cabinet artifacts and port coloration.

In tonal balance, the X34 is reasonably neutral with the exception of some upper treble shading, and a hint of mid/upper bass ripeness. Anchored by a surprising allotment of low-frequency energy and dynamic punch, the Excite X34 more than lives up to its name, achieving levels of performance that in the proper setting



## EQUIPMENT REVIEW - Dynaudio Excite X34



suggest many of the best virtues of a good 2.5-way like the Sonus faber Venere 2.5 (Issue 232) or a three-way like the superb Revel F206 (Issue 234). It's not a speaker to shy away from an explosive big band recording like *Count Basie Live at the Sands* [Mobile Fidelity]. Heavy brass has a way of making cowards of smaller compacts, but the X34 pretty much has an answer for every fusillade.

Vocals are well balanced with a good measure of chest resonance and upper-octave air, an impression that was conveyed as I listened to Colin Hay covering his own song "Overkill," a mega-hit from his bygone, down-under, Men At Work days. This is an "unplugged" version with only a simple, and slightly muted, guitar accompaniment. The sound, though closely miked, is airy and incredibly intimate, like Hay was singing in your living room.

Goodness knows my loyalty to stand-mount monitors is unwavering, but the X34's lower mid/upper bass response fills in gaps that many compact-speaker aficionados may not even have realized have gone missing. The weight of bass/baritone singers is one example. A bass or baritone singer's body is one big, barrel-like resonator, a fact that is plainly heard when he performs live and unamplified. In fact, the weight of his voice is not unlike the darker colors produced by a piano's soundboard—sustained and rich as chocolate. Speaking to that point, I heard Bryn Terfel in recital at the Dorothy Chandler Pavilion in Los Angeles under just these circumstances and I was astounded at the weight, the gravitas, of his unmiked voice and the piano accompaniment in this huge, 3000+ seat venue.

At a little over three feet, the X34 is not an especially tall floorstander particularly for American audiences. And, oftentimes the combination of a

lower tweeter height and that driver's dispersion characteristics creates an impression of a low acoustic ceiling having descended over the orchestral venue. However, that impression never materialized in my time spent with the X34. During Laurel Massé's *Feather and Bone* the massive space of the Troy Savings Bank venue retained most of the vast acoustic reverberant cues that I'm familiar with. (The Dynaudio Directivity Control at work, perhaps?)

Strings could be sweeter—they tend to be a little dry, and violin section layering is not quite fully explored. This comports with my view that low-level image resolution, micro-dynamics and focus could be more revealing—a conclusion I reached listening for the softly tapped cymbal embedded deep in the soundspace during the March section of Vaughan Williams' *The Wasps* or the delicate harp theme that follows the main melody in the opening section of the same piece.

Bass response is very good, audibly descending into the mid-thirty-cycle range and rock-solid to 40 Hertz. It's fairly uniform in output although it does thicken and diffuse somewhat in the midbass. (Foam port plugs are supplied to reduce bass output if required.) Still, the X34 maintains a firm grip on orchestral bass drum and other low-frequency resonances and decay information, even within the complexities of a full-blown symphonic performance. The tight, acoustic bass line during Holly Cole's "Take Me Home" was controlled and unwavering with a convincing sense of pace and rhythm. In such moments I hear clean stops and starts, devoid of timing artifacts or hangover from the port. I should add that this level of LF performance should make the X34 particularly attractive to home-theater enthusiasts (especially in concert with the X24 center channel) who aren't prepared to go the LFE/subwoofer route.

The Excite X34 is one versatile little number that was willing and able to get down and party with the best of them. With few exceptions, it touches all the musical bases and does so with a footprint no bigger than an average-size compact—food for thought monitor-fans. An authentic crowd pleaser in the most musical sense. **tas**

### SPECS & PRICING

Type: Two-way, bass reflex  
Drivers: One 1" tweeter, two 6" mid/bass  
Frequency response: 37Hz-23kHz  
Nominal Impedance: 8 ohms  
Sensitivity: 86dB  
Dimensions: 6.7" x 36.6" x 10.6"  
Weight: 37 lbs.  
Price: \$3400

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# Our Top Picks in Floorstanding Speakers under \$10k

## Infinity Primus P363

**\$400**

This remarkable speaker is less than budget-priced for a nearly full-range floorstander: It is almost down at the price level (after discounting) of typical miniature speakers for computer use. But in many respects it competes with the best dynamic speakers available. With its anodized aluminum drivers, distortion is all but vanishingly low. Its off-axis behavior is absolutely exemplary at any price level. And its frequency response is surprisingly smooth and flat. The balance is slightly “home theater” with a vigorous midbass and a small midrange recession relative to a smooth but slightly elevated treble. But a bit of minor EQ tweaking will produce a sound that is very close to exactly neutral. All this at this price point is not just impressive; it is the dawn of a new era, says REG. REG, 250

## PSB X2T

**\$1295**

Luckily for listeners (particularly those who are just getting started or who might not have the deepest pockets), PSB does its homework. The Canadian manufacturer has created a transducer of incredible value for an incredibly reasonable price—and, incredibly enough, it also sounds great. In appearance, this four-driver three-way is anything but flashy: a slim, compact, three-foot-tall, dual-front-ported, quasi-D’Appolito floorstander, with an MDF enclosure that comes in any finish you want as long as it’s black ash. But what the X2T lacks in eye-catching looks, it more than makes up for in ear-pleasing sound. Its primary strengths lie in the power range and the bass, where it can really turn heads. This little speaker delivers surprisingly dense tone color and hefty, extended low end—an unexpected feature in such a package at such a price point. Its soundstage may not be the deepest around, but in almost all cases the imaging of singers, instruments, and players is impressive, even precise, offering high sonic verisimilitude. In short, the X2Ts live up to PSB’s marketing message: “real sound for real people.” JM, 253

## Magnepan .7

**\$1395**

The latest (and greatest) “mini-Maggie,” this modestly sized, two-way, line-source floorstander uses all quasi-ribbon drivers (as opposed to the mix of quasi-ribbon and planar-magnetic in the MMG). The result is a superior blend between tweeter and mid/bass, with much better bass-range speed and power, low-level resolution, tone color, and top and bottom extension. Though the .7 benefits on some (chiefly large-scale) music from the addition of a subwoofer, reviewer JM thought it was shockingly realistic on acoustic instruments (and equally swell on a good deal of electric rock) all by its lonesome, reproducing an ambient soundstage so markedly different than the sound of the room the speakers were auditioned in that it transported her. JV completely agreed. In his opinion (and that of Ms. Mullins), the new .7 is *the* best option in a reasonably priced high-end loudspeaker. Like all Maggies, the .7s do require some power to drive, and their bass panels can be clipped at very very loud levels. JM/JV, 250

## GoldenEar Triton One

**\$5000**

The Triton 1 is an outstanding performer at anything like its price, and as affordable a path to the top echelons of high-end sound as AHC has encountered. Its mix of a ribbon tweeter, midrange drivers in D’Appolito configuration, and woofers and passive radiators is enhanced by a unique cabinet design. The midrange and treble provide exceptional realism without hardening the midrange in ways that appear to add detail to the music but deprive it of some of its natural smoothness and beauty. The soundstage is excellent, and the speaker is less sensitive to room coloration in the bass than many others. It can even be driven with single-ended amps. AHC, 246

## Larsen Model 8

**\$7000**

The Larsen Model 8 speakers are unusual among floorstanders—they are designed to be placed against the wall, with the wall and floor used as part of the acoustic design, rather than as something to be avoided. This approach to producing sound in rooms grew out of work of the late Stig Carlssen (with whom designer John Larsen worked) decades ago, and the principles remain valid. The profound knowledge of how speakers and rooms interact embodied in the design leads to an unusually convincing presentation of music of all sorts, both small-scaled and large. Unusual but superb. REG, 251





# Floorstanding Speakers over \$10k

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## Featured Review



# Legacy Aeris

## Reinventing the Speaker as a Hybrid System

By Anthony H. Cordesman

Photography by Cody Hamilton



**The Legacy Aeris is a great speaker by any standard, and I can see why Robert Harley recommended it so highly after a listening session at the Rocky Mountain Audio Show [Issue 230]. It is a truly full-range speaker, with bass deep into the subwoofer region, outstanding performance at every frequency to the limits of hearing and beyond, excellent definition, outstanding dynamics, and a visual image that might win it an entry to the Museum of Modern Art in New York.**

It comes with separate 500-watt amplifiers dedicated to each bass driver with a crossover point low enough that you can still get the best sound out of your regular power amplifier, and it has a very well chosen mix of drivers that provides a coherent and naturally detailed sound at any reasonable listening distance, as well as enough dipole radiation to widen the stage and reproduce more natural ambience.

And yet, these are only half of the reasons I'm excited about the Aeris. Bill Dudleston, Legacy's chief engineer, has produced some other excellent speakers, but the Aeris breaks new ground in what for me is the most important frontier in high-end audio: It comes with the Aeris Wavelaunch processor that allows you to tailor the frequency response to be as musically realistic as possible in a real-world listening room.

The Aeris Wavelaunch processor is an electronic unit that goes between your preamp and amplifier. It gives you up to 30 settings that you can use to adjust the sound of the speaker to correct room-interaction problems, partly correct for over-bright, close-miked older recording, and even—if you are fanatic enough—compensate for the different equalization curves in LPs.



## Legacy Aeris

**Music vs. Technology**

Most experienced audiophiles will already be well aware of just how serious room-speaker interaction problems are with more conventional speaker designs. Back in the 1960s, Roy Allison pointed out that low-frequency response in any normal listening room will look like the Alps no matter how accurate the speaker is in an anechoic chamber, or when measured so nearfield that room interaction problems are minimized. There are always peaks and valleys well in excess of 5dB, and almost always serious colorations from such peaks and valleys in the midbass, where the impact is clearly audible. There also are smaller response and reflection problems that affect the rest of the upper bass, midrange, and upper midrange. These can be corrected to some extent by adjusting the location of the speakers and listening position and by room treatment. I have never measured anything approaching a normal home listening room, however, where such preventative measures eliminated such response problems.

Moreover, “flat response” measurements inevitably create a musical sound that is too hard and bright. A single response or target curve also cannot correct for the fact that recordings differ sharply in timbre. This is particularly a problem for classical music fans because today’s all-too-typical close-miking, while dramatic in apparent detail, produces an upper-midrange hardness that is often a cause of listening fatigue when a speaker is voiced for “flat” response and placed in a real-world room.

Designing individual components for flat measurements and then voicing them for the best musical performance has severe limits. First, technical measures cover only a relatively limited part of the “error budget” of problems detected by the human ear. Second, any front-to-back walk-through in a concert hall will tell you immediately there is no one “flat” response—and that what you hear on stage is not what you hear live. Third, no one lives in a concert hall. Even a custom-designed listening room is susceptible to significant speaker-room interaction problems unless the system can be equalized to deal with them.

The good news is that we have learned to be tolerant of such colorations, and speaker designers now almost universally use the crossover in their speakers to act as a passive equalizer to

both improve frequency response and musicality. The bad news is that audiophiles as a breed are far less tolerant than others. This helps explain why audiophiles often talk about speakers as the most colored component in a stereo system, why they keep changing speakers, and why listening to a speaker in a large showroom where the speaker is precisely matched to the room doesn’t guarantee that it will sound as good when you get it home.

No one can solve these problems simply by changing speakers or listening rooms. Our perceptions are not shaped by the character of the speaker or the listening room *per se*, but by the interaction between them. Moreover, this same interaction means no combination of front-end gear, no matter how good, will be voiced with the nuances that best correct for these problems in speaker-room coloration. As a result, the search for the best high-end sound inevitably means consciously or unconsciously tailoring the system around the speaker-room interaction problem as well as finding the best-sounding individual components.

In the past, most equalizers that tried to reduce these interactions created as many problems as they solved. Older analog equalizers could partly solve truly critical room problems, but were often badly colored themselves. They also altered dynamics, and took some of the life out of music. Furthermore, they could only affect timbre and not the other problems in getting the best signal at the listening position like phase and time.

A few pioneers have addressed such problems with considerable success. Richard Vandersteen, for example, designed speakers with built-in subwoofers that could be corrected to deal with many real-world problems in the bass below 100Hz without coloring the rest of the speaker’s response. Firms like TacT Audio and Audyssey developed digital equalizers that address most of the problems in response, make automatic room corrections, and adjust some aspects of time and phase.

Manufacturers like Rives have improved analog equalizers to the point where any colorations are so inaudible that the benefits outweigh the drawbacks. As Robert E. Greene points out in a recent review, the DSpeaker Anti-Mode 2.0 Dual Core room-equalization system provides the first truly affordable room-correction system that can be inserted into any normal home



## Legacy Aeris

system, although it has some limits in digital headroom and input flexibility.

### The Legacy Aeris System

And here we get back to the Aeris system. The Legacy Aeris is not a speaker as much as a system for ensuring the speaker can be adjusted to solve room-speaker interaction problems in a musically realistic way. This is the single most important area for advances in high-end audio, and Bill Dudleston has pushed further into this area than any designer I'm aware of to date.

You can get a full description of the Aeris on the Legacy Web page, along with its manual and a technical paper on its design. Its technical specification are shown below. In sound, however, the following features define a unique approach to speaker design:

- The signal going to the speaker is shaped by an outboard electronic unit called the Aeris Wavelaunch processor that goes between your preamp and amplifier. It provides 40-bit DSP room correction with a 24-bit CODEC and features balanced analog inputs and outputs, level adjustment, and a USB port to interface with your computer for optimizing performance. It not only provides room correction but also equalizes and time-compensates the sound at the listening position.
- The Wave Launch provides up to 30 different adjustable settings for different frequency response curves.
- The electronics provide signal routing and processing via the 4-input by 8-output matrix and XConsole software. Each balanced input and output of the routing matrix has independent level adjustment and each output can be configured as a submix of any of the inputs.
- The included Aeris algorithm divides the left and right inputs with a customized high-pass and low-pass network to form a stereo two-way crossover. The transfer function for each loudspeaker is pre-programmed at Legacy for linear output from each driver, correcting minor anomalies inherent in the combined array. The output side of the matrix is factory configured for Aeris, the input side (left side of the matrix

display in the software) is to make adjustments in your room

- Software with an empirically derived algorithm is integrated into the speaker design to compensate for losses in low-frequency separation by increasing the ratio of difference information in bass frequencies to more closely approximate half space (free space with ground plane).
- The Aeris Wavelaunch processor provides the necessary amplitude and time-domain adjustments to utilize beneficial low-frequency boundary gain while reducing anti-modal resonance. This, in turn, significantly reduces cone excursion requirements, thus decreasing distortion.
- Reverberation is minimized by reducing sidewall reflections via the radiation nulls to the side of the speaker. This open-air arrangement behaves as a dipole from 80Hz to 3kHz, summing into a cardioid pattern with the bass drivers in the band from 80Hz to 200Hz. According to Legacy listening panels in controlled trials have felt that imaging precision and soundstage width are consistently improved in the Legacy Focus system.
- Separate 500-watt full-bandwidth ICE power amplifier modules are provided for each of the two 12" woofers to reduce intermodulation distortion and prevent the user's main amplifier from encountering up to 40 volts of EMF back-generated by the Aura motor system used in the woofers.
- Increased dynamic range and waveform tracing accuracy are ensured by employing drivers with higher sensitivity and greater acceleration. The high-flux magnetic motors of the midrange drivers are larger than those on most bass drivers.
- The cardioid-shaped radiation pattern decreases boundary coloration from sidewalls while also decreasing modal sensitivity at low frequencies.
- A new dual tweeter based on the Heil Air-Motion Transformer with a range of seven octaves and a sensitivity of 98dB is integrated with a high-sensitivity 8" midrange.

In short, the Aeris is not so much a speaker as a hybrid system that integrates speaker design and electronics to a degree I've never encountered before, and with remarkable success. I've



## The Absolute Sound 2013 Product of the Year Awards Upper-End Loudspeaker of the Year Legacy Aeris



Legacy's Aeris is one of the great values in upper-end loudspeakers today. For your \$18.5k you get a lot of loudspeaker: a six-driver, 4.5-way floorstander with dual integral 500W power amplifiers (one for each 12" woofer), 10" mid/woofer, 8" midrange, and dual AMT tweeters. Moreover, the Aeris comes with Legacy's Wavelaunch DSP processor that provides time- and amplitude-domain processing to reduce room modes and deliver flat frequency response. The Wavelaunch also allows you to quickly and easily dial-in a specific tonal balance to suit your taste. The result is a loudspeaker that is extremely neutral, goes very low in the bass without strain, is capable of wide dynamic swings, and has a very smooth tonal balance. Despite the multiplicity of drivers, the Aeris manages to sound continuous from top to bottom. With a whopping 95.5dB sensitivity and built-in woofer amplification, the Aeris can be driven by even low-powered amplifiers. Anthony Cordesman summed up the Aeris thus: "Great as many stand-alone speakers are, the Legacy Aries is the avatar of what the next generation of speakers should be." That makes the Aeris our Upper-End Loudspeaker of the Year.



## Legacy Aeris

had some great speakers in my listening rooms over the years, but I have never before been able to get around so many room-interaction problems. The difference is striking.

### Setup

Your dealer will do the initial setup with you and you can listen to music as well as test tones. Setup is not only measured; it is also interactive. You can hear what is happening. You can have the bass adjusted to be as musically natural as possible and then add new settings to the equalization options the dealer installs by using a PC or Mac and experimenting as you listen.

You can also work with your dealer to make sure the initial setup does not overcorrect or undercorrect. Every good automated system I know of does not try to make things truly flat because this over-equalizes the speaker and creates new room interaction problems. But even

the best correction system with automated setup has to be designed for all rooms, all speakers and subwoofers, all music.

Working with the dealer to tailor the setup while you are actually listening to music makes a critical difference, particularly because this is an area where measurement alone produces uncertain results. Every FFT and RTA measurement system I have produces at least slightly different measurements at the same listening spot with the same electronics and speaker and the same bass material. One may be “right,” but there is no way to know from the measurements alone.

### Listening to a “Dealer” Setup

Bill Dudleston set up my review pair just as a dealer would. He measured my room and the speaker response, and then worked with me—just as a dealer would—to ensure the musical results were at least as good as the measured

## SPECS & PRICING

**Type:** Six-driver, 4.5-way loudspeaker with integral woofer amplification and DSP speaker/room correction

**Tweeter:** Dual Air Motion Transformer System (one 4" AMT tweeter, 1" AMT super-tweeter)

**Midrange:** 8" titanium-encrusted, accordion-edge

**Midwoofer:** 10" accordion-edge

**Subwoofer:** Two 12" spun-aluminum diaphragm with cast frame

**Internal amplification:** Two 500-watt ICEpower modules for bass section

**Frequency response (+/-2dB):** 16Hz–30k

**Impedance:** 4 ohms

**Sensitivity:** 95.4 dB

**Cabinet dimensions:** 14.5" x 58" x 16"

**Base dimensions:** 19" x 1" x 15"

**Weight:** Approximately 200 lbs.

**Price:** \$18,500; premium finish, \$19,750; exotic finish, \$20,800

### LEGACY AUDIO

3023 E Sangamon Ave.

Springfield, IL 62702

(800) 283-4644

legacyaudio.com



## Legacy Aeris

settings. He then tailored the resulting equalization and time adjustments to provide a musically realistic flat setting, a “warm” setting, and a “recessed” setting that compensated in part for the excessive brightness or hardness of close-miked recordings.

The results are typical of what an audiophile who does not want to create his own settings would get, and they were exceptional from the start. The treble and upper midrange were very extended and provided all the air I could want without hardness. The Legacy Dual Air Motion Transformer (the Heil AMT) tweeter was smoother than any previous Legacy I have heard, but did not soften detail in any respect. It was equal to the best ribbons and electrostatics. I have heard speakers that rival the Aeris’ capability to get the very best out of the best SACDs and high-resolution downloads, but I have not heard better top-octave sound at any price.

Equally important, the transition to the lower midrange of the “titanium-encrusted” 8" midrange did not encrust any aspect of the music. Many designs I’ve heard that mix driver technologies have at least minor sonic anomalies in the transition areas between them. The Aeris reproduced the midrange of my best piano and violin recordings seamlessly and with the kind of accuracy that is sometime missing in even the most expensive competition. It did equally well with flute and clarinet and soprano voice, reproducing the difficult passage in voice in ways that showed the strain a given singer was under but that added nothing in hardness or coloration. I can’t say that it could salvage mediocre harpsichord recordings, but it did as accurate a job of reproducing the most difficult instruments in the sonic repertoire as I’ve heard, and it was

as natural with cymbals as my recordings allow.

Bach is often synonymous with great music and bad recordings. I know—I have several hundred recordings of Bach chamber music. I found the Aeris did an exceptional job of ensuring all of the detail came through without adding the kind of coloration I often hear even from very expensive speakers. The same was true of Vivaldi and recordings with original instruments, which often are more a curse than a blessing.

You don’t have to love classical music or the Baroque, however, to hear the Aeris’ sound quality. Try *Jazz at the Pawnshop* and you may well hear even more detail than you thought was on the recording. The same is true with acoustic guitarist Bruce Dunlap’s jazz recordings and with classic, pre-digital, naturally miked pop recordings like young Joan Baez or Judy Collins. I don’t imply that the Aeris is not equally revealing with modern rock and jazz recording, but it is much harder to guess at what is accurate when the recording is not acoustic.

As for the bass, the Aeris will reproduce all of the bass detail that is actually on even the most demanding bass spectacles. Saint-Saëns, the deepest organ music, Kodo drums, Telarc bass spectacles, bass guitar, synthesizer—take your pick. What is more important is that the Aeris Wavelaunch processor smoothed out the mid-bass and upper bass and created a smooth transition into the midrange to well over 500Hz—one of the great advantages of a system that is not automatic and not limited to frequencies below 80 or 100Hz.

The Aeris can overdrive my room at every bass frequency that is musically relevant, although you will still need a subwoofer for earthquakes, thunderstorms, explosions, and communication

with elephants. The Aeris has exceptional bass detail from the deepest musical bass smoothly up into the midrange, and yes, the claims about reducing boundary problems are true. The Aeris not only provides great bass detail, it does so more evenly throughout the room. I normally can hear and measure far more room-boundary effects in the bass both with music and test tones.

The dynamics are just as good as everything else. The Aeris does not have any sweet spot in loudness. The upper-octave drivers and midrange do an outstanding job with low-level detail in even the most complex orchestral material. The same is true at levels well over 110dB, although my tolerance does not extend beyond a few brief moments at that level. I left it to friends to abuse their favorites at sustained listening levels with deep bass being played at well over 100dB. They were as impressed with the Aeris as I was unimpressed with their judgment.

The soundstage was roughly the equivalent of a point source, but broadened by the dipole feature of the speaker and given impact by the exceptional bass. The Aeris holds an excellent center image and stable overall stage with very good width and depth. If you want exaggerated width you won’t get it, but you will get what is on the recording and get a relatively wide listening area, as well. The driver height of the AMT tweeter is also almost perfect for a seated listener, and imaging depth, width, and proportion have a realistic balance that does not favor one good recording’s soundstage over another. A pleasure regardless of whether the music is solo guitar or the new Cyrus-Beiber version of the *Ring* cycle.

**And if You Are Willing to Experiment**

I did have two complaints. One is that the LEDs, which can easily be switched off, should be blue to match my electronics. The second is that adjusting the Aeris Wavelaunch processor can become addictive.

Bill Duddlestone did warn me that he had clients who tried to adjust the Wavelaunch processor for individual recordings. I found, as I began serious listening, that I was using my computer to do something very close to this. I started by slightly adjusting the frequency extremes for older recordings and then created another setting to deal with the excessive midrange energy in far too many recent recordings.

My addiction grew once I found I could tweak the sound as I listened and come close to correcting for different LP equalization curves, improving the sound of poor or mediocre recordings on the fly. In the process I learned more and more about the equalization and compensation process. As a result, I started creating individual settings for different types of music.

About the only thing that saved me from a major intervention was the fact the Wavelaunch processor settings have to be recalled manually (no remote yet) to select the different curves. As a result of the immense effort in walking 30 feet, and having to actually reach out my arm to reach the switches, I was able to bring my addiction under control. I got my settings down to a reasonable number in addition to Bill Duddlestone’s set-up options, and restricted my tendency to tweak the recording as it played to a few recordings that actually justify the attention.

In all seriousness, it is one thing to buy one great speaker with one set of trade-offs and sonic nuances and another to be able to keep a



flat setting as a reference and branch out to adjustments that allow you to explore a wide range of sounds and choose the most musically realistic mixes. You will eventually have to either trust your judgment or the dealer's setup, but do remember there is no way you can get truly accurate response—or the most musically natural results—from a given speaker in a given listening room unless you do make such adjustments.

Given the fact there is no one recording standard, no one recording equalization, and no predictable room-speaker interaction, this really does make a difference and I suspect many other audiophiles are going to go through the same experience. Best of all, it really is easy. If you want see what I mean, just go to the video demos on the Legacy Web site or on YouTube. If you can download the videos, you have the smarts to operate the Wavelaunch.

### Compatibility and Setup

This is a complex system to install and weighs about 200 pounds a side. Dealer help and support will be critical, and you need to make sure the dealer will work with you during setup. I'd also consider paying for a revisit after a month of listening if you don't want to adjust the unit yourself.

Other than that, the Aeris' built-in bass amplifiers simplify the load and the speakers' high efficiency simplifies their power needs. I would not use single-ended triodes, but any amp of over 50 watts is in the ballpark and a 100-watter is more than safe.

I did not experience any particularly sensitivity to speaker cables. My reference AudioQuest and Kimber worked fine, and so

did some older model Straight Wire. I'd go for longer interconnects and shorter speaker cables with no trick impedances, junction boxes, or capacitive loads.

The Wavelaunch processor benefited from good interconnects but ordinary, high-quality balanced cables work just fine. I would recommend that Legacy include higher-quality XLR connects as the ones provided had poor lock-in features. You may even need specialized XLR cables to go from your preamp to the Wavelaunch.

You may also need to get a set of adapter cables (available from Legacy) that attenuate the signal coming from the Wavelaunch to your amplifier, a useful device if the amplifier has a high input sensitivity. At first I had some low-level noise from the processor using my Pass preamp, but zero noise with the adapter cables—even with my ear near the drivers.

The digital headroom in the Wavelaunch was outstanding, the software reasonably intuitive in a form-follows-function way. The controls were easy to operate with both the Mac and PC after a little experimentation, and the readouts were clear. I would like to see an easier way to make the cursor lock onto a given curve to adjust it upwards, downwards, or in width, but this seems a simple software fix that will probably be solved by the time you read this.

I was not a fan of the speaker's appearance without the accessory grille cloth, or of the AMT's large gold logo. I doubt many partners who are not total audiophiles will go for the "techie" look as well. Get the optional grille cloth. It is magnetic and easy to remove.

Finally, Bill Dudleston tells me that by the time you read this, there will be a set-up CD that can

be used with one of the FFT/RTA applications for the iPad and similar tablets to measure frequency response and perform other tests. I would want to be able to make such measurements and be able to do my own setups. In fact, I can't figure out why most speaker manufacturers don't provide such set-up discs tailored to their speakers and an easily affordable device like an iPad. Not every speaker can come with a Wavelaunch processor, but every speaker benefits from getting the bass response right and the highs on the proper axis. You'd still have to listen, but ignoring the help measurements can give is as silly as failing to listen.

### Summing Up

The Legacy Aeris is a speaker that helps redefine the state of the art. Every improvement in audio components matters, but there are two that rethink what an audio system should be. The first is integrating speaker design with room compensation and the ability to set up different frequency response curves to compensate for the problems in recordings. The second is the creation of music servers like the Meridian Sooloos that can store vast amounts of music in ways that not only allow you to listen to high-resolution digital audio but play back the music with far more flexibility, and compare different performances, artists, and composers with an ease that can redefine your listening experience. Great as many stand-alone speakers are, the Legacy Aeris is the avatar of what the next generation of speakers should be. **tas**

## Bonus Content FURTHER THOUGHTS

After listening to the Legacy Aeris for months, I find little to change in my review. The one thing that has impressed me more over time is the quality of the dual air motion tweeter and upper midrange, and how well the AMT folded ribbon tweeter integrates with the 8" midrange driver. At first listen one tends to focus on the bass and dynamics, but it is the clarity and realism of the 4" ribbon and complementary 1" AMT ribbon super-tweeter in reproducing all music with detail and without edge that is most impressive.

The Aeris clearly benefits from a professional setup as provided by dealers. The instructions provided for making user adjustments post setup are fine, but for audiophiles frequently moving their speakers about, an automated process would be useful. Presently, Legacy recommends the use of pink noise and spectrum analyzer for setup.

Bill Dudleston, the designer of the Aeris, tells me that he is working on software that will simultaneously optimize the frequency and time domain to fit the intended listener target function using a provided pre-calibrated microphone. The process under development will also improve room energy accuracy out past 30ms without introducing positionally sensitive compensation of early reflections (which can be very weird for multiple listeners). The advantages of giving equal weighting to the time domain is that resonances will be addressed in the processes unlike simple boost or cut equalization which can modify transient behavior. Existing Aeris clients will be offered the upgrade option when available. —**Anthony H. Cordesman**



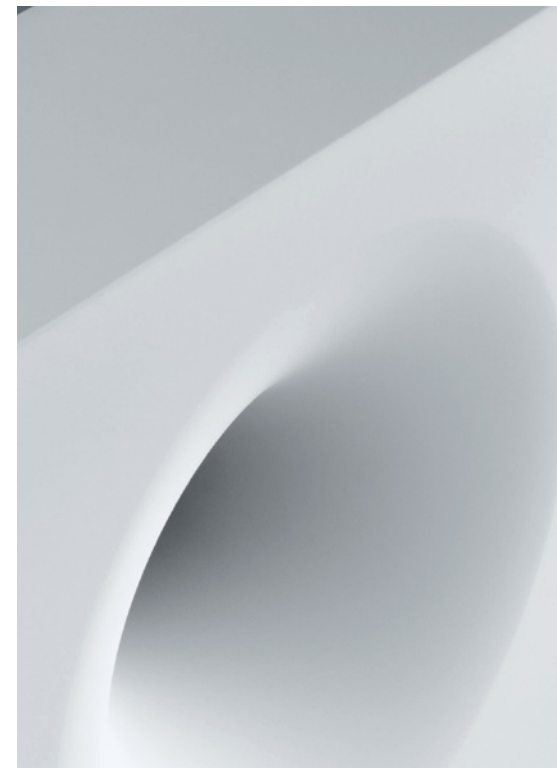
# Avantgarde Acoustic Zero 1 Pro

## Modern Masterpiece

Jonathan Valin



## EQUIPMENT REVIEW - Avantgarde Acoustic Zero 1 Pro



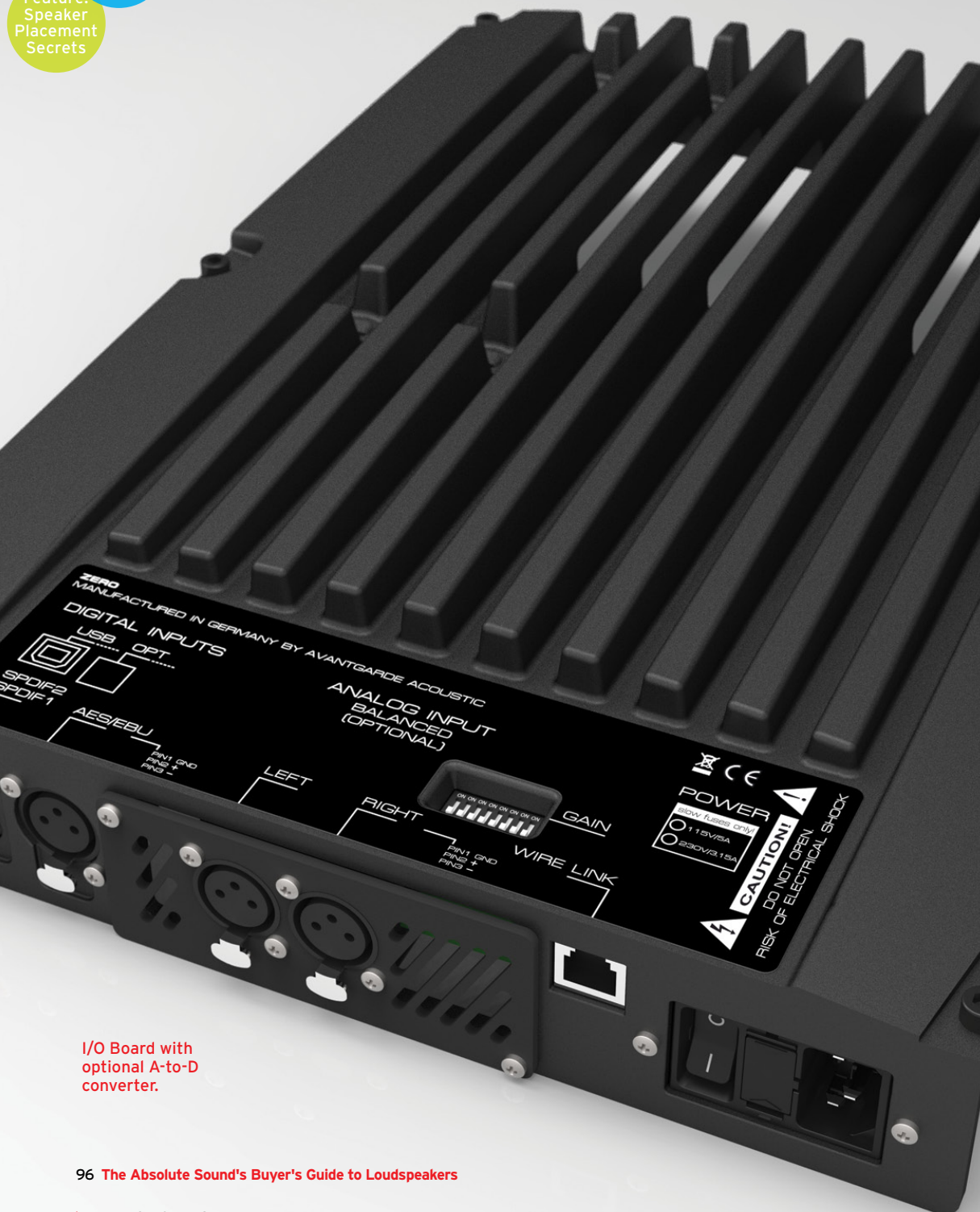
**B**efore I turn to the subject of this review—Avantgarde Acoustic's fabulous, \$17,500, powered, digitally optimized, virtually plug 'n' play Zero 1 horn loudspeaker system, which, to spill the beans in the very first sentence, is far and away the most ingenious and sonically successful compact horn loudspeaker I've ever heard (and in many ways one of the freshest, most brilliantly engineered, and strikingly styled loudspeakers of any kind I've come across in years)—I'm going to talk a bit about horns and my past experience with them. Those of you who feel like I'm taking the long way around the barn, can skip to the chase on page 130 (column two). Those of you who haven't have had much experience with horn loudspeakers may want to read on.

As was the case with subwoofers (until the JLAudio e110 showed up just a few months ago), I've taken a "been there, done that" attitude toward horn loudspeakers for the past decade or two. I gave them a lengthy shot around the close of the past millennium—using Avantgarde Acoustic's four-way Trio Compact horn loudspeaker system as my reference for two-and-a-half years. By the end of that time I'd lost sight of all the things that horns do better than other speakers (and they do a whole bunch of things better) in the light of all the things they do worse.

Chief among the original Trio Compact's shortcomings was its inability to consistently turn the one trick I consider most important in any stereo component: disappear as a sound source. Despite its incomparable transient speed, still unexcelled dynamic range, near-'stat-like resolution and tone color, and ability

to make certain hard-to-realistically-reproduce instruments and ensembles (such as grand piano and symphony orchestra) seem astonishingly "there," sooner or later the Trio ended up betraying its presence by sounding like three separate tubes yoked to an inferior cone subwoofer. In other words, the Trio lacked the seamless driver-to-driver coherence that is one of the chief prerequisites of a "disappearing act."

Of course, the Trio Compacts I owned were the very first iterations of Avantgarde's strikingly beautiful spherical-horn system, and a good deal has changed in the German company's thinking over the last twenty years (as the Zero 1 and my recent experience with the latest Trio/Basshorn system attest). Even at that, I've never forgotten those occasions on which the original Trio shone. No other speaker I've used as a reference has combined speed of



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attack, dynamic range, resolution, and beautiful tone color (especially when it was driven by SET amps) in quite the same measures as the Avantgarde Trio Compact. But then no other speaker has had the advantages of horn-loading.

The most mature loudspeaker technology and quite literally the first, horns benefit and to some extent suffer from the enormous amount of research devoted to their design. According to horn guru Dr. Bruce Edgar, there is still a lack of clear consensus about how to build a proper horn (and any number of wrong ideas and dead ends in the literature—not surprising given that horns have been studied and written about for better than a century). What isn't in doubt, and never has been, are a horn's manifold intrinsic strengths, the first and foremost of which is much higher efficiency.

A horn is able to provide higher SPLs (and greater transient speed and dynamic range) at a given listening position and given wattage for two reasons. First, the horn's tapered shape increases the directivity of the driver's wavelaunch, concentrating and intensifying the sound rather in the same way that a flashlight's beam becomes brighter and more intense when that beam is focused rather than diffused. (The horn's tapered shape and consequent highly-directional wavelaunch has the substantial additional benefit of reducing the deleterious effects of room reflections, since, unlike conventional cone or dome drivers or planar dipoles, horns don't radiate substantial

amounts of their energy hemispherically or in a figure-eight pattern.)

Second, a horn plays louder, with greater speed and dynamic range, because it more efficiently couples its driver to the air of the room via a phenomenon known as "acoustic impedance matching." Like a megaphone, a horn constricts the area and volume of air that the driver (or human voice, in the case of a megaphone) works "into." As a result of this constriction, the acoustic impedance of the air trapped in the horn's throat (the narrowest part of the

horn immediately in front of the driver) comes much closer to the high acoustic impedance of the driver's diaphragm. (When the impedance—the electrical, mechanical, magnetic, or thermal opposition of a system to the flow of energy—of a source and a load are matched, power is transferred maximally.) This

superior impedance matching of air and driver allows a horn to generate higher pressures from smaller movements of its diaphragm. Moreover, as the horn's tapered shape gradually increases in area toward its mouth (the widest part of the horn that opens onto the listening room), those high-pressure soundwaves generated in the horn's throat by miniscule vibrations of the driver's diaphragm grow lower in pressure and progressively larger in displacement as they travel down the horn's length, allowing them to couple more efficiently to the low-impedance air of the listening room. A horn-loaded driver is in many ways the ideal acoustical-energy delivery sys-

**No other kind of loudspeaker can move air as efficiently as a horn speaker does—and on powerful instruments or large ensembles the effect can be startlingly realistic.**



## EQUIPMENT REVIEW - Avantgarde Acoustic Zero 1 Pro

tem, typically providing ten times more sound power than a cone speaker would from the same amplifier output.

But playing much louder with much less amplifier power is only one of a horn loudspeaker's inherent virtues. Because the diaphragm of the driver attached to the horn works so much more efficiently (thanks to increased directionality and acoustic impedance matching), the driver itself has *far* less work to do than a non-horn-loaded driver, such as a typical direct-radiating cone or membrane that has to move air without the benefit of impedance matching. The horn-loaded driver's much smaller excursions mean much lower inertia and distortion, which translate into a blur-less clarity, electrifying speed and pace, and sensational dynamic range that have to be heard to be fully appreciated. No other kind of loudspeaker can move air as efficiently as a horn speaker does—and on powerful instruments or large ensembles the effect can be startlingly realistic.

That's the inherent positive side of horns. The negative side, unfortunately, is also built into them.

Because of horn-loading, the very-high-pressure soundwaves generated in the horn's throat are literally reflected off the throat walls. Any irregularities in those walls (any bumps or dips or material or structural resonances) and any high-Q resonances in the drivers themselves (when a compression driver is run out-of-pass-band, it decouples from the horn, particularly in its lower frequencies, generating distortion) will add a characteristic turbulence to the signal that ends up being amplified along with the music. The sonic result of this added distortion

is the “cupped hands” or “horn coloration” that you typically hear on P.A. systems—like someone talking with his hands so tightly cupped around his mouth that they slightly pinch his nose. Such colorations also have the psychoacoustic side effect of localizing the drivers, making them sound even more like individual tubes than like a coherent loudspeaker system.

Additionally, though properly designed horns are inherently phase-correct transducers, the various resonances of the materials the horns are made of and the necessarily (because of the physical size of the tubes) much wider disposition of the drivers in space vis-à-vis each other can make overall time/phase/frequency coherence a dicey proposition. The small cone and dome drivers of a latter-day dynamic loudspeaker are typically located to the exact micrometer on a baffle—to ensure a time/phase/frequency-coherent wavelaunch. Though the positioning of drivers in a horn system is also mathematically precise, the horns' physical size, their inherent resonances, and, paradoxically, their more highly directional wavelaunch tend to work against such coherence at normal seating distances, once again making you increasingly aware that you're listening to separate drivers playing in separate frequency ranges.

Nowhere is this sense of incoherence more prominent than in the bass, which in many contemporary horn systems (such as my Avant-

garde Trio Compact from the late nineties) is often handled by a conventional cone subwoofer. Why not use a separate horn for the bass, you ask? Because the long wavelengths of bass frequencies would necessitate a horn with a mouth the size of a three-or-four-car garage! (Back in the day, Nelson Pass actually turned a large garage in the hills above the Berkeley campus into a horn-loaded woofer, which played so loudly and went so deep that cops from all over the valley were regularly called to his residence to tell him to, uh, “turn it down.”)

**How do you eliminate crossovers in a three-way loudspeaker? Well, that brings us to the niftiest part of this incredibly nifty loudspeaker.**

The other solution to reproducing bass frequencies in a horn system is via a so-called folded horn—a long, zig-zag-shaped, flaring duct built inside a cabinet into which a woofer fires. The path-length and flare-rate of the duct determine the low-frequency cut-off point of the horn,

although the resonances of the cabinet and of the duct itself can result in the same horn-like colorations in the bass that you often hear in a horn speaker's mids and treble. (Avantgarde currently uses a superior version of a quarter-wave folded horn in its Basshorn system, but that's a story for another day.)

Seamlessly matching a cone subwoofer to an ultra-fast, ultra-clean, ultra-high-sensitivity horn system via conventional means is about as tough a task as you can set yourself in high-end audio. In fact, until I heard the Avantgarde Zero 1s I would've said it was impossible—a fool's er-

rand. Even the best direct-radiating cone subs will seem slightly sluggish off-the-line compared to the super-charged engine of the horn-loaded drivers. Plus, as is the case with any subwoofer, you have the extremely tricky issue of crossover slope/point to negotiate, plus the little matter of dispersion pattern, which is highly directional and relatively room-independent in a horn and (down to a certain frequency) omnidirectional and highly room-dependent in a sub.

My view of a horn system's strengths and weaknesses has not changed much since the Trio Compact days. Oh, I've certainly heard great-sounding horn systems at various trade shows, including several in Munich just a few months ago. (And once again I'm not denying the unique virtues of horn-loaded drivers.) But I've also invariably heard traces of the “cupped hands” colorations and driver-to-driver incoherence that eventually wore me down and out when I owned the original Avantgardes. (I guess I should also note that because of the various phase, time, and frequency-response issues I've already mentioned and the sheer aggregate size of their wavelaunch, horn loudspeakers don't image with great precision—nor, since they don't disperse their sound hemispherically the way point-source direct-radiators do, do they typically soundstage “outside the box.” Although the severity of these problems depends on the design of the horn and the level it is played at, certain horns can be as much the poster children for “six-foot-wide” voices and violins and guitars as vintage planars were.)

So...it would seem that to live with a horn loudspeaker system's great virtues you must also live with a horn loudspeaker system's great

## EQUIPMENT REVIEW - Avantgarde Acoustic Zero 1 Pro

flaws. This is certainly what I've believed for the past two decades. And then along came the Avantgarde Acoustics Zero 1s.

What's different about the Zero 1s? In a word, everything.

These extremely ingenious speakers were truly designed on a blank slate. They make brilliant use of Digital Age technologies (developed for Avantgarde by Danish DSP guru Thomas Holm) to solve many of the intrinsic problems of horn loudspeakers, and in particular those issues that have been the biggest stumbling blocks for me—coherence and coloration. That they succeed in doing so to an extent I wouldn't have believed possible (had I not heard them) is a wonderment. It is also, I confess, the best argument I've yet come across for using DSP to optimize the performance of a transducer.

What exactly are Zero 1s? They are compact, self-powered (active), high-sensitivity (104dB/1W/1m), three-way loudspeakers with a spherical-horn-loaded tweeter, a spherical-horn-loaded midrange, and a direct-radiating cone woofer. All three drivers are housed in a stunning Bauhaus-like enclosure made of a sandwich of polyurethane foams—one of the coolest-looking objects of audio art I've seen since, well, the Avantgarde Trios. Why did Avantgarde use this foam-sandwich material? Because the random distribution of randomly-sized bubbles in the center section of the sandwich makes the entire structure highly non-resonant and self-damping, plus these plastics can be injected-molded to order, which is precisely what Avantgarde does. Internal bracing is cast into the front and rear casings of the Zero 1 enclosures, while the spherical horns

are molded into the baffle, recessed into it in concave fashion, rather than projecting out in front of it. (Polyurethane's ultra-smooth, non-resonant surfaces make an excellent material for a horn, where smoothness, particularly in the throat area, is essential to help prevent turbulence and distortion.)

Each of the Zero 1's three drivers is powered by its own built-in amplifier. Both the tweeter and the midrange use 50W, zero-negative-feedback, Class A solid-state amps, the power supplies of which are identical to the power supply in Avantgarde's flagship XA amplifier. A 400W Class D amplifier is used to power the woofer. (The amps were designed by Avantgarde's resident engineering genius, Matthias Ruff.) All of the amplifiers are directly connected to the drivers' voice coils, without any power-robbing, phase-shifting, passive crossover parts (resistors, coils, caps) in the signal path.

How do you eliminate crossovers in a three-way loudspeaker? Well, that brings us to the niftiest part of this incredibly nifty loudspeaker. As previously noted, Avantgarde commissioned Thomas Holm to develop a digital crossover network using 66-bit FPGAs (Field-Programmable Gate Arrays—essentially computer chips that are designed and programmed to order)—and FIR (Finite Impulse Response) algorithms to optimize the entire speaker's amplitude, impulse, and phase response from about 30Hz (the cutoff frequency of the woofer) to about 20kHz (the cutoff frequency of the tweeter) within a "listening bubble" of about 2m to 4m, with a listening position of approximately 3m being ideal. (A digital crossover is capable of complex, progressive slopes running from 6dB/octave at



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## EQUIPMENT REVIEW - Avantgarde Acoustic Zero 1 Pro

crossover to 100dB/octave at a driver's cut-off point; an analog X/O simply couldn't manage this.)

The "price" of all this digital optimization is that you have to come into the Zero 1 via digital or digitized sources, which, after DSP filtration, are converted to analog just ahead of the power amplifiers via three 24-bit/352.8kHz Burr-Brown DACs. The speakers (well one speaker—for which see the sidebar on setup) come with a wide variety of digital inputs (one USB, one TosLink, two SPDIF, and one AES/EBU), all of which (save for the USB) are capable of handling 24-bit/192kHz high-resolution music files. (No—the Zero 1 won't do DSD or double-DSD... yet.) The Zero 1 can also be sourced wirelessly via AirPort Express and offers the option of an A-to-D converter board for those of you (like me) who want to play back LPs or tapes.

With amplification built in, all you have to add to the Zero 1s to make them play is a source and a USB or AES/EBU or SPDIF or TosLink cable. (And you don't even have to add a cable if you choose to source them via an AirPort Express.)

Provided that the speaker's rake angle (which affects the height and directivity of the tweeter), distance from the rear wall, and toe-in are set properly (for which, see "Setting Up the Avantgarde Zero 1s"), Avantgarde claims that the Zero 1s will be virtually plug 'n' play in any room, doing their DSP-optimized magic regardless of the listening room's shape or size or damping. (Remember that because of their intense directionality horn-loaded drivers don't excite room nodes like wide-dispersion point-source drivers, although conventional woofers, such as the one in the Zero 1, can and do.)

To test Avantgarde's bold claim, as soon as they arrived I plopped the Zero 1s down in my living room—an irregularly-shaped space with fourteen-foot ceilings and no room treatment of any kind (I never listen in this room). After attaching their bases and fiddling with the Zero 1s' rake, toe-in, and location vis-à-vis the rear wall as per the instruction manual, I started playing music via a Mac computer connected to Berkeley Audio's superb USB-to-AES converter. To my amazement—and that of my wife Kathy, who, even after all these years, is the least-audiophile person I know—the sound was remarkable. To top this off, Kathy was so smitten by the incredibly cool way these things look that she asked me to return them to the living room after testing, so she can listen to them on a regular basis (unbelievable!).

Before I start dissecting the Zero 1s' sonics, let me make two things clear. First, while the Zero 1s sounded far, far better than any speaker had any right to do in the totally untreated space of my living room, all speakers—including horns—will perform more optimally in a room that, either inherently or by design, has a judicious mix of damped and "live" surfaces. Second, though the Avantgarde Zero 1s have been DSP'd to sound amplitude/impulse/phase-correct within a spacious listening bubble, their response is not intended to be further tailored to a given room via the DSP built into the speakers or by an outboard DSP unit—nor does Avantgarde encourage users to try this. In Avantgarde's opinions such manipulations will only screw up an already painstakingly optimized sound, and whatever "gains" may be heard in certain areas will most certainly be

traded off against profound losses in others.

So...what does the Zero 1 sound like?

I could say, "Like an electrostat with sensational dynamic range, limitless loudness capabilities, and deep, superbly defined bass." But that would be a bit misleading, as 'stats have more soundstage depth than the Zero 1s, somewhat higher resolution, and less midrange presence; plus, most of them are warmer in timbre, particularly in the midbass, where they usually have a hump, and the presence range, where they're usually recessed. What the Zero 1s really sound like is precisely what they are: horn loudspeakers without the horn-loudspeaker colorations.

All of the good things that you expect from a horn loudspeaker are there: the far-truer-to-life (and faithful-to-the-source) dynamic range; the fine low-level detail about instruments and performance; the superior speed of attack; the lifelike presence on voice and instruments. What aren't there to any appreciable degree are the bad things that you also expect from a horn loudspeaker: the lack of driver-to-driver coherence, the poor-to-nonexistent integration of the woofer or sub, the "horn-colored" midrange and/or piercingly directional tweeter, the six-foot-wide imaging, and (to a degree) the truncated soundstaging. Here, for the one and only time in my experience, is a horn system that, minus an occasional dollop of extra sibilance (not brightness, mind you), does disappear as a sound source.

Let's start with timbre and dynamic range—perhaps the foremost of horn-loudspeaker virtues but often the very things that get them into the most trouble. Most horns are not particular "neutral" transducers. Because of their own colorations and the often highly-colored amplifiers

that are used to drive them, they don't produce timbre with the transparent-to-source accuracy of a linear system like, oh, a typical Magico Q Series floorstander. What horns (and SETs) do do, or can do, despite their colorations is make timbre sound spectacularly lush and beautiful—the way we would like tone colors to sound at their best rather than the way they more often sound in life or were actually recorded on record. In short, when it comes to timbre horns are the quintessential "as you like it" kind of speaker.

Where horns are highly transparent-to-sources, however, is dynamic range. Here no other kind of speaker will reproduce swings from *pianissimo* to *fortissimo* (or the absence of them on highly compressed pop records) with the accuracy of a horn. A recording with considerable dynamic range—even a smaller-scale one such as *Mario Lanza Live in London* [RCA], for example—can give conventional loudspeakers fits. At shows I've almost invariably heard such speakers grow bright and edgy or outright break up on Lanza's most powerful fortes, provoking at least one famous audio engineer/loudspeaker designer to proclaim that there had to be something "wrong" with this record (as his speakers were, presumably, perfect). There was and is, in fact, nothing wrong with the recording. It's just that when playback ranges, at an average level of a mere 62.7dBC, from a peak of 90.5dBC to a minim of 37.3dBC (actual measurements taken using the Avantgarde Zero 1s with a calibrated SPL meter) most drivers simply don't have the "bandwidth" to cope at more lifelike average volumes. Their inertia, their peak-to-peak excursion limits, their distortion when they are pushed hard quickly—all of the things that don't

## EQUIPMENT REVIEW - Avantgarde Acoustic Zero 1 Pro

come into play with a horn-loaded driver—make a simple aria like “Lamento di Federico” a torture test *par excellence*.

Horns sail through such demanding dynamic passages with literal ease, waxing and waning continuously, as dynamics do in real life, rather than flattening out and breaking up on peaks or dropping below the noise floor on valleys as they do with many conventional loudspeakers. But what horns will also do (as already noted) is amplify their own resonances along with the music, giving something like Lanza’s tenor a markedly nasal, cupped-hands timbre and (if the tweeter is also misbehaving—and it usually is) added sibilance and overly aggressive, in-your-face presence. When you factor in a typical horn’s inability to image precisely, you can end up with just as much of a sonic nightmare as you get from a conventional cone or planar loudspeaker in the face of virtually instantaneous, near-60dB dynamic swings.

The Avantgardes do none of these bad things and all of the good ones. Thanks to Thomas Holm’s brilliantly successful DSP’ing of amplitude response, the Zero 1s are far and away the most neutral—which is to say, the least “horn-colored”—horn loudspeaker I’ve ever heard. By neutral, I do not mean the Zero 1s are lacking in color—overly cool, clinical, or whitish. They have extremely lifelike timbre on well-recorded discs; they simply aren’t anywhere near as Technicolored as most horn speakers. As a result, when Lanza hits his triple-fortes there is not only no strain; there is also no added distortion, horn coloration, or excessive in-your-face/lap presence (although the Zero 1s do have more presence than non-horn-loaded speakers).

In addition to vanquishing the coloration/distortion problem, Holm’s DSP’ing makes the drivers work in phase and time to a degree I’ve never heard before from a horn loudspeaker. The most obvious audible benefits come in imaging and soundstaging. On a CD like the Lanza disc or a 96/24 file like Joni Mitchell’s *Court and Spark* [Warner/Asylum] or an LP like *Leonard Cohen: Live in London* [Sony], Lanza’s and Joni’s and Lenny’s voices (and the voices of the backup singers on the two pop albums) have as much focus as you’d hear on a good ‘stat. They’re not etched or laser-cut, as with certain mini-monitors, but they are definitely naturally sized and defined.

The DSP seems to pay a similar benefit with the soundstage, which extends slightly outside and behind the speaker enclosures, though it typically starts closer to the plane of the drivers or a bit in front of it. (I have to wonder whether this somewhat wider, deeper, “outside the box” staging—so unusual in a horn speaker—isn’t also a side benefit of the way the horns are built into the Zero 1’s enclosure. Unlike horns that extend outward from the front baffle, the Zero 1’s concave horns are surrounded by a bit of a flange—the “left-over” surface-area of the rectangular baffle into which they are set. Perhaps this flange gives them a touch of point-source-like dispersion. I’m sure its presence was factored into the DSP.)

With such a clean, focused, and spacious presentation—and such superior dynamic range—the Zero 1s have excellent resolution, reproducing little details, such as the swirl of drummer Paul Motian’s brushes on the skin of his snare or the way the great bassist Scott

LaFaro double-stops certain plucked notes on *Waltz for Debby*, or the chucking sound of Javier Mas’ archilaud (a Spanish version of the twelve-string guitar) in “Ain’t No Cure For Love” and other numbers from *Leonard Cohen: Live in London*, with lifelike clarity and color. When speakers are this neutral and drivers are this low in inertia, you’re not going to miss many musical or performance details. On the other hand you’re not going to be buried in them, either—this is not an analytical speaker.

I mentioned Scott LaFaro’s standup bass just a sentence ago, so let me turn to the Zero 1’s bottom octaves. The seamless integration of a cone woofer into a system of horn-loaded drivers is really one of the great triumphs of this loudspeaker (and of Holm’s DSP). In timbre, focus, speed of attack, and resolution, you will have no sense—zero—that the music in the bass octaves is coming from a different kind of driver. In dynamic range and impact, the woofer also keeps up with the horns convincingly, although I wouldn’t say the Zero 1’s single 12" woofer packs all the weight and wallop of the four ported woofers in a multi-driver floorstander like the Raidho D-5; on the other hand the Zero 1 doesn’t have the excess midbass energy or the beguiling and, I think, lifelike added power-range warmth of the D-5. (Unlike the Raidho, the Avantgarde was a snap to situate in my treated listening room and didn’t excite any room resonances.) The Zero 1’s bass is extremely detailed, exceptionally well defined, surprisingly deep-reaching, unusually natural in timbre, but perhaps somewhat laid-back when it comes to slam.

No one should take this last point as a potential disqualifier. There really isn’t anything

“disqualifying” about this landmark horn-loaded speaker—the first of its breed and, as I’ve already said, the highest-fidelity compact horn system I’ve ever heard. The Zero 1 does have a touch more presence (a more forward-projected midrange—although see my sidebar on setup for a change in this regard) than some cone speakers or most ‘stats, and it can on rare occasions (I mean rare—it doesn’t do this on anything like a regular basis) very slightly accentuate sibilance on vocals (once again see the sidebar on setup), but on the whole its horn-loaded tweeter is as much a model of good behavior as its midrange and its woofer, sounding sweet, clear, and natural on massed strings, woodwinds, upper-octave piano (and other percussion), and higher-pitched brass. (Though its horn virtues are manifest, it is only fair to point out that—perhaps because of the equalization and the absence of true compression drivers—the Zero 1 isn’t as lightning-fast or as hard-hitting as a “true” horn speaker, though the way Holm’s eq eliminates horn issues more than makes up for these very small differences in speed and impact.)

Let me conclude with an overall observation. I am an analog guy used to listening to analog sources via conventional electronics, and the Avantgarde Acoustic Zero 1 is a digital loudspeaker. Consequently, you might think that I would’ve found its sound not to my taste. However, while I can’t truthfully say that listening to digital and digitized sources through a digitally optimized loudspeaker is the same experience as listening to analog sources through conventional loudspeakers and electronics, I can say this: I was not at all put off by the quality of the Zero 1s’ presentation. On the contrary, I greatly



## EQUIPMENT REVIEW - Avantgarde Acoustic Zero 1 Pro

enjoyed (and continue to enjoy) the Zeros, to such an extent that I'm seriously considering buying them—not that I think (or think that you should think) that a reviewer buying any item at parts-cost should be considered a virtuous act. What I do think is that when a guy who is as devoted to analog as I am (and continue to be) finds a digitally optimized speaker so engaging and pleasurable—and, on many occasions, so startlingly realistic it curls his toes (give a listen to Nina Simone and tell me she isn't "right there")—that he's considering buying them, it *does* mean something. To put this plainly, if you're looking for the benefits of horns without their downside and you use digital sources almost exclusively, I can't recommend the Avantgarde Acoustic Zero 1 active, horn-loaded, digitally-optimized, virtual plug 'n' play loudspeaker highly enough.

### Avantgarde Zero 1 Setup

The instruction manual that comes with the Zero 1 does a good job of explaining how to set these speakers up for your listening position. As noted in the review, they will make far-better-than-decent sound virtually anywhere, but for highest fidelity they need to sit in a space with a mixture of live and damped surfaces (such as an average audiophile listening room). Though the speakers can be parked close to rearwalls (with a consequent increase in bass output), I found the Zero 1 had the best balance in the places that I usually park speakers-under-test—about four feet from back and sidewalls and about ten feet from the listening seat, with the speakers toed in so that you are listening virtually on axis (though the Zero 1s also sound

swell with some toe-out, slightly off-axis). The most important adjustment you will make is to the tilt of the speaker. Adding (supplied) washers to the front of the speaker (where it screws into the supplied stands) increases the angle of tilt. What you want to do is ensure that the tweeter is more or less directed at ear height.

The two speakers that make up a Zero 1 pair are configured as a master and a slave unit. The Master speaker has all of the digital inputs and the remote-control sensor (see below). The Slave speaker has the same built-in amplifiers as the Master but no inputs. You can connect and sync up the Master and the Slave by two means: wirelessly via a built-in, dedicated 2.4GHz ISM/GRD link or hard-wired via an Ethernet cable. (I chose the Ethernet cable.)

Outside of on/off switches beside the IEC power-cord inlets and the various inputs for digital sources on the Master unit, the Avantgarde Zero 1s have no controls. Everything is handled by its hefty cylindrical remote, which you use to turn the speakers on and off, change inputs, and raise and lower volume by aiming the remote at the IR-receiver built into the base of the Master loudspeaker. Though the power-on light in the bases of the Master and Slave speakers wink when the speaker is "off" and brighten to full illumination when the system is turned on, these are the only "indicator lights" on either loudspeaker. Unfortunately, neither the speakers nor the remote have any provision for telling you which input you are switching to and from (or what volume level you are at). For me, the usual routine is to keep pressing the Channel button until I hear the music I want to hear—then adjust volume from there. Another little oversight is the absence of



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## EQUIPMENT REVIEW - Avantgarde Acoustic Zero 1 Pro

a mute control on the remote. To turn these speakers down—for whatever reason—you have to hit the volume-down control button or switch inputs or turn the entire speaker system off. (If you change inputs be aware that the remote is uni-directional, which is to say that you can't "go back" to the input you just left with a touch of a button; you have to cycle through all the inputs to get back to the channel playing music.) The other little drawback of the remote is ergonomic. There is a reason why most companies do not make cylindrical remote controls—they can roll off things like tabletops or chairs if they aren't set down carefully.

All of the Zero 1's inputs are compatible with 24-bit/192kHz files, except for the USB input, which is limited to 48/16. Why Avantgarde made this choice I don't know, but in practice it isn't much of a limitation. All you have to do is use a USB-to-AES (or SPDIF) converter box, plug your USB cable into the converter, and then plug an AES or SPDIF cable from the converter into one of the Zero 1's high-resolution inputs—instant access to high-res files. The AD converter for analog sources that came with my Zero 1s is 24/96.

At the moment Avantgarde makes no provision for DSD or double-DSD playback. However, the spare port into which my AD board plugs (no assembly or disassembly required) could easily house a DSD module. If DSD catches on, I'm sure that Avantgarde will make such a module available.

According to its Web site, Avantgarde does offer an optional software package (though it wasn't offered to me) that lets you further tune your room/speaker interface via DSP, with 100 built-in EQ curves (each with 16,000 frequency points) and, one supposes, the potential of developing any number of freakish curves of your own. Although the company strongly advises against taking this route, endless DSP'ing is available

to you tweekers out there. (Given that Avantgarde is markedly opposed to this kind of fiddling, you have to wonder why the software's even being offered as an option.)

*N.B.* Since I wrote this review, Avantgarde has developed an app—Windows only, I'm afraid—that addresses many of the command-and-control issues that I just mentioned. In order to use it, you have to connect a PC, on which the app has been downloaded, to the Zero 1 Master speaker via a USB cable. Once the Zero 1 and your computer are hooked up, you can use the app to do all of the things that I just said you couldn't do with the remote, as well as to adjust some things that I didn't even mention—e.g., set volume precisely with a numerical readout, mute the speaker, directly select the source by input name, adjust the balance, switch between stereo and mono, optimize the gain of the analog input for mm or mc cartridges, etc. The only downside is that the app requires a hardwired connection, eliminating the USB input as a potential audio source and making a functioning PC or PC laptop a necessity. Though it certainly works, I think the app is a bit of a kludge solution to a problem that would be better addressed with a new, wireless touchscreen remote.

Along with the app, Avantgarde has also made a simultaneous change to its DSP engine, which, though subtle, does audibly affect the upper midrange and lower treble, reducing or outright eliminating the occasional touches of extra sibilance that I mentioned in the review, slightly dialing back presence, tightening focus just a wee bit, and, as a result of the changes in tonal balance, making the bass octaves seem a bit fuller and more prominent, though they still don't have the slam of the Big Boys.

## SPECS & PRICING

**Type:** Three-way active, digitally optimized floorstanding loudspeaker with horn-loaded tweeter, horn-loaded midrange, and dynamic bass  
**Subwoofer frequency response:** 30Hz-250Hz  
**Midrange horn frequency response:** 250Hz-2kHz  
**Tweeter horn frequency response:** 2kHz- 20kHz  
**Sensitivity:** >104dB  
**Inputs:** USB, TosLink, SPDIF, AES/EBU, analog (optional)  
**Digital processing:** 6 channel, 66-bit FPGA up to 100dB/octave; progressive FIR filters; three 24-bit Burr-Brown DACs  
**Amplification:** Two 50W Class A, one 400W Class D  
**Dimensions:** 490 x 1040 x 318 mm  
**Weight:** 30 kg (per speaker)  
**Price:** \$17,500

### AVANTGARDE ACOUSTIC LAUTSPRECHERSYSTEME

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Germany  
+49 (0)6254 306 100  
avantgarde-acoustic.de

#### JV's Reference System

**Loudspeakers:** Raidho D-5, Raidho D-1, Avantgarde Zero 1, MartinLogan CLX, Magnepan 1.7, Magnepan 3.7, Magnepan 20.7  
**Linestage preamps:** Soulution 520, Constellation Virgo, Audio Research Reference 10, Siltech SAGA System C1, Zanden 3100  
**Phonostage preamps:** Audio Research Corpora-

tion Reference Phono 10, Innovative Cohesion Engineering Raptor, Soulution 520, Zanden 120  
**Power amplifiers:** Soulution 711, Siltech SAGA System V1/P1, Constellation Centaur, Audio Research Reference 250, Lamm ML2.2, Zanden 8120  
**Analog source:** Walker Audio Proscenium Black Diamond Mk V, TW Acoustic Black Knight, AMG Viella 12  
**Tape deck:** United Home Audio UHA-Q Phase 11S OPS  
**Phono cartridges:** Clearaudio Goldfinger Statement, Ortofon MC A90, Ortofon MC Anna, Benz LP S-MR  
**Digital source:** Berkeley Alpha DAC 2  
**Cable and interconnect:** Synergistic Research Galileo LE, Crystal Cable Absolute Dream, Anzus Diamond  
**Power Cords:** Synergistic Research Galileo LE, Crystal Cable Absolute Dream, Anzus Diamond  
**Power Conditioner:** Synergistics Research Galileo LE, Technical Brain  
**Accessories:** Synergistic ART and HFT/FEQ system, Shakti Hallographs (6), Zanden room treatment, A/V Room Services Metu panels and traps, ASC Tube Traps, Critical Mass MAXXUM equipment and amp stands, Symposium Isis and Ultra equipment platforms, Symposium Rollerblocks and Fat Padz, Walker Prologue Reference equipment and amp stands, Walker Valid Points and Resonance Control discs, Clearaudio Double Matrix SE record cleaner, Synergistic Research RED Quantum fuses, HiFi-Tuning silver/gold fuses



## EQUIPMENT REVIEW - Avantgarde Acoustic Zero 1 Pro



▲ View through the door of Avantgarde's showroom.

In the late winter of this year, I visited Avantgarde Acoustics in Lautertal, Germany—a picturesque village just outside of Frankfurt. My relationship with Avantgarde dates back to the mid-1990s when, I believe, I became the first writer (I was then with *Fi Magazine*) to review the company's flagship Trio Compacts. My review helped put the company on the map and, even though I'd moved on from horns and SETs before the turn of the millennium, I maintained a lively interest in the company and a friendship with its founder Holger Fromme and its chief engineer Matthias Ruff.



▲ Avantgarde's beautiful Uno, Duo, and Trio horn loudspeakers in the Lautertal showroom.

My trip in late February was designed to bring me up to date on the entire Avantgarde line (a lot has changed in the near-twenty-years since I first heard the Trio Compacts), allow me to listen to the Zero 1s and the latest Trio/Basshorn system (with reviews of each in the offing), and visit the Avantgarde factory to see how its speakers, particularly the Zero 1s, are made.



▲ Avantgarde's listening room in Lautertal.

Avantgarde's listening room, within the Lautertal showroom, is large, beautifully appointed, and very good sounding. Here you see the ultimate Avantgarde setup: a pair of Trios mated to six centrally located, powered (by six 600W ADRIC amplifiers), expo-spherically horn-loaded Basshorns. With a collective mouth area of 54 square-feet, the Basshorn stack can reproduce true horn-loaded bass as low as 27Hz. (A pair of the new Zero 1s is sitting in front of the Trios.) The Trio/Basshorn system I heard in Lautertal was vastly improved in every regard over the Trio Compacts I reviewed decades ago, in particular, in the bottom octaves (thanks to the Basshorns) and in top-to-bottom coherence, which now seems to me almost seamless. I may review the entire Trio/Basshorn system in a future issue of TAS, but on the basis of my Lautertal audition I don't think I've ever heard a better speaker on large-scale power music, such as symphonic showpieces, big band, or hard rock. I know I haven't heard one with more realistic power or lifelike scale.



◀ Avantgarde's offices.

Avantgarde's office building is extraordinary. Formerly occupied by Avantgarde founder Holger Fromme's father—a hugely successful German entrepreneur who once owned a 40% stake in Leica AG (among many other ventures)—the offices are unique in my experience of audio firms. Filled with sculptures and artwork from famous contemporary German artists (Fromme's father was an art collector of exceptional taste) and Avantgarde's own strikingly sculptural loudspeakers, it is quite the most beautiful audio office I've ever seen.



▲ Holger at his desk.

Holger's office is on the second floor. The desk he is sitting behind once belonged to his father. tss



# Vienna Acoustics Liszt

## Worthy of the Name

Jacob Heilbrunn

**S**ometimes the most powerful audio memories are formed when you least expect them to be. I had one such experience about a decade ago, when I visited Tom Unger's venerable store, Gifted Listener Audio, in Virginia near Dulles airport.

I drove there with my father-in-law who was keen to demo a pair of Magnepan 1.7 loudspeakers, which he ended up purchasing. But before we listened to them we paused at the front room of the store, where a pair of Vienna Acoustic Mahler loudspeakers was playing. A small crowd was listening to the Mahlers. I made bold, as they used to say in the old days, to pop in a CD of jazz organist Jimmy Smith's extremely dynamic album *Root Down*. Within a split second, I was riveted by the deep, prodigious bass as well as the control and musicality of the Mahlers. Ever since I've had something of a soft spot for Vienna Acoustics, which explains why I jumped at the chance to audition the company's new loudspeaker in its Imperial Series.

Since the advent of the Mahler, much has changed technologically, and those changes are reflected in chief designer Peter Gansterer's latest brainchild, the Liszt loudspeaker. The Liszt represents an attempt to trickle-down many of the features from Vienna Acoustics' top-drawer Klimt line. For a start, the \$15,000-per-pair Liszt features the company's flat-spider-cone coincident system. The cones are all made in Austria and the tweeter is proprietary to Vienna Acoustics. "The shape of a cone has anomalies that we can eliminate by going flat," says importer Kevin Wolff.

The dual-cavity-vented bass drivers operate below 200Hz and are housed in their own separate cabinet, while the coincident driver housed in the upper module can be angled horizontally—but not vertically—for time alignment and optimal coupling to various rooms. Mathematically the cabinet was designed for seven internal braces, but in listening to the speaker Gansterer manipulated where they were placed for optimal tuning. As Gansterer's aim is to keep the crossover components to a minimum, he employs a modified first-order crossover with parts tolerance at one-percent or less to help ensure a seamless and uncolored sound.

As anyone who has been to Vienna, or has even a nodding familiarity with classical music, knows, the stakes for a company based in Vienna and laying claim to hallowed names like Mahler and Liszt are very high indeed. Music, you could even say, is encoded in the imperial city's DNA. It's not uncommon to see Viennese bring musical scores to concerts. Music also plays a central role in *fin de siècle* novels such as Arthur Schnitzler's *The Road Into the Open*,



# EQUIPMENT REVIEW - Vienna Acoustics Liszt

whose protagonist Georg von Wergenthin is a musician and composer. Even the fine restaurant Beethoven liked to frequent—*Zum schwarzen Kameel*—remains open for business today. In short, for Vienna Acoustics to fail to measure up would constitute a gross impertinence.

It is thus a pleasure to be able to report that with the Liszt, Vienna Acoustics has more than met the test. The U.S. importer Kevin Wolff installed them, pronounced himself satisfied, and I tweaked them a little bit after he left to further optimize their sound. Though it has a relatively small footprint, the Liszt produces a wide and deep soundstage. The frequency balance is excellent with the transition from bass cabinet to upper module sounding quite seamless. But the hallmark of the loudspeaker is its sonic purity. Lithe, taut, and nimble, it displays great tonal fidelity and dynamic alacrity.

Most of my listening was done with the excellent Octave MRE 220 amplifiers which are outfitted with the KT-120 tube and produce up to 220 watts into a 4-ohm load, more than ample for either the Vienna Acoustics or my own Wilson XLFs. The Liszt and the Octaves, which are made in Germany, seemed to mate really well—a new joint venture between Austria and Germany. The Octaves have excellent image, transparency, and a slightly forgiving sound. In listening to the Liszts, it only seemed fitting to begin with Mozart. Some of my favorite new CDs are appearing on Harmonia Mundi with the Dutch fortepiano-playing phenom Kristian Bezuidenhout, who steadily records Mozart’s keyboard music for the label. The detail he wrings out of the sonatas makes his recordings something of a revelation. It was quite an absorbing experi-

ence to listen to the Liszt capture the nuances of his playing. The sense of black space and decay endowed the music with a great sense of realism. It almost seemed as though you could see the fortepiano’s hammer striking the string and the felt damper stopping the string from vibrating. When a loudspeaker reaches this level of fidelity it feels as though you can sense the movements of Bezuidenhout himself.

Something similar occurred in listening to another rising star, the Austrian baritone Florian

Boesch, whose work I also cannot commend highly enough. The Liszt did a remarkable job of capturing Boesch’s haunting performance of Schubert’s song cycle *Winterreise*. It wasn’t simply a matter of capturing the details. It was that the presentation of the most minute micro-dynamics on both voice and piano conveyed a larger sense of the sonic tapestry. To hear Boesch’s voice move in a split second from a hushed whisper to roaring (without any sense of dynamic compression) “There will be my beloved’s house” on the song “Torrent” is simply chilling. What the Liszt is able to capture, in other words, is the flow of the music. It draws you into the music so fully that the electronic character of reproduction is banished. Instead, you are drawn into the emotional moment. Time becomes suspended almost as though you were in a concert hall.

For all its control and grip, then, the Liszt does not suffocate music, as some loudspeakers do. Rather, it is distinctive for what it does not do, which is to say that the lack of bass overhang is a very conspicuous feature. On jazz guitarist Mark Whitfield’s CD *True Blue*, for example, Rodney Whitaker’s bass presents a challenge for many loudspeakers. I’m not going to tell you that the Liszt plunges into the bass netherworld of the big bad boys from companies such as Wilson, Magico, or Focal. It doesn’t. But the bass it does produce is quite impressive—I imagine it starts rolling off at about 35Hz or so—and is speedy and tight. This helps to explain why the mids and highs sound so pellucid. Bass overhang is bound to muck them up, which, among other things, is why it’s almost always a vexing task to try and match subwoofers to main loudspeakers.

With its focus on detail, the Liszt is an admirably high-resolution loudspeaker. The soundstage it produces is not forward but it is very vivid. Perhaps this came through most clearly on the CD *The World According to Andy Bey* [High Note]. On the cut “Never Entered My Mind,” for instance, Bey’s grand voice and rich piano chords suffuse the listening space, with his abundant use of the pedal patently audible. The same attention to detail was apparent on a performance of Elgar’s cello concerto by Jean-Guihen Queyras on the Harmonia Mundi label. Once again, the superb transient and timbral fidelity of the Liszt was apparent. The Liszt was able to evoke not simply the bowing of the cello but its resonating cavity. The emotional plangency of the introduction, as the cello and orchestra surge, came through with real verisimilitude. At such times, it’s hard to believe that a loudspeaker that is as diminutive as the Liszt can produce such an ocean of sound to smoothly sweep you away.

Once again, I don’t mean to imply that the Liszt can best much bigger and more elaborate loudspeakers. The real point is somewhat different. It’s that the Liszt delivers a remarkable quotient of reference-level sound for its price. This loudspeaker is scarcely a budget item, but, at the same time, it’s nowhere near the Rockefeller-like sphere a goodly slice of equipment occupies. So on the overall price-versus-value spectrum, the Liszt deserves to be singled out as a true contender, a revealing and refined loudspeaker that, coupled with excellent front-end equipment, can deliver sensational sound. With the Liszt, Vienna Acoustics has lived up to its heritage. **tas**

## SPECS & PRICING

<b>Drivers:</b> One 1.2" handcrafted, hand-coated neodymium center-vented silk-dome tweeter; one 6" flat-spider-cone, high-power, neodymium-motor midrange; three 7" spider-cone woofers	<b>VANA Limited (U.S. Importer)</b> 728 3rd Street, Unit C Mukilteo, WA 982751518 (425) 374-4015 vanaltd.com
<b>Frequency response:</b> 28Hz-25kHz	<b>Associated Equipment</b> dCS Vivaldi CD/SACD playback system, Continuum Caliburn turntable with two Cobra tonearms, Ypsilon PST-100 Mk. II preamp, Ypsilon VPS 100 phonostage, Octave MRE 200 and Ypsilon Ultimate monoblock amplifiers, Stillpoints Ultra 5 footers, Transparent Opus and Audience cabling
<b>Impedance:</b> 4 ohms	
<b>Sensitivity:</b> 91dB	
<b>Weight:</b> 198 lbs. per pair	
<b>Dimensions:</b> 11.6" x 47.6" x 17.2"	
<b>Price:</b> \$15,000 per pair, depending on finish	



# Magico S5

## A New Direction

Alan Taffel

**I'm going to tell you right up front that I am not someone who has loved every Magico to come down the pike. I fell hard for the original Mini and have admired its descendants. But other models have sounded a little "forced" to me. I could not escape the sense that the electronics, no matter how powerful, were struggling mightily just to get the drivers moving. (As, indeed, they were, as testified by Magico's traditionally low sensitivity.) At times, despite the exemplary resolution and other virtues Magicos encompass, this one trait burst the illusion of reality for me. Because live music, of course, flows effortlessly.**

It's also fair to say that most Magico models fall squarely into JV's "accuracy" camp. I wouldn't call myself an "as you like it" kinda guy, but I do feel that some natural warmth is lost in the recording/playback chain, so a speaker that burnishes the sound a smidge is actually enhancing realism. Magico's stringent adherence to accuracy is clearly not a failing—many rightly consider it an asset. But for me the parsimonious warmth level means that while I greatly admire Magicos, I haven't always loved them.

Now comes not only a new model, but an entire new line of Magico speakers. The S Series hews to the company's immutable design principles, notably including sealed cabinets made of ultra-rigid aluminum, yet delivers them at significantly lower price points than comparably-sized Q Series models. What corners have been cut? Not many, it seems. The Q's have more internal bracing to lower the ultimate noise floor (and yet the S's have benchmark-setting noise specs), and the Q's cabinets are made from

solid aluminum sheets whereas the S models must make do with the extruded variety (but the S cabinets gain rigidity through the greater curvature of their enclosures).

The Q's also feature across-the-board higher-grade parts, but you wouldn't know it from perusing a list of S-model components. These include anodized aluminum-alloy woofer cones, Nano-Tec midrange cones, a beryllium-domed tweeter, crossovers with copper-foil inductors and Mundorf caps, and single-strand internal wiring throughout. The S Series may be Magico's volume leader, but radical compromise simply isn't in the company's DNA.

Atop the new lineup stands the S5, a four-driver, three-way design that was also the first S model to be introduced. (Since the S5's unveiling, Magico has released the S1 and, most recently, the S3.) The S5 occupies the lucrative, crowded, and hotly contested \$30k weight class, which includes stellar entrants from the likes of Rockport, KEF, and Wilson. Yet Magico's Alon Wolf, a preternaturally confident man, is not cowed by these rivals. Indeed, he makes no secret of the S5's mission as a competition-slayer.

I first heard the S5 way back at the 2012 T.H.E. Show Newport. My reaction, given my admiring but tempered stance toward the brand, took me completely by surprise. I freaking loved the speakers. I loved them so much I was literally crying during the audition. I loved them so much, I didn't want to leave the room. It seemed to me that on the way to building a less expensive speaker, Magico had—either intentionally or serendipitously—come upon a new sound. I knew immediately that I needed to spend more time exploring these speakers and Magico's new direction.



The S5 in Magico's new listening room.

Those explorations, however, had to wait. What followed that initial audition was a huge time lag before the speakers hit my loading dock (a.k.a., garage). Alon's wish was to couple the S5 review with the first press visit to the company's new manufacturing and test facility (see sidebar). Since we at TAS have trouble refusing a scoop, I readily agreed. The problem was that, as so often happens, moving into that new space took Magico longer than expected—a year longer. Eventually, Magico completed its move in, I flew to San Francisco to check it all out, and a few days thereafter a very glossy and very heavy pair of S5s took pride of place in my listening room.

Now, after nearly two years, I am finally in a position to give a full report on the S5 and, by extension, the S Series in general. I have had the benefit of both extended, quality time with the S5, as well as multiple exposures to the S3 and S1. What I can now confirm is that the Magico S Series does indeed have a new sound. To these ears it is a better sound, and I'm going to tell you why.

But first, let's begin with Magico's foremost calling card: resolution. Thanks to their remarkable solidity, high-grade drivers, and effectiveness at banishing extraneous



## EQUIPMENT REVIEW - Magico S5

vibrations, Magicos have always been a shoulder or two above most other speakers in extracting inner detail. Sure enough, the S5 is a detail-unraveler nonpareil. For those who savor audio components that unearth previously obscured details—and who in this hobby doesn't?—the S5 is a decadent treat.

One of the first things I played through the speaker was the seemingly bottomless (detail-wise) “Mercy Street” from Peter Gabriel’s masterwork *So*. The S5 disclosed a previously unheard—even on highly revealing speakers—cornucopia of tiny components in the song’s ever-fascinating percussive underpinning. An already riveting track became even more so.

Furthermore, the inner detail delivered by the S5 manifests itself—without a trace of edginess, mind you—from top to bottom. Too many speaker designs do well with midrange detail, but their top or bottom is a relative blur. Not so with the S5, which is revealing of every nuance no matter where it falls. Further, the S5 doesn’t just produce transient-based detail like the aforementioned percussion; it is equally adept at unearthing timbral information. This is a distinct and complementary type of detail, one whose resolution makes instruments sound more real.

New details are one thing, and I don’t mean to diminish their impact. But for me a far more thrilling experience is hearing how multiple musical lines and sonics, having been retrieved, layer one atop the other to create a whole. In truth, this is a much tougher test of a speaker, because one detail or musical event can easily overshadow—or completely

obscure—another. Revealing everything at the same time requires not only superior resolution but also near-perfect linearity and timing. The S5 meets these additional requirements, and consequently pulls off the layering feat with unusual aplomb.

By way of illustration, consider that in “Mercy Street” there are actually two vocal lines being sung in unison rather than what at first appears to be one. The second vocal is a double of the first, one octave down. Gabriel has explained that this was done very purposefully to emphasize the downward depressive spiral of the song’s subject, poet Anne Sexton. Depending on the system, the lower-pitched vocal usually falls somewhere between inaudible and subliminal. Through the S5, it was more distinct and independent than I have ever heard it. An already profound track became even more so.

Of course, resolution of this caliber is no stranger to Magico speakers. What I particularly

### SPECS & PRICING

Type: 3-way, dynamic driver, floor standing loudspeaker

Driver complement: Two 10" woofers; one 6" midrange; one 1" tweeter

Frequency response: 22Hz-50kHz

Nominal impedance: 4 ohms

Sensitivity: 89dB

Dimensions: 15" x 48" x 14"

Weight: 190 lbs.

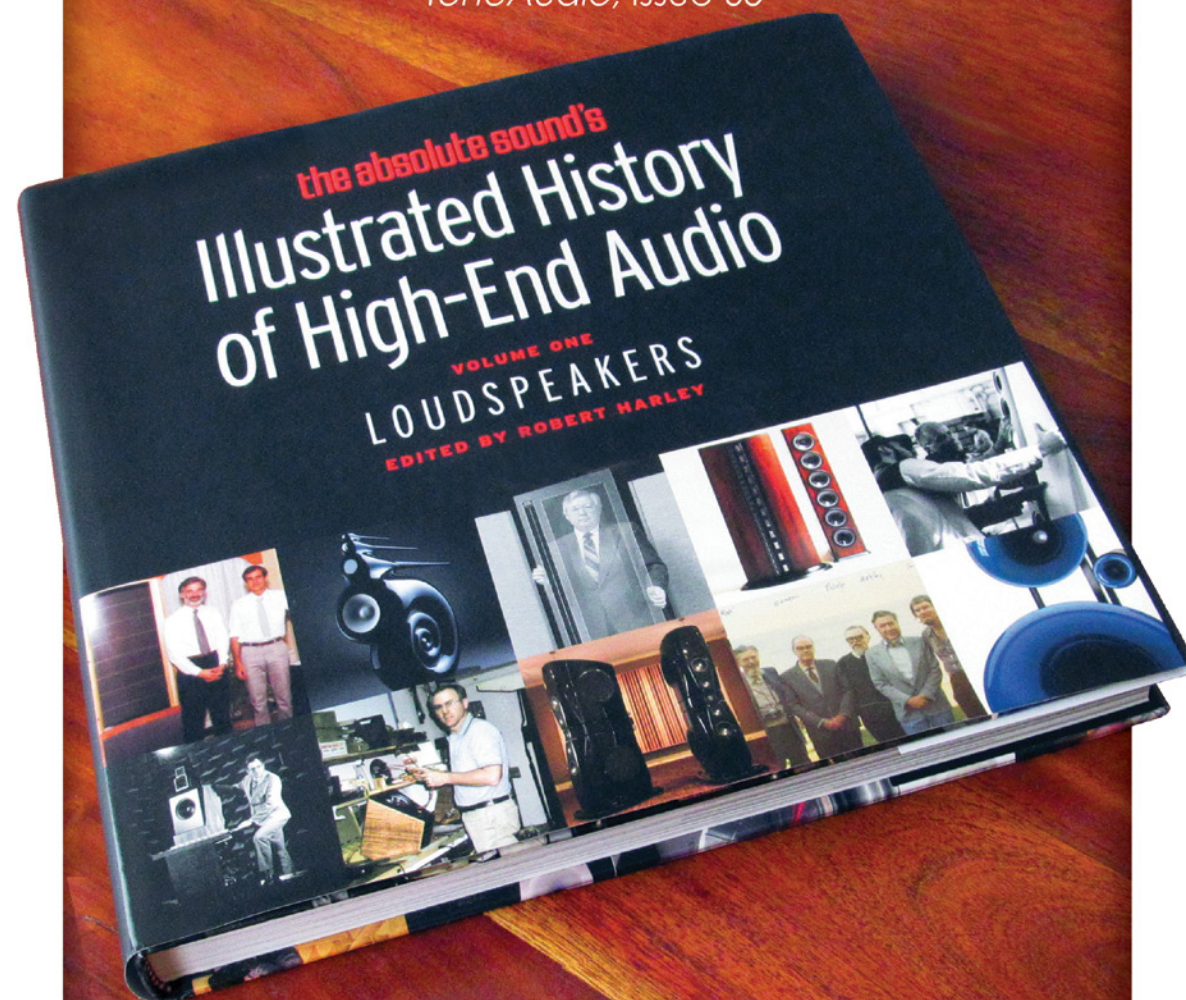
Price: \$28,600

#### MAGICO

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## EQUIPMENT REVIEW - Magico S5

like about the S5, though, is its ability to not only deconstruct the music, but to put it back together again into a cohesive, organic whole. If I had to choose between ultimate resolution and this ability to present the sum of the musical parts, I would opt for the latter. As it turns out, with the S5 there is no need to choose.

The S5's imaging also follows Magico custom, which is to say that this speaker is an imaging champ. Few speakers are as adept as the S5 at creating the beguiling illusion of a soundstage wholly independent from its enclosure. An example is Decca's wonderful LP set of *Porgy and Bess*. Through the S5, the proceedings unfold on an airy stage suspended, as if by invisible ties, between the two speakers. Singers and players are exactly where they're supposed to be, yet without any "Hey, look at me!" hyperbole and, significantly, without drawing attention away from other musical elements. With the S5, imaging is seamlessly woven into the overall sonic portrait.

One change I do hear between Q and S models is in the area of bass. Many reviewers have hailed the tight bass of Magicos, but I have always found them a bit too tight and controlled. This is in keeping with what I hear from most sealed-box speakers. I tend to prefer the free-flowing ease of good vented designs, even if that means a tad less control. But the S5 offers a nice mixture of ease and control. In my room, once they were settled in, warmed up, and properly positioned—they like to be far apart and not very toed in—these speakers never once sounded forced. While always maintaining control—slop is anathema

to Magico—the S5 unfailingly lets music flow without effort or strain. Neither the speaker nor the electronics behind them ever feel like they're working hard to get the goods out—a significant and agreeable change. (Bye the bye, the S5 also has higher sensitivity than most other Magicos. Coincidence? I suspect not.)

The S5 is equally impressive in other matters of bass. As best I can tell, the move from Q to S has not compromised extension in any material way. The S5 is unequivocally a full-range speaker. As I noted in my recent review of the Rockport Atria, the last, deep note of the obligato bass motif that ends "Mercy Street" is often a punch pulled. It certainly was for the (less expensive) Rockport. In contrast, the S5 tosses off the entire line with such assured fluency, it's as if the speaker is saying, "Excuse me, but is this supposed to be hard?" Further, the still-tight bass lends these speakers an indefatigable, propulsive sense of rhythm.

If I were being picky about the S5's bass, which I'm actually paid to be, I would say that in comparison to my reference speakers the S5's low end is a bit less airy and dynamic. The S5's low notes don't breathe and bloom quite as marvelously as do notes elsewhere in its musical palette. However, I found that I was only aware of this on the grandest orchestral material.

We now arrive at the category where I hear by far the biggest change between Q and S Series models: voicing. Call it what you will—richness, sweetness, warmth—the tonality of the S5 contrasts with Magico's standard strictly-neutral aesthetic. This sweetness is what stole my heart in Newport Beach, and it immediately



made its presence obvious in my own listening room. As I indicated earlier, I find a warm tonal balance to be consonant with the sound of live music—so long as it is not overdone. The S5 has no difficulty walking that line; its warmth is completely natural sounding and certainly not euphonic.

Listening to the culmination of the S5's sonic virtues can be quite a mind-blowing experience. That definitely was the case for me when I dropped the diamond on "Mars" from the marvelous new 45RPM ORG pressing of Mehta commandeering Holst's *The Planets*. The ability to hear every single thing that every player is doing, to understand how all their written parts and performance-emphases layer and intersect, and to be in the throes of the slow but incessant sonic buildup proved, for me, an overwhelming combination. It takes a "complete" speaker to deliver such a complete listening experience.

The S5 now takes its place not only atop Magico's new model range, but as the standard bearer for the company's new sonic direction. With the S Series, Magico delivers a newfound tonal lushness, freer-flowing bass, and an emphasis on organic musicality. The beauty of the S5 is that it achieves these fresh attributes without sacrificing Magico's way with resolution, imaging, bass extension, and rhythm. I have to applaud Magico for finding a way to create speakers that are more affordable and more overtly inviting than its flagship line, without losing the essence of the brand. I encourage you to listen for yourself. Even if you are someone who has loved every Magico to come down the pike, you may well be as surprised and delighted as I was.



## EQUIPMENT REVIEW - Magico S5

# New Sound, New Digs

I was the first reviewer to visit Magico's sprawling new facility just outside San Francisco. The building marks a major milestone for Magico in that, for the first time, corporate offices, R&D, machine shops, assembly, and a listening room for test and evaluation are all under one roof. According to Alon Wolf, it was the listening room that proved the most difficult to get up and running. The machine shop took ten days; the listening room took ten months.

Allow me to take you on a tour of the new plant. Our first stop is the QC station, which features the vaunted and relatively rare Klippel measurement system. Magico compares every major module of every speaker against a reference. Nothing happening here at the moment, so let's stroll toward the rear, where speakers are assembled. There are five CNC machines strewn around. I'm told that each costs between \$150k-\$600k, depending on size. That's a lot of money, obviously, but the machines make up for it in efficiency. An S1, for instance, takes just three hours to form. At the moment, though, a pack of workers is manhandling, with evident strain, the gigantic aluminum slabs that will ultimately become a Q7. Even with this equipment, one of those babies takes a week to build.

Next up are the miles of parts aisles, which look typical of such things, followed by the crossover-assembly area. These are S Series crossovers. One of the differences between the S Series and the Qs is that the latter's crossovers are built by Mundorf in Germany. Drivers, too, are assembled around the world, from Germany to Israel, but all final assembly happens right here.

Everything about the factory bespeaks Magico's quality orientation. The parts for S Series models are already very high quality: extruded aluminum for the cabinet, top-drawer caps in the crossover, overbuilt drivers like the beryllium-domed tweeter. But the parts for Q-grade models are simply over the top. By way of illustration, Alon places one of his competitor's midrange drivers in my hand. I can hold it comfortably. Then he proffers a Q Series midrange unit. This one tries to take an immediate nose-dive to the floor. It requires considerable

strength to keep it from doing so. Alon watches me struggle and smiles wryly.

Despite its quality orientation, Magico's products are not nearly as lavishly priced as they might be. In the case of the S Series, especially, the price belies the quality within. Alon claims that an S5 built by anyone else would cost \$50,000. Once you've seen how the thing is built and the parts within, it's easy to believe him. So how does Magico keep the price down? Alon says the secret is simply that he is willing to accept lower profit margins—and he makes his dealers do the same.

Our last stop is the listening room, which is clearly Alon's pride and joy. The space cost a quarter million dollars to build, and is actually a room within a room. The outside shell is made of 5" thick Sheetrock, bolstered with internal steel plating for stiffness. Attached are rails with rubber "springs" on which the internal shell is mounted. Unlike the outer shell, this one is designed to flex—a means of capturing bass energy and eliminating standing waves. To further subdue acoustic undesirables, RPG supplied a bevy of diffusers, midbass traps, and other acoustic treatments. All this sounds very "science project," but in truth with the diffuser arrays adorning the walls, a lush oriental rug complementing the dark wood floor, and comfortable-looking modern furniture, the room is a visually stunning and inviting space.

Upon entry, the first thing you notice is the exceptional quiet. The AC, which naturally runs off dedicated transformers for ultra-clean power, is physically a long ways away and is barely audible. Acoustically, the space is not exactly dead, but at the same time it's clear that there are zero extraneous echoes or elongated delays. In this environment, your own voice sounds a bit strange—like hearing a recording of yourself. Being here is initially slightly discombobulating. Yet upon cranking up some music, the room's *raison d'être* becomes evident.

Let's sit and have a listen. The system is fronted by a rotating assemblage of some of the finest electronics in the world. Today we are playing music primarily through Constellation gear. The speakers are the very pair of S5s that will shortly be sent to me for review. That Alon never misses a trick. We figuratively drop the needle (there is no turntable in the room) and the first thing that impresses me is the

imaging, which is far more precise than I—and most of you—are used to hearing. There is, of course, a wide, deep soundstage. But what really strikes me is the sense that vocals are popping out from in front of the speaker plane.

When the music calls for low frequencies, the room displays its second major attribute: support for bass that is truly rumblingly deep. I can already hear how low an S5 can go, a trait I would soon confirm in my own listening room. The lack of stray signals in the room also allows timing to achieve an unprecedented level of accuracy and irresistibility.

But Magico didn't build this room merely for sonic fireworks. Its mission is to aid in speaker voicing and to confirm that products meet their design specs. Without a truly linear test room, Alon feels it is impossible to judge a speaker itself. In that sense, then, this room's goal is to not be there at all. As a result, like the similarly acoustically isolated (and similarly costly) listening room at KEF in England, Magico's new space allows the listener to perceive very subtle differences. I am not surprised to find that it is pure child's play to perceive sonic changes when Alon switches various electronics in and out of the chain. I can hear that degree of change in much lesser rooms. What does surprise me, though, is that far more subtle differences, such as those between different masterings of the same CD, are equally audible.

Compared to a normal listening room—or even a concert hall—Magico's new space is a lot more linear and a lot better behaved with respect to standing waves and reflections. That means that it doesn't sound like any typical listening room, but it also means it can serve as an invaluable tool in the speaker-design process. For pure listening, it is an unusual and singular experience. **tas**

# YG Acoustics Hailey 1.2

A Breakthrough in a State-of-the-Art Point Source

Anthony H. Cordesman



**T**he YG Acoustics Hailey 1.2 can be summed up in two words: precision and performance. It is another successful assault on the state of the art in speaker design and manufacture, and one of the most revealing speakers approximating a point source I've ever heard. Its outside appearance may make it look like a relatively conventional three-way cone design: It's housed in an understated "form-follows-function" cabinet. In practice, however, there is nothing conventional about its components and cabinet, and nothing conventional about its sound quality and truly outstanding resolving power.

Let me get the one piece of bad news about the Hailey 1.2 out of the way early on. It costs \$42,800 a pair. While there are some great speakers at the entry level such as the Golden Ear Triton One, true state-of-the-art performance still costs a pretty penny. The Hailey's cabinet and its drivers and component parts involve some of the most expensive tooling and manufacturing in the business—YG notes that manufacturing a pair of Hailey 1.2s requires 61 hours of in-house computer numerical control (CNC) milling/machining, and involves some 1640 parts per pair, with critical tolerances tighter than one thousandth of an inch (20 microns). Moreover, the design is the product of a long, costly development process that has to be paid for over time.

The Hailey 1.2 may have the look of a smaller floorstanding speaker, and it only measures 13" x 48" x 21", which, coupled with its sculptural styling, makes it one of the best high-end speakers around for wife or partner ac-

ceptance. The Hailey is, however, a 170-pound speaker with an all-aluminum cabinet featuring a sculptured front panel engineered to preserve phase coherence and to provide wide dispersion. Its interior has extraordinary bracing and is designed to get the best sound out of each speaker module.

In any case, the good news is that you get an outstanding amount of performance for your money. Simply put, in sheer realistic musical detail, the Hailey 1.2 speaker comes close to, or outperforms, the best full-range ribbon and electrostatic speakers I've heard. I've learned the hard way never to underestimate the improvements that always come in the best designs, but, today, the Hailey 1.2 is about as revealing as a speaker can get.

## TECHNOLOGY AND FEATURES

It should already be clear that this is going to be an enthusiastic write-up, but, first, a word about the prejudices I brought to the review process *before* I actually listened to the Hailey and began to judge its sound quality. I approach any product that has well-written marketing literature with instinctive distrust, and even a brief look at the YG website will alert you that someone at YG knows how to market a product.

I am particularly skeptical of any literature that uses proprietary terms to make claims about improvements in audio technology. YG uses a lot of them. In fact, YG describes the six key technologies in the Hailey 1.2 as follows: BilletCore drivers that are slowly carved (machined) from solid billets (blocks of) aluminum into precision shapes and are the most rigid drivers currently available; a ForgeCore tweeter that has "innovative internal geometries and offers vanishingly low distortion for pure, natural high frequency reproduc-



## EQUIPMENT REVIEW - YG Acoustics Hailey 1.2

tion”; DualCoherent crossover technology that is designed with a proprietary (one-of-a-kind) algorithm—the only algorithm that is optimized for perfect relative phase and perfect frequency response, which results in the “flattest frequency response and the best relative phase ever seen in independent measurements” (in tests performed by numerous labs around the world); ToroAir in-house-wound toroidal inductors unique to YG that prevent the cross-contamination of electromagnetic energy from spoiling delicate high-frequency details and musicality; Focused Elimination technology that eliminates mechanical losses from internal enclosure resonances; and YG’s aforementioned cabinet technology that involves CNC-machined enclosures constructed of aircraft-grade alloy (aluminum) and pressurized assembly processes with extremely tight tolerances that allow the company to produce speakers with the lowest resonance (vibration) on the market.

That’s five proprietary sets of buzzwords for six key features. Worse, YG actually publishes detailed comparisons of how these features affect performance by making direct comparisons to other speakers. Any reviewer who has been exposed to decades of competing technical claims learns to call into question manufacturer “specsmanship,” almost as much as manufacturer literacy.

And yet, several months of listening have convinced me that the Hailey 1.2 really does deliver outstanding performance in the areas where YG makes technical claims and provides comparisons with other designs. In short, this is an extraordinarily coherent and transparent loudspeaker.

As I mentioned earlier, the Hailey 1.2 at least rivals the best electrostatics and ribbons in both regards. This may be largely due to the fact that I’ve never seen cone drivers made like the ones in the Hailey 1.2. What YG calls “Billet Core” technology results in some of the lightest diaphragms for their size that I’ve ever encountered. They are also among the stiffest and most piston-like, with fracture-free surfaces and supporting ribs that make them incredibly strong along their main axes. YG claims this construction helps push all resonances out of the passbands and greatly improves linearity. The Hailey’s drivers certainly sound like they are benefitting from these characteristics.

I can neither confirm nor challenge the merits of features like “DualCoherent” and “ToroAir,” but I can say that the Hailey’s sonic performance is on par with that of the Wilson Audio Alexia in coherence, focus, and detail. It is, as noted, also one of the only cone speakers I’ve heard which sonically rivals or exceeds the Quad ESL-63, the Quad 2805, and the Quad 2812 in these areas. Moreover, it has far better low-end extension and dynamic headroom than the Quads, as well as flatter bass in most actual listening rooms. It is a little hard not to credit YG’s claim that it has designed and produced some of the most phase-coherent and least distorting speakers around.

### The Sound

There is no easy way to describe resolving power in words. Picking a given recording can help a bit, but I have learned the hard way that the use of reference recordings is only a preliminary step that cannot replace prolonged listening to



## EQUIPMENT REVIEW - YG Acoustics Hailey 1.2

a very wide range of music. It's also essential to experiment with speaker and listening position (and adjustments), different reference components and cables, and different media.

So let me begin by describing one key aspect of that listening process. Like most audiophiles, I have been experimenting with various forms of "high-resolution" recordings. By and large, I have not been happy with the sonic results. There are recordings where high-resolution samples really matter, such as the newer high-resolution recordings from Reference Recording. In practice, however, one needs to clearly separate the hype from the actual results. In case after case, paying for higher resolution in bits and frequency—or DSD—doesn't do anything to seriously improve the sound of older recordings, or to compensate for close-miking or studio re-engineering of the mastertape (and the difference in sound is often more the product of re-mastering than of true higher resolution).

Like a few competing state-of-the-art designs, a properly set-up pair of Hailey 1.2s has the sheer resolving power to make this only too clear. You can't psych yourself into believing the hype if you can clearly hear the level of improvement or non-improvement in every aspect of recording quality at every frequency, regardless of the complexity of the music and musical dynamics. You also get a little underwhelmed with paying for higher bit- and frequency-rates when a classic RCA Red Seal from the 1960s sounds more musically natural in a three-channel SACD, and other older recordings that have not been remastered or overproduced are more enjoyable to listen to.

At the same time, I have heard speakers whose resolving power often results from excess energy in the upper midrange, or some other shift in sound quality, which ends up generating listening fatigue, forcing you to tailor your choice of recordings to what sounds good on that particular speaker.

Happily, the Hailey 1.2s does not do these things. It shows that true resolving power is inherently musical, unless there really is something wrong with the recording. Even though I could hear colorations on discs more clearly—and the results of close-miking and excess upper-midrange boost, as well—the Hailey 1.2s delivers the kind of musicality that makes listening a pleasure.

This speaker's wide soundstage, its ability to present imaging that is as natural as the recording permits, and its reproduction of the mastertape's original depth level are all truly outstanding. Each of these virtues became ap-

### SPECS & PRICING

Driver complement:	Dimensions: 13" x 48"
10.25" BilletCore woofer,	x 21"
7"	Weight: 170 lbs. per
BilletCore midrange, 1"	channel, unpacked
ForgeCore tweeter	Price: \$42,800 per pair
Loading: Sealed box	
Frequency response:	YG ACOUSTICS LLC
20Hz-40kHz	4941 Allison St. #10
Sensitivity: 87dB	Arvada, CO 80002
Nominal impedance: 4	(801) 726-3887
ohms	yg-acoustics.com

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## EQUIPMENT REVIEW - YG Acoustics Hailey 1.2

parent on recording after recording, and one interesting conclusion I reached was that many older discs sounded better—regardless of bit- or frequency-rate.

The Hailey 1.2 reproduces excellent detail and microdynamics at every frequency. When writing a review, I normally work my way through performances with different types of voice, instruments, complexity, and types of music. For this review, I was unable to do this because, in certain cases, I simply couldn't find a coloration in the speaker that was greater than that of a given recording or of the cartridge or DAC I chose.

Like the Wilson Alexias and Legacy Aeries I use as references, the Hailey 1.2s are speakers for all music. Although my own prejudices have led me to believe that musical composition has steadily degraded ever since Limenius, and anything written since Josquin De Prez is musically questionable, I do listen to modern avant-garde composers like Bach, and even to jazz, rock, and country. Even after several months of exploring my collection, I was still impressed by the Hailey's neutrality, transparency, and sheer musicality. And I can pretty well assure you that if you get the chance to audition the Hailey 1.2s with your favorite recordings you are going to have the same experience.

If I have any caveats about the Hailey's performance, and I have had to push to find something to criticize, they are largely personal. First, I'd like a slightly warmer overall timbre and more deep bass energy. There is no meaningful definition of flat in a speaker, and transducers with the same measurement claims can sound significantly different in timbral nuances. Moreover, with speakers as good as the Hailey 1.2s, prefer-

ence becomes a matter of your own taste, and not some aspect of the absolute sound. My own taste is for a speaker that is just slightly warmer, and since I can find so little else to critique, let me suggest that this is an area you might want to check if you audition the speaker.

Second, I'd like more energy and dynamic life in the deepest bass. The Hailey 1.2s do very well even with the deepest organ, bass guitar, and synthesizer notes. They also measure well with a wide range of bass test tones in my room, going well down into the low 30Hz region, with output into the 20Hz region. But, they don't have that "subwoofer" level of deep bass energy that a number of other reference-quality speakers now provide.

I have found, however, that both bass and timbre are very much products of how a speaker interacts with a given room. This means that the fact that I would prefer a touch more energy in the bottom octaves is most likely the result of my listening room. At the same time, YG does produce two flagships with more bass—the Sonja 1.2 and Sonja 1.3. I have not had the opportunity to listen to them in a meaningful way, but if you are auditioning the Haileys and find the low end to be an issue, you might want to audition these others for comparison.

## COMPATIBILITY AND SETUP

The Hailey 1.2 is a relatively sensitive loudspeaker at 87dB, with a 4-ohm nominal impedance and a 3-ohm minimum. This makes it a fairly easy load, and I did not experience any speaker/cable issues that were not part of the cable's sound character. I have a mild personal preference for Kimber Kable, but I'd advise you

to do a lot of comparative listening. Any given cable has coloration, so you'll want to choose the a sound you like.

I tried bi-wiring, but found the change in the presentation was minor compared to the differences in the sound of given brands and models of cables.

The Hailey 1.2 will work well with most amplifiers, but it would be absurd not to use a really exceptional amp with a speaker this good. I would not use a low-powered design below 100 watts. You can get superb dynamics, but you need an amplifier that can deliver them.

In very broad terms, most tube amplifiers will probably deliver somewhat warmer sound and less defined bass, and solid-state designs will have more apparent upper-midrange energy and tighter and better-defined bass. The Hailey is less sensitive to such issues than most speakers; however, some of the nuances you hear will still depend on the particular amplifier you're using.

As for room interaction, the Hailey is a sealed design and therefore less sensitive to room interaction in the low end than most ported speakers. Nevertheless, deep bass performance will be a bit of a crapshoot, as it is with every speaker. There is no way to predict the mountains and valley that will appear below 200Hz. The Hailey 1.2 also has unusually wide dispersion, and you need to be careful about sidewall reflections. Keep it away from the sidewalls if you can; a bit of damping may be needed if you can't.

Another critical point about setup: A speaker this good and precise requires very careful setup to get the best trade-off in frequency response,

soundstaging, and detail. Getting the best out of the Hailey means experimenting with placement and the finer details of toe-in and tilt. A really good dealer is going to spend at least an hour or two getting the floor position, speaker tilt and height, and fine-tuning of the listening position right. I suspect, however, that most serious audiophiles are going to spend several more weeks refining final adjustments to their taste.

It is amazing how much more revealing this speaker can become in subtle ways with such tweaking. I could actually hear tiny adjustments in height and tilt during the manufacturer setup, and changes in toe-in were very audible. So were adjustments in distance between the speakers, and the rear and sidewalls. It took me a long time to precisely relocate the speakers, using tape to mark various positions, taking careful notes, and bringing some really demanding friends into the process to find the limits of the Hailey 1.2s. (With all deference, the instructions in the speaker manual are essentially useless in this area.)

This does not mean you should get frightened about, or obsess over, setup. The Hailey 1.2s will sound very good in any halfway sensible position, but you will only know how truly great it is if you work hard to find exactly the best placement—both for the speaker and your listening seat. And here, a piece of advice that most dealers have learned not to give: It is always a good idea to experiment with different listening positions within your listening room, even at the cost of "décor shock."

## SUMMING UP

A truly great speaker system! And yes, truly worth its cost.

## EQUIPMENT REVIEW - YG Acoustics Hailey 1.2

### YG ACOUSTICS FOUNDER YOAV GEVA ON THE HAILEY 1.2'S DESIGN

**COST IS ALWAYS A DESIGN QUESTION. HOW DID THE HAILEY 1.2 EVOLVE INTO A \$42,800 SPEAKER?**

As with any complex design, there are many cost factors. In the case of Hailey 1.2, the most significant is the BilletCore drivers' extremely demanding machining process. The ability to produce drivers with tolerances tighter than a thousandth of an inch requires over a million dollars' worth of CNC equipment, and countless hours of painstaking precision by skilled machinists.

**YG ACOUSTICS PUBLISHES SOME OF THE MOST DETAILED COMPARATIVE PERFORMANCE DATA OF ANY SPEAKER MANUFACTURER. WHAT ARE THE TECHNICAL PERFORMANCE FEATURES THAT YOU FEEL ARE MOST IMPORTANT IN SPEAKER DESIGN AND COMPARING SPEAKERS?**

The most important element is of course reliability, because if a speaker doesn't work, its sound quality quickly becomes irrelevant. In terms of sound, our goals are neutrality (flat response), soundstage and dynamic contrast (near-zero relative phase), and long-term listenability (ultra-low distortion). There are many other performance parameters that we optimize for, but those listed above, in my opinion, form the basis for natural sound reproduction.

**HOW MUCH OF THE HAILEY 1.2 DESIGN IS THE RESULT OF MEETING TECHNICAL GOALS AND**

**HOW MUCH IS THE RESULT OF ACTUAL LISTENING?**

Measuring and listening are equally important, and one cannot exist without the other. We use measurements as an R&D tool, and listening is the final standard for evaluation. We believe that everything can be measured, but only careful listening can tell us whether we've really measured everything. YG Acoustics uses over 300 measurements, and thousands of hours of listening, when developing a speaker.

**IF I MAY FOCUS ON TWO KEY DESIGN FEATURES, WHAT LED YOU TO ACTUALLY MACHINE THE DRIVERS FROM A SOLID BILLET, AND WHY USE A CNC MILLED ALUMINUM CABINET?**

The cabinet came first, over twelve years ago. We measured the enclosure-vibration of many speakers, and saw that up to ten percent of their output came from the cabinet rather than the drivers. In a world where fractions of a percent of distortion are critical, we felt that a vibrating enclosure was totally unacceptable. Our solution was milling highly rigid aluminum enclosures, and optimizing each cabinet to its specific frequency-range.

Drivers came thereafter, as a direct result. Even with a rigid cabinet, resonances were still leaking through standard driver cones and causing distortion. Our solution was milling reinforcements (ribbing) right into the cones, which mandated machining drivers from solid billet. A side benefit of machining is clearly visible under a microscope—the surface does not suffer from the micro-cracks that tend to weaken stamped cones.





## EQUIPMENT REVIEW - YG Acoustics Hailey 1.2

YOU PUBLISH SOME VERY DEMANDING FREQUENCY SPECIFICATIONS FOR THE HAILEY 1.2. WHAT ARE THE CHALLENGES OF GETTING SUCH PERFORMANCE IN REAL-WORLD LISTENING ROOMS, AND DOES THE LISTENING ROOM NOW NORMALLY PROVIDE MORE COLORATION THAN TODAY'S BEST SPEAKERS?

You're absolutely right, the room is a critical component in any high-end system. However, comparing the level of coloration of a room to that of a speaker is a bit tricky, because they mostly affect different components of the sound. The speaker's direct sound is unaffected by the room, whereas the indirect sound (reflections off the walls, floor and ceiling) is very heavily affected by the room. Therefore, in a truly natural-sounding system, both need to be good.

WHEN YOU SAY AUDIBLE RESPONSE EXTENDS DOWN TO 20HZ, AND THAT THE RESPONSE IS PLUS OR MINUS 1DB IN THE AUDIBLE BAND, WHAT DOES THIS REALLY MEAN IN AUDIBLE DEEP BASS RESPONSE?

Excellent question! When a manufacturer specifies deviation, it can only refer to the direct sound from the speaker, and not to the total energy output in any given room, which includes both direct sound and room reflections. In reality, below 200Hz there is no meaningful distinction between direct and reflected sound, because our brain doesn't process each separately at low frequencies. Therefore, the correct way to interpret specs is to consider the +/-1dB as meaningful only above 200Hz, and the usable output as meaningful below 200Hz. The deviation below 200Hz is then determined by the room. In an average room you can expect around -3dB at 20Hz, but every room (and every placement within the room) is different.

WHAT LED YOU TO ENGINEER FOR SUCH DEMANDING PHASE PERFORMANCE?

Only when the relative phase is near zero do all drivers radiate in unison, and the speaker behaves as a single sound-source despite having more than one driver. Thanks to our insistence on near-

zero relative phase, we are able to combine the neutrality and low distortion of a multi-driver speaker with the natural soundstage that one would otherwise associate with single-driver designs.

WHEN YG TALKS ABOUT SEEKING POINT-SOURCE PERFORMANCE, WHAT DOES THIS REALLY MEAN IN A SPEAKER WITH THREE DRIVERS?

It means that all drivers radiate in unison, and are time-aligned to reach the listener's ears at the same time, as if they were a single sound source. Of course, in some frequencies, the mid-range will produce more output than the tweeter and the woofer, and in others, the tweeter or woofer will do the majority of the work, but whenever two drivers overlap, they will have the same phase and thus will move in unison.

LET ME ASK YOU TO GO BEYOND THE HAILEY, AND COMMENT ON SOME OTHER KEY SPEAKER DESIGNS AND HOW THEY COMPARE: FULL-RANGE ELECTROSTATICS? FULL-RANGE RIBBONS? HYBRIDS? LINE-SOURCES? BIPOLAR VERSUS PORTED AND SEALED-CABINET SPEAKERS?

These are broad categories, and each contains both good and mediocre implementations. Thus, I'd rather avoid any generalizations that might hurt a worthy, hard-working competitor. We prefer to focus on the end result, and invite the readers to judge every speaker on a case-by-case basis using careful listening.

IF YOU WERE TO ADVISE AN AUDIOPHILE AUDITIONING THE HAILEY 1.2 WHAT TO LISTEN FOR IN EVALUATING THE SPEAKER, WHAT SOUND CHARACTERISTICS WOULD YOU REGARD AS MOST CRITICAL TO LISTEN FOR?

Above all, I recommend focusing on long-term listening enjoyment. Any deviation from reality, be it bloated bass or bumped-up treble or "euphonic" distortion, will eventually grow old. Instead, I constantly ask myself whether the speaker gets "out of the way" and allows me to focus on the music. What I find most helpful is listening often to live, unamplified music, so that I have a constant reference. TAS



# Estelon XB

## The Elements of Style

Alan Taffel

**G**iven the title of this review, you might assume I'm going to focus on the Estelon XB's shapely figure. And, to be sure, there is that. The XB—like all Estelons—has one of the most sensuous silhouettes on the market. The speaker is all curves and smoothness, rather like, well, the female body that it resembles in a Picasso-esque way. So, yes, the XB exudes an aesthetic that is the antithesis of modern slab speakers.

But the style is not just aesthetic—it's also musical. Allow me to explain: All good musicians employ techniques such as shading the tone of their instrument or voice, playing with rhythms, and subtly varying dynamics in order to inject tension and repose, melodic line, and expressive tonal color into what would otherwise be a rote series of notes. Truly great musicians—from symphony orchestra conductors to soloists and singers—go even further; they use these elements to stamp their music with a style that is all their own. If an audio component can capture *that*, it can offer the listener a connection beyond the music to the players themselves. This is what the Estelon XB, under the right circumstances, can do.

When I first began listening to the XB, I didn't immediately recognize that it possessed this rare ability. My first impression was of enormous resolution, particularly the sort of timbral resolution that makes instruments ring true. A great example is the first track I played, "Rainbow," from the new Robert Plant album *Lullaby and the Ceaseless Roar*. I had just auditioned this song on my reference system of CH Precision electronics driving my one-of-a-kind Metaphor 1 speakers, and the main thing I came away thinking was what a lousy recording it was. Then I re-played the track with the CH gear driving the Estelon XB's—and my eyes bugged out. No, the recording had not miraculously improved, but suddenly the opening drum thwack was *tangible* rather than a poor facsimile. What accounted for the difference? Certainly the dynamic burst from dead silence, but the illusion was primarily due to the drum's fleshed-out timbre.

The same proved true for other instruments. Through

the XB, the acoustic guitar on "The Dress Looks Nice on You" from Sufjan Stevens' *Seven Swans* has an exquisite richness and true-to-life body. The violin and doublebass on the Pentatone SACD of Stravinsky's *L'Histoire du Soldat* have individual strings, and the brass has both spit and burnish. On Miles Davis' *Kind of Blue*, the upright bass' hollow cavity and thick strings are palpable.

Soon, though, I began to realize that I was not just hearing a lot of detail; something more was going on. The XB was taking me beyond engagement with the music to engagement with the players themselves. I didn't grasp this all at once, but over time. The sensation came to a head while I was listening to my go-to jazz CD, Michael Wolff's *2am*. As with other pieces I'd tried through the Estelon, the first thing I noticed was the XB's sensational timbral richness. Through this speaker, Wolff's grand piano's lower registers roll like a bowling ball across the room, while the top keys tinkle and sing. Further, every note in between speaks with the unique voice of its position on the keyboard.

But Wolff goes much further than simply playing his compositions on a gorgeous-sounding piano; he plays them with a unique style. An aggressive use of dynamic contrast has always been an obvious part of that style, one that all but the lamest of systems can convey to some extent. Yet the Estelons showed me something far less obvious: how Wolff uses the more subtle dynamics produced by the way he strikes a key to conjure a specific tone for each note. I could actually hear him modulate each jab or caress to get exactly the desired effect. This is a higher level of insight into the musician's art than most components



EQUIPMENT REVIEW - Estelon XB

are capable of conveying. When it suits him, Wolff also bends time to dramatic effect. This, too, came through, as did the snarl with which Christian McBride played what were previously impersonal walking bass lines. I have listened to this track as a test so often that I rarely go beyond the first minute; it tells me everything I need to know. But the Estelons gave me so much new insight into Wolff and his trio's playing that I was, for the first time in eons, riveted for the duration.

I have already hinted that there are certain prerequisites to getting the XB to pull off this feat of communion with the musicians. The first is sufficient power. These are not particularly sensitive speakers, as I discovered when playing the aforementioned Stravinsky SACD. This disc is recorded with lots of headroom—always a good thing—so overall volume is on the low side. I'm used to cranking the level up for the first track, but through the Estelons I turned it up to "11" and still the sound level—and more importantly the dynamics—were tepid. Thank goodness for programmable electronics like the CH Precision A1 amps, which let you choose an optimal gain structure for your source components and speakers. I had dialed them back for my very efficient reference speakers, but all I had to do was punch in an extra 3dB of gain and, voilà!—plenty of volume and dynamic punch. In short, you'll want to drive the XB with something that has sufficient oomph.

You'll also want to take steps to minimize the speaker's sole sonic blemish, lest it get in the way of the music. That blemish is that the Accuton ceramic-dome tweeter can sound hard, even piercing. I suspect some ringing is

going on at higher volumes; ringing that I do not—and JV in his review pointedly did not—hear on Estelon's higher-priced models, which use different Accuton tweeters. Fortunately, proper setup can significantly alleviate the issue. The trick is to use virtually no toe-in. This isn't a hardship, since the XB requires none to produce stellar imaging. Also, be sure to employ the supplied spikes. They're not your run-of-the-mill doohickeys, but rather an integral part of the system. They do a commendable job of soothing the highs so you can focus on hearing what and how the musicians are playing.

Although I consider them tertiary to the capabilities I've already described, there are other things these Estelons do well that deserve a mention. As noted, imaging is one of them. The whereabouts of players—and the space between them—are impeccably portrayed. On Dave Brubeck's *Time Out*, I have never heard the stand-up bass so distinctly positioned from the other instruments. Which brings up the XB's bass, arguably the best I have heard in my room. Without any placement fuss, the XB delivers low end that's rich, satisfyingly deep, chock full of tonal information, and tight as a snare drum head.

The Estelon XB is a rare component, capable of connecting you not only to the music but to the minds and hearts of the players and singers *behind* the music. Thirty-five-thousand, nine hundred dollars is unquestionably a lot of money for a pair of speakers. But how much is that connection worth? Listen to these speakers, properly set up, then decide. TAS

More about Estelon and Estonia

You might be surprised, as I was, to see speakers—and pretty high-tech ones, at that—coming from Estonia, a tiny former Soviet satellite-state just outside St. Petersburg, Russia. Until I sat down at CES to speak with Estelon's designer Alfred Vassilkov and his daughter Alissa, who is the company's marketing chief, my image of Estonia was that of a medieval place, replete with an aging infrastructure and a dearth of modern technology. Turns out I was dead wrong. In fact, Richard Branson recently dubbed Estonia the "Silicon Valley of Europe," thanks to the country's technology base and friendliness to startup companies.

In planning and ultimately founding Estelon, the Vassilkovs took full advantage of these assets. Like many of Estonia's engineers, Alfred Vassilkov had spent much of the Soviet era working within the country's sprawling radio-building industry. As a result, when he decided to start a speaker company, he had plenty of contacts to draw on. Still, Vassilkov, who is a perfectionist, spent five years finalizing the designs, materials, processes (e.g., molding, painting), and supply chain he'd need for his speakers before declaring the company ready to build the first one.

In talking to Vassilkov, you quickly realize that everything about his speakers has been thoroughly thought through. Why are the woofers so low in the cabinet? To maximize floor reflection, which makes the speaker less sensitive to positioning within the listening room. (I experienced this phenomenon firsthand; the Estelons were the easiest speaker to "lock in" that I've ever reviewed.)

Why is the midrange above the tweeter? For the opposite reason: to minimize first reflections from the floor.

What about that curvaceous cabinet shape? It gives each driver optimal volume and minimal diffraction. Also, the non-parallel walls greatly reduce internal reflections and are inherently stiffer than traditional boxes.

The XB's cabinet material is also critical to stiffness. The enclosure is built not from MDF or aluminum but rather from a marble-based composite that is molded into its unique shape. The cabinet is a single piece; there are no seams. According to Vassilkov, the result is a structure just as stiff as aluminum, but more acoustically inert.

The speaker's finish isn't rooted in physics, but is nonetheless a design high point. Each Estelon takes six weeks to lacquer and paint, a process that involves unique materials and techniques developed in Germany. The result is a mirror-smooth finish as deep and durable as that of fine automobiles. **AT**

SPECS & PRICING

Type: Three-way, floorstanding loudspeaker	Price: \$35,900
Driver complement: 8.7" woofer, 6.25" midrange, 1" tweeter	<b>ESTELON</b> Alfred & Partners OÜ Tanuma 126 Tallinn 13521 Estonia (+372) 661 0614 info@estelon.com
Frequency response: 22Hz-30kHz	<b>BLUEBIRD MUSIC (U.S. Distributor)</b> (416) 638-8207
Nominal impedance: 6 ohms	
Sensitivity: 87dB	
Dimensions: 16.5" x 49.6" x 23.25"	
Weight: 152 lbs. each	

# Kharma Elegance S7-S Signature Standard-Setter

Neil Gader



Describing the Kharma Elegance S7-S Signature as an elegant and expensive floorstanding loudspeaker is technically accurate, for, indeed, that is what it is. But once your eyes really begin taking it in, examining every exacting line and curve, every flawless detail, that description almost seems an injustice. There's a slight otherworldly vibe about the S7-S. The exterior finish is a bit too deep, the heavy nameplates and impeccable chrome trim a little too lustrous. Something akin to obsession is suggested by the gently radiused corners of its baffle, the brushed aluminum bell of its port, the skin-tight seams where the crossover plate abuts the back panel—something that sets it far apart from the commonplace.

Nonetheless, the Kharma Elegance S7-S is quite obviously a loudspeaker—specifically of the two-way floorstanding variety—in a bass-reflex enclosure with a rear-firing port. It is also the smallest of the four models in the Elegance line. It uses two of Kharma's proprietary transducers: a one-inch beryllium-dome tweeter inset within a robust surround and discretely angled baffle, and a seven-inch, ultra-high-modulus (UHM), carbon-fiber mid/bass driver (the Kharma Omega7) that represents a sea change from the familiar ceramic cones of earlier Kharma models. In conversation, Kharma's Charles Van Oosterum describes the UHM cones as the stiffest in the industry and “a real challenge to work with.” He credits FEA (finite element analysis) for playing a large role in optimizing the diaphragm's shape so that first breakup resonances are pushed as high in frequency as possible. Its voice coil is an “underhung” design (wherein the height of the coil is less than the height of the magnetic gap), lowering its inductance, and, hence, producing a “faster,” more responsive driver. An underhung voice coil is also more linear at higher excursions because the coil doesn't leave the magnetic flux field at either end of its travel. The crossover point is 2.25kHz, but Van Oosterum adds that this proprietary network uses neither a strict first- or second-order filter but something in between.

The enclosure is a visual *tour de force*. It's constructed from 35mm of heavily braced, high-quality MDF. Internal damping materials are made of a high-density cellular foam with a patented top layer that improves mid- and low-frequency absorption. The cabinets are actually hand-treated with this compound, which is said to effectively silence vibrations by “optimizing the com-

plex interactions among the back-radiated energy of the drivers, the enclosure, and the baskets of the transducers.” The cabinet's finish is an ophthalmologist's dream—so clear you could pass an eye test reflected in it. Of course, you're dealing with a nineteen-coat process that includes three layers of impregnation, five layers of grinding, three layers of color, and eight layers of clear-coating, after which the entire cabinet is hand-polished to its otherworldly sheen. A wide variety of standard colors is offered, as well as any color on demand.

The S7-S that Kharma supplied for this review was the hot-rodded Signature version, which includes Kharma's own silver wiring throughout (the company maintains its own exclusive line of cables) and various internal hand-applied tweaks. Other flourishes abound, including heavy clamping-type speaker terminals reminiscent of the Cardas versions. These only permit spade connectors, but are very secure and apply excellent pressure. For stability Kharma employs its Spike Disk Suspension System (SDSS)—outrigger footers that are unique to the Elegance Series and works of art in themselves. These footers are pre-installed and integral to the cabinet's structure. SDSS is made of composite materials with adjustable spiked feet capable of angling the speaker back slightly for dialing in time alignment—an adjustment I took full advantage of in the closer confines of my smallish listening space. Even the aluminum-framed grille is no afterthought—it's masterfully assembled and attaches via embedded magnets so that there are no holes tapped into the baffle.

For a two-way design in this price range, the Kharma rubs elbows with some elite competitors—some larger, some three-way. Thus, it has a very high sonic bar to

clear. To be honest, you would think that by now every last drop had been squeezed from the venerable two-way design. But boy, you'd be wrong. From the get-go there's no missing where the S7-S's sonic strengths lie. Transparency is its calling card, pure and simple. For me this criterion (in partnership with resolution) is shorthand for the essence of the high-end experience—the ability to convincingly portray musicians playing live music in an acoustic venue. And that convincing illusion is what the S7-S conjured up on every one of my reference musical selections. Stravinsky's *Pulcinella* [Argo], a go-to chestnut, is harmonically dense, rhythmically various, and wryly humorous. The S7-S reproduced each instrument clearly without smearing or veiling. It even managed to convincingly reproduce the weight and bluster of the raucous trombone and bass-viol duet—no easy feat. Solo piano, perhaps the single most difficult full-range instrument to capture accurately, was utterly of a piece from one end of the soundboard to the other. There was no shift in character or narrowing of perspective, and zero congestion in the higher octaves, even in the face of the attack transients of some highly percussive playing. As I listened to the spare arrangement of Lyle Lovett's “Baltimore,” I was transfixed by the way the acoustic guitar seemed to swallow the microphone and the resultant waves of warm air radiating off the soundboard. Equally affecting was the sheer authenticity of the row-by-row layers of handclaps from the live crowd in Bilbao, Spain, during Joan Baez's “Ain't Gonna Let Nobody Turn Me Around” from *Diamonds and Rust in the Bullring* [Analogue Productions]. The S7-S even exposed the odd studio mishap—someone slamming a studio door at the end of Evgeny Kissin's performance of



# EQUIPMENT REVIEW - Kharma Elegance S7-S Signature

the “The Lark,” for example, or a poor tape edit, or a late vocal punch-in. Cues such as these were emblematic of the S7-S in full song: a loudspeaker with a more immersive and open personality than previous Kharma of this size.

Tonally, the S7-S’s character was well balanced with a ripe, warmer cast and a nicely supportive low end. The soundstage it produced was firmly weighted and fully continuous, with an intensely detailed midrange and treble. There were no overt suckouts in the all-important upper bass, nor did the S7-S veer toward beaminess as it ascended to the upper octaves. The beryllium tweeter was fast and extremely high in resolution without adding its own texture. (There was a small hint of the dryness common to this dome material, but there was no mistaking the S7-S for a more clinical and aggressive studio-monitor-type speaker.) Inter-driver coherence was excellent, with absolutely no sense of driver localization. Listening perspective was a few rows back from the front, a location that added to the drama of symphonic depth and dimension, but occasionally seemed to soften the energy and drive of contemporary pop and rock.

The S7-S dug deep in the bass, as well. I was getting rock-solid in-room response in the 40Hz range and substantial output into the mid-30s—not true subwoofer territory (the S7-S won’t rupture a fault line) but impressive on both a quantitative and a qualitative level. Without blinking, this Kharma peered deeply into the windy bell of the baritone sax during Jen Chapin’s cover of the Stevie Wonder hit “It Don’t Mean Nothing” [Chesky]. Its bass response was composed, but not leaned-out in a pitch-differentiation-only way. The S7-S had a wider range of expression

than that, accurately characterizing timbres from standup bass to Fender bass, piano, organ, and heavyweight winds.

The S7-S shone most intensely with orchestral music. Whenever I dialed up a naturalistic volume, images and dimension came alive with the angles, light, reflections, and complexity of a Vermeer. It’s a rare loudspeaker of any size or driver configuration that has the resolution to map the contours of a recording venue like the Kharma can. It not only revealed the acoustics and immersiveness and sweep of symphonic venues; it also exposed the veil of artifice of contemporary commercial and pop recordings. You could almost peer into the recording studio where The Carpenters recorded platinum hits like “Close to You,” and see knobs being twisted to punch up a vocal, faders rising and falling, the application of varying amounts of reverb to dry off or wet down specific tracks.

One of the most exhilarating aspects of listening to music through the S7-S was the degree to which it operated outside its box. Such observations are commonly reserved for *small* two-way, stand-mounted monitors, which are renowned for vanishing into the listening space, revealing little of themselves and everything about the music. However, even elite mini-monitors perform this disappearing act at the cost of highly restricted acoustic output, squeezed dynamics, and limited low-end extension. The S7-S’s magic is that it encapsulates the ethos of the mini-monitor—“no localization allowed”—but does so across a vastly wider frequency spectrum. In my room, the complex and varied transients and resonances of bass drum and timpani originated in precise spatial formations. During Vaughan-Williams’

*The Wasps Overture* [RCA] the percussion players lined up at the rear of the orchestra (and just forward of the hall’s back wall) came into strong focus, with the layers of string sections spread across the stage in front of them. What you didn’t hear was the S7-S’s cabinet, or its drivers, or its rear-firing port. In an era of new and exotic cabinet materials, the S7-S is a tribute to Kharma’s long experience honing the traditional enclosure.

To my way of thinking, a large portion of my sonic impressions are owed to Kharma’s superb new mid/bass driver, which combines a muscular midrange balance with the sinewy, fast-twitch transient response that Kharma’s ceramic diaphragms were so famous for. The new driver is a major leap over its predecessor. This isn’t a negative referendum on earlier models, but my take was that these efforts, though ultra-refined, could also sound a bit fragile, even brittle, and seemed to be biased toward lighter more delicate music, shying away from the heavier macro-dynamics of large-scale music. Back in the day, I was truly in awe and admiration of a Kharma’s resolving power but not as emotionally moved by it. The UHM mid/bass has changed that.

The Kharma may very well be the zenith of the two-way floorstander, but it still has its limits, modest though they are. It will be at its effortless best in medium-sized to smaller spaces where it can tap a little extra low end via wall reinforcement. I mentioned earlier the slightly distant audience perspective, and have concluded that there is a narrow frequency dip in the presence range that softens energy there a bit. In addition, larger dynamic swings tend to soften a little sooner than they do with larger multiways. Bass excursions, while taut and controlled in the mid-

bass, lose intensity further down. For example, there was a little less resonance and decay from the talking drums’ during Jennifer Warnes’ “Way Down Deep.” (These drum-skin cues were immediately recaptured in all their rippling glory with the addition of a capable subwoofer like the REL S/5 [Issue 252]—a great match with the Kharma for those seeking the last word in bass extension. Kharma makes a matching subwoofer in the Elegance line, which I haven’t heard.)

The Kharma Elegance S7-S Signature is on a very short list of the world’s most musical, luxurious, and sophisticated speakers. And I have to tip my hat for the elegant way it takes its place on that list. It serves as a reminder that sometimes we don’t merely own a high-end component just to listen to, but also for the sheer pleasure of its company. We all can’t afford an S7-S, but I wish every audiophile could have the opportunity to hear one. That’s what I would call spreading around a lot of good Kharma. *tas*

## SPECS & PRICING

Type: Two-way, bass-reflex floorstanding loudspeaker	Weight: 79 lbs. each Price: \$21,750
Drivers: One 1" tweeter, one 7" Kharma Omega7 mid/bass	<b>KHARMA INTERNATIONAL</b>
Frequency response: 29Hz-30kHz	Kalshoven 7 4825 Al Breda
Sensitivity: 86dB	The Netherlands
Impedance: 8 ohms	+31 (0)76 571 50 10
Dimensions: 14.1" x 38.3" x 21.8"	kharma.com

# Our Top Picks in Floorstanding Speakers over \$10k

## Legacy Focus SE

**\$10,615 (depending on finish)**

The massive, six-driver, four-way Focus SE is capable of creating a big sound in every sense of the word, while still delivering the kind of speed and resolution from the midrange onwards that is customary in better ribbon and electrostatic speakers. The upper mids and treble have life and air, along with a slightly forward perspective. A sensitivity of 94.5dB makes the Focus SE easy to drive. A lot of loudspeaker for the money. AHC, 215

## Magnepan MG20.7

**\$13,850**

These Maggies' magical ability to transport listeners to a different space and time and to there realistically recreate (with lifelike scope and size) the sound of acoustic instruments and the venue they were recorded in is extraordinary. It almost goes without saying (since these are Magnepan), but the 20.7s are also incredibly good values, although you're going to have to bring a lot of high-quality power to this party, and you're going to need a good deal of room to house two speakers the size and width of a couple of NFL linebackers. JV, 249

## Avantgarde Zero-1 Pro

**\$17,500**

Avantgarde Acoustic's DSP'd, active Zero 1 compact horn loudspeaker does the seemingly impossible: preserves almost all of the virtues of a horn-loaded loudspeaker while eliminating almost all of its vices. Digitally corrected for accurate phase, amplitude, and impulse response within a "listening bubble" of 2m to 4m, the Zero 1 is quite simply the least horn-colored horn loudspeaker JV has heard. Exceptionally neutral, coherent (even in the bass), detailed, and fast, with surprisingly lifelike imaging and good soundstaging and that three-dimensional midband presence that only horns give you, the Zero 1s can make certain instruments and voices sound as "there" as any speaker on the market. All you have to add to these powered, digitally optimized, horn-loaded loudspeakers is an AES/EBU, USB, or SPDIF cable and a digital source. JV, 245

## Legacy Aeris

**\$19,525**

The Legacy Aeris is one of the great values in upper-end loudspeakers today. For your \$19,525 you get six-driver, 4.5-way floorstander with dual integral 500W power amplifiers (one for each 12" woofer), a 10" mid/woofer, an 8" midrange, and dual AMT tweeters. Moreover, the Aeris comes with Legacy's Wavelaunch DSP processor that provides time- and amplitude-domain processing to reduce room modes and deliver flat frequency response. The result is a loudspeaker that is extremely neutral, goes very low in the bass without strain, is capable of wide dynamic swings, and has a very smooth tonal balance. TAS' 2013 Upper-End Loudspeaker of the Year. AHC, 235

## Magico S5

**\$32,400, MCAST; \$36,325, anodized**

The S5 stands atop Magico's new S Series. A four-driver three-way design, it epitomizes the lineup's newfound tonal lushness, freer-flowing bass, and emphasis on organic musicality. The beauty of the S5 is that it achieves these fresh attributes without sacrificing Magico's traditional strengths. The S5 is a detail-unraveler nonpareil and an imaging champ. Its bass is a nice mixture of ease, control, and extension (this is unequivocally a full-range speaker), although its low notes don't breathe and bloom quite as marvelously as do notes elsewhere in its musical palette. With the S5, and the entire S lineup, reviewer AT feels that Magico has created speakers that are both more affordable and more inviting than those in its flagship Q line. AT, 246

## YG Acoustics Hailey 1.2

**\$42,800**

The YG Hailey 1.2 is part of the new generation of YG Acoustics' speakers. At roughly the mid-point in the line, the Hailey 1.2 is a three-way in a sealed enclosure with drivers and aluminum enclosures made entirely in-house. The 10.25" woofer and 7.25" midrange driver feature cones machined from solid blocks of aluminum for maximum stiffness. Sonically, the Hailey 1.2 can be summed up in two words: precision and performance. In these regards, the Hailey 1.2 is *at least* the rival of the best electrostatics and ribbons, says AHC, producing excellent detail and microdynamics at every frequency. Being a sealed design, the Hailey 1.2 is less sensitive to room interaction in the bass than most ported speakers. AHC, 251





# Subwoofers



# JL Audio E-Sub e110 Subwoofer

Old Dog, New Trick

Jonathan Valin

**I**t is no secret that I'm not a fan of subwoofers. In my experience they take away more in transparency and coherence than they pay back in low-end extension and power-handling, especially when they are mated to bass-shy two-ways or any kind of planar, 'stat, ribbon, or quasi-ribbon. (Ironically, subwoofers work best—or at least better—with speakers that don't really need them, i.e., with dynamic speakers that already have good bass extension.) Thus, it may come as a surprise to learn that I really like JLAudio's e110 sub, even when it is paired with a two-way. It certainly came as a surprise to me.

The e110's price tag may also come as a surprise—\$1500 in what JL calls its “black ash” finish, and \$1700 in the gloss-black version sent to me. This isn't exactly cheap for a single ten-inch driver in a small (13.5" x 14.25" x 16.5"), hefty (53-pound), sturdy box, but it isn't Thor's Hammer or JL Audio Gotham (or even REL Series R) territory, either.

What you get for that grand-and-a-half is a highly engineered loudspeaker that incorporates many of the patented Finite Element Analysis-based technologies that JL Audio has been introducing since 1997—such as its Dynamic Motor Analysis program for computer-optimizing driver design, its Vented Reinforcement Collar driver-mount system, its Floating Cone Attachment method of driver construction, and its Engineered Lead-Wire System for internal wiring. You also get a built-in, proprietary Class D amplifier (powered by a proprietary switch-mode power supply) said to be capable of 1200W RMS; a genuine two-way (high-pass and low-pass), built-in, active crossover using a fourth-order (24dB/octave, 80dB/decade) Linkwitz-Riley filter, equipped with variable gain, variable crossover-frequency, and variable phase controls, as well as a polarity (absolute-phase) switch; a ten-inch JL Audio woofer with dual spiders and a linear motor system engineered to provide equal force over the driver's entire excursion range (with both positive and negative current flowing through the coils) at any applied power level up to the built-in amp's peak; and a sealed box whose entire front panel is actually the steel mounting flange of the E-Sub's driver assembly (the back plate of the driver is threaded and bolted to the thick rear wall of the enclosure). In sum, the e110 represents a lot of technology for the money.

As anyone who's fiddled with subs knows, setup is at least half the battle when it comes to getting the most out of a subwoofed system, and I can honestly say that JL Audio (for whom subwoofers are a long-time labor of love) provides some of the sanest instructions and most useful tools for optimizing its subs I've seen—provided that you first acquire the right software. That software, which was sent to me separately by JL Audio (it doesn't come with the sub—and I think it should), is the Soundocor Test CD V 2.6.1, available (for \$18) on-line at <http://www.soundocor.com/testcd/index.htm>.

Without this CD (or something similar) you will just be making educated guesses when it comes to certain key adjustments, which means, of course, that you will be haunted by second and third guesses since you'll never be quite sure whether your first guess was “right.” With the Soundocor CD (and the Radio Shack SPL meter for which it is optimized) you can dial certain parameters in with confidence, giving you a “textbook accurate” baseline, from which you can depart or to which you can return as you season the sound—and you will season the sound—by ear.

The first step in the set-up process is finding the spots where the subs are happiest in your listening room. What JL and Soundocor suggest is to place one sub at your listening position, facing forward, then plug a CD player directly into the sub's RCA inputs (using the CD player's analog outputs), and play back Tracks 22, 23, and 24 of the Soundocor CD, which contain music with very deep bass. As these tracks are playing, you crawl around the perimeter of your room listening for those areas where the bass sounds weak and thin or those where it sounds boomy and ill-defined (usually in the corners).



# EQUIPMENT REVIEW

- JL Audio e110

According to JL, you should also find certain spots where the porridge is just right, and these are where the subs go.

To be honest, this “crawl-around” method is rather hit-and-miss. It also assumes that the subs will sound better somewhere along the perimeters of the room, which hasn’t always been the case in my experience. Typically, I’ve found that for the transparency and coherence I prefer (as opposed to ultimate slam and extension) subs fare better close by the main speakers, immediately to the outside or the inside (or both, as explained in the sidebar) of the speakers’ enclosure and roughly parallel to their drivers, although the subs’ exact location

vis-à-vis the mains and the sidewalls needs to be adjusted by ear.

Far more hit than miss are JL’s suggestions for getting the subs and the mains in phase. A subwoofer’s phase control is intended to adjust the “arrival time” of the sub’s output so that its driver and the main speaker’s woofer or mid/woofer or bass panel are pushing and pulling together throughout the frequency range covered by both units. The question is how can you tell when the drivers of both speakers are in maximum sync? With the appropriate tracks on the Soundocor CD and the e110’s continuously adjustable phase control, finding the answer to this often-perplexing question is a snap.

For the record, JL Audio recommends the same method that Robert Harley recommends in *The Complete Guide to High-End Audio*: Reversing polarity on the main speakers, playing a test tone at the crossover frequency (Tracks 2 through 17 on the Soundocor CD give you one-minute test tones ranging from 20Hz to 120Hz at 5Hz and 10Hz intervals), and adjusting the continuously variable phase control for the least amount of bass. As Robert explains it: “The technique works because it’s easier to hear the maximum null than it is to hear the maximum peak. When the phase control is set perfectly, the main speaker’s woofers will move out when the subwoofer cone is moving in, cancelling

each other. When the main speaker’s correct polarity is restored, the main speakers and the subwoofer are maximally in-phase.”

Similarly the sub’s volume level can be optimally set by playing back Tracks 18 and 19 on the Soundocor CD. Track 18 contains “contoured” high-frequency noise (i.e., a test signal with no low-frequency information that has been contoured for the Radio Shack SPL meter). What you do is adjust the volume of your preamp so that your Radio Shack meter reads 85dB (slow, C-weighted) while Track 18 is playing. Track 19 contains “contoured” low-frequency noise (i.e., a test signal with only low-frequency information that has also been contoured for the Radio Shack SPL meter). Playing this track back, you adjust the level control on the e110 subwoofer so that your meter once again reads 85dB SPL (slow, C-weighted). In theory, your e110 subs are now matched in level with your main speakers.

Of course, this doesn’t mean that your system will sound as coherent or as transparent as it does without subwoofers—or that the sub’s level will not need further tweaking by ear. Getting a relatively seamless blend and tight, powerful, high-resolution, high-definition bass depends on several other equally important factors: the crossover frequency that you choose between subs and mains, the quality of the subwoofer itself (including its amp, controls, and crossover), and above all else your own listening preferences.

The question of crossover frequency is hotly debated. JL Audio recommends that crossover be set at 80Hz or higher, regardless of main speaker. And it is true that setting the sub at

## SPECS & PRICING

Enclosure type: Sealed

Driver: 10"

Effective piston area: 58.78 square inches

Effective displacement: 131 cubic inches

Frequency response (anechoic): 25-116Hz

+/-1.5dB, -3dB at 23Hz, -10dB at 18Hz

Amplifier power: 1200 W RMS (short-term)

Dimensions: 13.5" x 14.24" x 16.51"

Weight: 52.7 lbs.

Price: \$1500 in ash, \$1700 in gloss

### JL AUDIO, INC.

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jlaudio.com

JV’s Reference System

Loudspeakers: Raidho D-5, Raidho D-1,

Estelon X Diamond, MartinLogan CLX,

Magnepan 1.7, Magnepan 3.7, Magnepan

20.7

Linestage preamps: Soultion 520,

Constellation Virgo, Audio Research

Reference 10, Siltech SAGA System C1,

Zanden 3100

Phonostage preamps: Audio Research

Corporation Reference Phono 10,

Innovative Cohesion Engineering Raptor,

Soultion 520, Zanden 120, Constellation

Perseus

Power amplifiers: Soultion 501 and

701, Siltech SAGA System V1/P1, Audio

Research Reference 250, Lamm ML2.2,

Zanden 8120

Analog source: Walker Audio Proscenium

Black Diamond Mk V record player, AMG

Viella 12

Phono cartridges: Clearaudio Goldfinger

Statement, Ortofon MC A90, Ortofon MC

Anna

Digital source: Berkeley Alpha DAC 2

Cable and interconnect: Synergistic

Research Galileo and Galileo LE, Crystal

Cable Absolute Dream

Power Cords: Synergistic Research Galileo

LE, Crystal Cable Absolute Dream

Power Conditioner: Synergistics Research

Power Cell 10 SE Mk III, Synergistic

Research Transporter Ultra SE, Technical

Brain

Accessories: Synergistic ART system,

Shakti Hallographs (6), A/V Room

Services Metu panels and traps, ASC Tube

Traps, Critical Mass MAXXUM equipment

and amp stands, Symposium Isis and

Ultra equipment platforms, Symposium

Rollerblocks and Fat Padz, Walker Prologue

Reference equipment and amp stands,

Walker Valid Points and Resonance Control

discs, Clearaudio Double Matrix SE record

cleaner, HiFi-Tuning silver/gold fuses

## EQUIPMENT REVIEW - JL Audio e110



I think, is that their essential qualities satisfy you—that you are pleased with what we used to call, in The HP Era, their “character.”

There is no sure-fire way of changing a loudspeaker’s character than crossing it over to a powered subwoofer at too high a frequency. With first- or second-order crossovers the problem is generally that the subs continue to play (albeit at reduced levels) into the power range and the midrange, audibly masking the very qualities of timbre, resolution, speed, and dynamic nuance that led you to buy your main speakers in the

first place. With steeper crossover slopes, such as the 24dB/octave Linkwitz-Riley filters in the e110’s crossover, this should be less of a problem. (The theoretical advantage of fourth-order Linkwitz-Riley filters is that because of their steep roll-off at the high and low cutoff frequencies their gain at crossover is closer to 0dB.) And yet...crossing the e110s over at 80Hz or higher isn’t less of a problem. Here it’s not so much that the sub is still playing beyond the crossover point, masking the main

speaker’s virtues; rather it’s that the sub’s own character (including the character of its amplifier and crossover) becomes more audible and predominant the higher up you cross it over, since the sub is literally playing more of the music.

Many people don’t seem to be as sensitive to this “change of sonic character” as I am, and can live happily with the added bass-range power and extension (and concomitant added breadth and width of soundstage) at what they presumably consider a reasonable cost in tonality and transparency. Speaking for myself, I would far rather live without the deepest bass than audibly sacrifice the characteristic sound of my main speakers.

For me, then, the secret to subwoofer satisfaction is to find a way to cross the subs over that doesn’t markedly change the character of the main speakers—or that changes it only in the sense of extending its virtues into the bottom octaves. With the e110s this means a lower crossover point (lower than 80Hz).

Although the speaker that I am using with the e110—Raidho’s superb stand-mounted D-1 (review forthcoming, recommendation already the highest)—is a two-way, it has remarkably satisfying mid-to-upper bass. Flattish down to the 50Hz–55Hz range its ported 4.5" mid/bass driver (which uses a diamond diaphragm) manages to give the psychoacoustic impression of going lower than it does because of its naturally full and high-resolution reproduction of the power range, where first and second harmonics live (as do a whole lot of fundamentals).

Because the D-1 doesn’t really cry out for a subwoofer and because I simply love the beautiful and lifelike way it sounds (which, reduced image size and dynamic power notwithstanding, comes very close to—and in certain respects exceeds—the sound of my reference Raidho C-4.1s), I picked it for this experiment, knowing full well that I would easily hear any changes in its character, and knowing, as well, that in the past I have not been able to mate super-high-resolution two-ways to subwoofers without substantial sonic penalties. And at a crossover point of 80Hz—with all other parameters (placement, phase, level) set to theoretical correctness (and then tweaked by ear to my own preference)—the changes in the Raidho’s character were marked. Despite the much deeper, more generous bass, the D-1 simply no longer sounded like the speaker I’d fallen in love with.

However...moving the e110’s crossover point down to 70Hz and subsequently to just below 60Hz, where the D-1 is still playing strongly, made for a blend that was so unexpectedly magical—and so much in character—that it was almost as if the D-1 had developed several more octaves of bass on its own.

At a crossover point of around 57–58Hz (this is an educated guess as the scale on the e110’s crossover-frequency control, though graduated, isn’t graduated finely enough to say for sure), the bottom bass—and this little sub goes deep, down only 3dB at 23Hz—acquired the same tonal and dynamic character, the same dark, rich, lifelike timbre, sensational transient speed, and ultra-fine resolution of texture and articulation in the low bass that



## EQUIPMENT REVIEW - JL Audio e110

the D-1 has on its own in the mid-to-upper bass, power range, midrange, and treble. At the same time bottom-end pitch-definition, impact, and extension were dramatically improved.

It was as if (and I scarcely exaggerate) a blanket that had been thrown over the deepest bass octaves had suddenly been lifted, revealing an astonishing wealth of previously unheard information—and revealing it with a clarity and definition that I don't quite hear even with my reference Raidho C-4.1s (though, as you will

see, there are other aspects of the bass that the C-4.1s are far better at reproducing).

I could give you musical example after example of the e110/D-1's virtues, but it is simpler to sum them up like this: In the bottom bass this combination reveals low-level details about pitch, timbre, intensity, and duration more clearly and more often than any loudspeaker I've heard, no matter how expensive or sophisticated. This is an ear- and mind-bogglingly high-resolution system.

## How Many Subs: One, Two, or...Four?

Unless you're restricted by budget or space, two woofers are the way to go. Though in the old days low bass was summed to mono on LPs, that isn't always the case with today's high-res sources (or with reissued stereo recordings from the so-called Golden Age). A single centrally located sub tends to "pull" bass-range instruments toward it, constricting soundstage breadth and changing the perceived location of instruments at the sides of the stage. For the widest and deepest soundfield and the most faithful-to-source imaging, two subs are definitely better than one.

However, there is a new wrinkle in low-bass management called "swarm" or "distributed bass" subwoofing. The logic behind the "swarm" is simple and elegant. With one or two subwoofers you are inevitably prisoner to the room-induced dips and peaks in response that (no matter how thoroughly you've "crawled around" the periphery of your listening space) accompany the locations you've finally settled on. But what if you were to

add two or four more subwoofers (i.e., a swarm) to the original pair, asymmetrically positioning each sub throughout the room? Proponents of swarm subwoofing argue that the combined average of the different peaks and dips at the different locations of each sub will smooth out overall bass response. *Voilà*: no giant mid-to-upper-bass humps, no need for digital signal correction.

Now I don't know whether this idea always works in practice as it should in theory, but I do know this: When I added a second pair of e110s to my setup (one on the outside of each D-1 and one on the inside at slightly different locations vis-à-vis the mains) I got even more fabulous sound. I'm not saying that you have to buy a second pair of e110s to get the exemplary sonics I talk about in this review. One pair will do quite nicely, thank you. But...if you want to carry this sub/satellite system even closer to the sound of those ultra-expensive Big Boys, a second pair of e110s will do the trick. JV

(It kind of makes me wonder what JL Audio's top-line sub—the \$12k Gotham, with dual 13.5" woofs—is capable of, although, when it comes to matching the speed and resolution of a great two-way, there is something to be said for a "quick" ten-inch driver.)

While hearing a fresh bonanza of low-level information about an instrument and the way it is being played is enormously satisfying (and contributes greatly to the sense of being in the presence of that instrument), let me quickly point out that bass-range instruments in particular aren't just about texture and articulation. They are also about power and impact, and here the e110/D-1 combo is not the most revealing speaker system I've heard. To be fair, this isn't the e110's fault. A two-way—even a great one like the Raidho D-1—and a ten-inch sub simply can't move air in the bass and power range the way a big multiway can; nor can such a combo image with the more-lifelike size (particularly image height) of a big multiway.

There is this, as well. My decision to place the subs nearby the mains and to cross over at a lower-than-recommended frequency in order to more fully preserve the character of the D-1s comes with a slight additional price in imaging and power. With the reinforcement provided by a nearer-to-the-wall placement and a higher crossover point, the e110/D-1 seems to size bass instruments—indeed all instruments—more consistently from their top octaves to their bottom ones. With the closer-to-the-speaker positioning and lower crossover point, some instruments seem to shrink a bit in size as they descend in pitch, so that a four-

string contrabass, for example, isn't as big and expansive sounding on its lowest notes (E1 and C1, 41Hz or circa 33Hz) as it is higher up in its frequency range.

This slight "funnel-like" effect in imaging is accompanied by a small loss of impact on big, powerful instruments and orchestral tuttis. I don't want to oversell this point. The e110/D-1 is plenty powerful, capable of genuine room-shaking temblors on really deep synth or bass drum, and punch-in-the-chest sock on toms or kickdrum. As two-way-based systems go, this one is a veritable dynamo. But...when it comes to pure wallop it ain't a Wilson XLF or a Magico Q7 or a Raidho D-5.

But then the Raidho D-1 and e110 subs don't cost what these giants cost, and don't take up the real estate that these giants do, and (if configured optimally—for which see the sidebar) don't give anything away in color, speed, definition, or resolution to the biggest of these Big Boys. For one-sixth (or less) of the system cost, you can live like a Robert Harley (or, yeah, like a Jonathan Valin)—with a loudspeaker that comes so close to the very best that you'll scarcely notice the difference. I scarcely do...and I do live like a Jonathan Valin.

The E-Sub e110 is a no-brainer highest recommendation if ever I heard one. And remember this is coming from someone who hates subwoofers (or used to). tas

# MartinLogan Balanced Force 210 Subwoofer

Take Control of Your Low End

Spencer Holbert



**F**or a very long time my audiophile friends and I had a “nose-in-the-air” attitude toward subwoofers. In our minds, subs were meant for clubs, thunderous home theaters, and drivers who liked to annoy neighbors and passers-by with loud, thumping music coming from their cars. Subwoofers, for all intents and purposes, had no place in a dedicated high-end, two-channel audio systems. Awhile back, I’d experimented with several (single) subwoofers in my listening room, but each time I found that they produced nothing more than low-end filler—bass lines that were boomy and bloated, rather than taut and accurate.

Then I received two MartinLogan Balanced Force 210 subwoofers for audition, along with ML’s Perfect Bass Kit (PBK) for dial-in, and decided to give subs another go. Not only did these two subwoofers radically change my thinking, they’ve also become essential tools for achieving the kind of taut, controlled low end that would be impossible with most stand-alone speakers.

## The Setup

Setting up a subwoofer—much less two of them—is a long and involved process: To achieve

optimal results you should expect to spend a minimum of ten hours, spread over a week or two, tweaking and listening. ML’s Perfect Bass Kit, sold separately (\$100), helps immensely, but there’s no substitute for patient and careful tuning of your dual-subwoofer setup before employing PBK.

The classic method for discovering the optimal location for your subwoofer is to place the sub in your listening position, preferably in your chair, and then crawl around the room listening for the spots where the bass sounds best. While this method can be pretty accurate, it’s not very

practical. What happens if the best locations are too far from your preamp, or in the middle of the room, or in some other unfeasible spot? Set-up challenges are further exacerbated when you use two subwoofers. I’m fortunate to have a very large listening space—33’ x 10’ x 27’. If you don’t have this kind of room and can only stick your subwoofers in corners, proceed with caution, as placing subwoofers there will reinforce room modes, and potentially cause your system to sound boomy.

I found the best placement for the Balanced Force 210s by using a kind of “balanced ratio” in between my speakers. Measuring from the tweeter, my speakers are set six feet from the rear wall, twelve feet apart, and toed-in 25 degrees. Measuring from the tweeter to the center of each subwoofer, I set each Balanced Force 210 three feet inside the main speakers and three feet behind each one. This means that the Balanced Force 210s are three feet from the rear walls, and roughly six feet apart.

I tested the Balanced Force 210s first with standard single-ended outputs and no bass management, then using PBK to measure the subwoofers’ outputs and optimize EQ, and finally with a preamp (the Classé CP-800) with bass-management capabilities. If you want to connect two Balanced Force 210s from a preamp or an integrated with subwoofer/auxiliary outputs, make sure the preamp has both left- and right-channel outputs—otherwise you will be running two mono subs. If you have only one subwoofer output, you can still “daisy chain” the two Balanced Force subs, and you can still use PBK to program one subwoofer, which will, in turn, control the second one. But far and away the best method for two subs is to have a preamp capable of dual-subwoofer bass management.

The Classé CP-800 allows for this, permitting the use of two XLR outputs to run the Balanced Force 210s in a left-channel and right-channel setup.

The Perfect Bass Kit comprises a microphone, stand, two USB cables, and software that allows you to measure your MartinLogan subwoofers and automatically calibrate them to achieve the best sound in your room. Connect one USB cable from the Balanced Force 210 to your computer, and then connect the other USB cable from the computer to the microphone. Next, set the microphone at your listening position, then use the PBK software to run measurements in up to ten different positions around your room. The PBK software plays a series of test tones as you go through this process, and in the end automatically uploads the “correct” EQ into your subs.

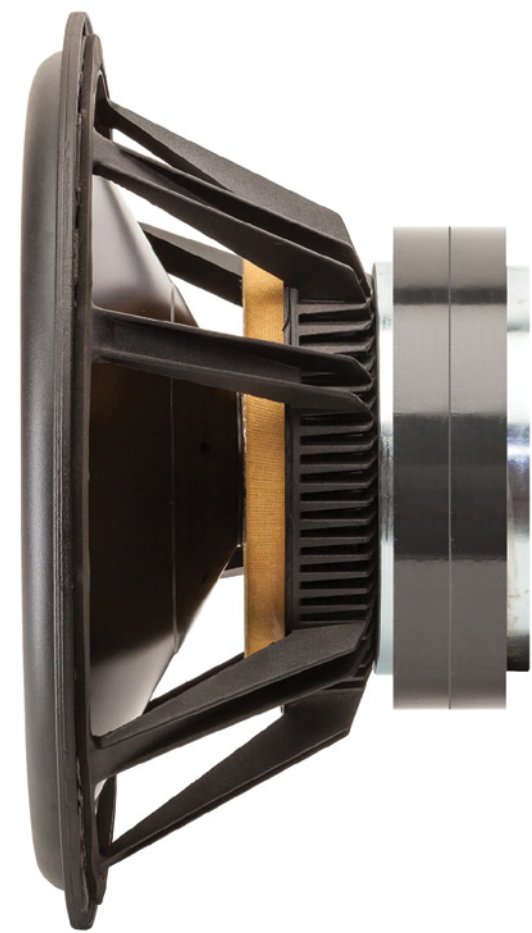
One of the PBK software’s few pitfalls is that it’s a Windows-only program. This means that all of you Mac users will be out of luck, unless you use Boot Camp or Parallels to run Windows on your Mac. I had to borrow a PC in order to run PBK.

Another downside is that you will need a laptop or multiple USB extensions to complete your measurements. While the supplied USB cables are 12 feet long, they aren’t quite long enough to safely move the microphone around the room without potentially yanking a stationary computer off its rack. Invest in a ten-foot USB extender (about \$6), or a USB-over-Ethernet extender (about \$15), if you’re worried about the degradation that occurs with longer USB cable lengths.

The measurement process takes about ten minutes, and is fairly effective at performing final tweaks for you, but, as I said at the start, it is



# EQUIPMENT REVIEW - MartinLogan 210



no substitute for proper subwoofer setup. Don't expect to plop the subs down anywhere in the room and have PBK resolve all issues—correct placement is the first, and most important, step. Even after all of this, you will still need to experiment with subwoofer output levels to find the ideal balance between too little and too much bass. However, once you've jumped through the hoops, things really take off.

**How Dual Subs Sound**  
The ML Balanced Force 210 subwoofers are extremely effective at reproducing low end. I'm not saying that "these are really great" in a flippant way, or because I like subwoofers. As I stated earlier, I haven't been a fan of subs in the past, but the Balanced Force 210s have changed all that.

In my large room, low-end extension has been an issue, and listening to great bass-centric albums from artists like Jaco Pastorius, Ron Carter, Charles Mingus, or Victor Wooten has always been a little unsatisfying—especially when it comes to electric bass. The Balanced Force 210s fixed that problem, and I can now listen to something like Victor Wooten's Soul Circus without cranking my system's volume to super-loud levels to achieve proper low-end response.

Listening to Jaco Pastorius' eponymous debut album [180g, Epic Records] was a whole new experience with the 210s. Jaco Pastorius was the LP that put the electric bass front and center, and is considered by many to be the greatest bass album of all time. But without subwoofers or a really incredible, über-expensive floorstander to reproduce those super-fast, low-end notes, songs like "Come On, Come Over" and "Continuum" never sound complete. With properly set-up Balanced Force 210s, Pastorius' bass finally came through in its full glory, each note taut and punchy. Most importantly, low-end imaging was dead-on precise—actual notes rather than some diffuse undertone floating ghost-like through the room.

Victor Wooten, one of the great modern electric bassists, can really test the limits of

your system with his playing, especially on songs like "Bass Tribute" from Soul Circus [CD, Vanguard]. "Bass Tribute" features multiple electric basses, as well as an upright bass, and separating all of those low-end notes is difficult for even the best floorstanders. But with a pair of good subwoofers, these songs transform your listening room into a recording studio full of tall Ampegs and Fenders. Again, the Balanced Force 210s have an incredible ability to properly locate electric basses and upright basses within the soundstage, and to do so without sacrificing speed and articulation.

Many hardcore audiophiles deem pipe organ the ultimate test of a system's ability to reproduce low bass. Of course, it's impossible to reproduce a gigantic pipe organ in your home (as anyone who has heard a pipe organ concert can tell you), but you can bring your

system to a whole new level of realism by properly setting up dual subwoofers. My go-to test record for organ music is, naturally, Karl Richter playing Bach's Toccata and Fugue in D Minor from Bach's Organ Works [LP, Deutsche Grammophon]. I've heard the Toccata and Fugue in D Minor played in several cathedrals throughout Germany, and the power and force of the organ is overwhelming—again, virtually impossible to reproduce at home. But the Balanced Force 210s get you eighty-percent there, which is pretty incredible for subwoofers a tiny fraction of the size of an actual pipe organ.

**Conclusion**  
I can't claim that the MartinLogan Balance Force 210s are the end-alls in low-end reproduction, or that they will fool you into thinking there is an actual standup or electric bass sitting in your living room. What I can say is that they have brought me much closer to the real thing and made me a believer in subwoofing. Now that the 210s are in my listening room, my music—and not just music where bass is prominent—has taken on a new life. They have made a far greater difference in my stereo than any other component I can remember in a very long time. If you have a large room or really feel the need to hear low bass, the Balanced Force 210s are essential tools to getting the most out of your music. Just make sure you have the space—and the patience—to fully appreciate these big boys. TAS

SPECS & PRICING

Frequency response:  
20-120Hz +/-3dB

Low-pass filter: 30-80Hz

Phase: 0, 90, 180, 270

Woofers: Two 10" sealed,  
high-excursion aluminum  
cones

Amplification: 850W Class  
D

Inputs: RCA, XLR, speaker  
level, 3.5mm trigger

Outputs: RCA/XLR multi-  
out

Power consumption: 125  
watts, 15 watts standby

Weight: 96 lbs. each

Dimensions: 19" x 19" x  
19.5"

Price: \$2995 each

MARTINLOGAN  
2101 Delaware St.  
Lawrence, KS 66046  
(785) 749-0133  
martinlogan.com

# REL S/5 Subwoofer

You Complete Me

Neil Gader



**I**f REL Acoustics, the highly regarded subwoofer manufacturer, pulled out of the high-end marketplace tomorrow, never again to manufacture another unit, its place in the audio pantheon would forever be assured. REL has offered superb build-quality and high standards of bass reproduction since the company was founded in 1990. Thankfully for bass fans everywhere, nothing has changed in its latest venture, the S/5, which may be the best-performing midpriced sub REL has offered in its vaunted history. The S/5 goes about its tasks so matter-of-factly, effortlessly, and invisibly that it seems to become another attractive fixture in the room—until you pull it from the system. Then you understand what authentic low bass brings to the party. You also begin to understand the meaning of...addiction.

The REL S/5 is the kingpin of the freshly minted S Series, a line second only to the big Gibraltar subs in the REL lineup. Tipping the scale at seventy pounds, the S/5 is not small, but it isn't a real-estate hog, either. The S Series enclosures are visually lavish and lavishly inert. Sporting 1 1/8"-thick cabinet walls, my gloss-black sample was superb in fit and finish. The solid T-304 stainless steel grab handles are first cast, then micro-machined, and finally polished in a six-stage process. The polished aluminum trim pieces—such as the footers—elegantly accent its dark good looks.

Inside the S/5 is a new forward-firing 12" alloy-cone woofer. According to John Hunter, REL's Woofer-in-Chief, this driver's excursion

has been increased to a full two inches, an improvement of a  $\frac{1}{4}$ ". He also points out that the cone's moving mass has been reduced almost 60 percent by his reckoning, and that it is "self-quieting," which is to say, it is so non-resonant that it stops as quickly as it starts. Additionally, there's a downward-firing 12" passive driver with a unique carbon diaphragm that is similarly stiff and lightweight. REL says that the S/5 uses a simple filter-type that's quite fast—with about eight milliseconds in group delay—to eliminate the passage of unwanted higher frequencies to the REL driver. Power is also superior to that of its predecessor, the discontinued R-528. The S/5 now uses a NextGen2 550W switching amplifier that can generate up to 873W on hard transients.

Per tradition, REL subs do not use high-pass filters—the main speakers run full-range, full-time. REL's view is that high-passing the sub/sat looks good on paper, as it allows the main speakers to perform with less stress and more dynamism. But REL also believes that high-pass filtration creates more problems than it solves. Why? Because the main speakers are designed and voiced to operate within a specific range of frequencies, and by cleaving away a portion of that output via a high-pass crossover you are essentially refashioning the speaker into a different, even unpredictable unit never contemplated by its designer. That's why—at least under their breath—many designers don't actively embrace third-party subs, high-pass or not. Subwoofers from the same brand are another story. They have purposefully designed drivers and low- and high-pass crossovers to pair with designated models (Revel, among others, comes immediately to mind as a specialist in these matters). In any case, no

high-pass filtering for the S/5.

The back panel houses a phase toggle and rotary settings for the low-frequency effects (LFE) level and for volume, plus the tiniest 39-step increments for adjusting the crossover over the range of 30-120Hz. There are dual low-level RCA inputs, plus an LFE input, but the high-level input is and has always been REL's preferred means of installation. A lengthy Neutrik connector is provided for this purpose. It carries within its jacket four wires for connection to an amplifier's speaker taps.

REL suggests starting with corner placement, usually on a room diagonal. This not only maximizes room gain but also allows "for the most linear true low bass wavelaunch." The set-up manual REL provides is quite comprehensive (without being intimidating) about optimizing placement. In my experience, dialing in an REL is a matter of a few easygoing minutes rather than hours of hand-wringing. My advice: Bring a friend for fine adjustments. (Because of the added expense, I hesitate to mention that if you have a "problem" room, setup is easier with two subs, as they work together to smooth and flatten overall room response, and thereby become less of a sonic presence. This was an experience that I enjoyed first-hand with a pair of S/5s, but that's a story for another time.)

## Mood Elevator

There are two sets of criteria that I use to evaluate subwoofers. There's overall bass quality (extension and musicality), and then there's integration (the subwoofer's ability to blend with the main stereo speakers). Net: Does it remain true to the character and voice of the satellites?

In the tight confines of my listening room, the



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## REL S/5 - EQUIPMENT REVIEW

S/5 wasn't even breathing hard as it extended response into the middle twenty-cycle range. It did so without calling attention to itself—no overhang, perceived box coloration or, to use the sonic slang, “slowness” in its response. In all honesty the S/5 will go even lower, but my room struggled to support 25Hz without the doors rattling and the space over-pressurizing. The S/5 makes short work of large-scale orchestral pieces laden with timpani and bass drum. Every decaying flutter off the skin of these instruments is presented concisely and cleanly, and often in overwhelming detail. Small-scale, low-level cues don't escape the S/5, either. Towards the end of Jackson Browne's “Colors of the Sun” from *For Everyman*, there's a repeated piano and drum motif that resolves into a deepening bass note that seems to ripple, sustain, and expand as if suspended in space. Each repetition of the motif is heavier and more resonant than the last, until the track begins a long fade. The bass notes hardly exist at all without the help of the S/5. Similarly, during Yes' “It Can Happen” from *90125*, there's a recurring bass line where the bassist slides his finger down the string, the pitch plunging as if tossed off a cliff. Most speakers by themselves can't reproduce the full weight of these descending notes convincingly. The S/5 can.

What makes its performance special, however, is not its obvious power, extension, and dynamic headroom. These exist to degrees that can overpower most medium-sized rooms. It's its clarity and focus that really impress. Credit is owed to the sub/sat transition, which is so seamless that it

becomes anyone's guess where the REL leaves off and the sats takeover. For me, this is where the believability factor kicks in. For example, when drummer Russ Kunkel plays some tom-tom fills during Carole King's “Home Again” on *Tapestry*, the drum-skin detail and tuning, and the resonant decay, reveal themselves in full bloom, images locked into position without a hint of the S/5 in the sonic picture. This was also true of the kickdrum positioned centerstage during Holly Cole's “Take Me Home.” The weight of the impact didn't pull towards the corner position where the S/5 was sitting—it remained focused dead center within the soundspace. And this wasn't just the case with the REL augmenting my compact ATC SCM20s, either. Even a speaker like the gorgeous Kharma Elegance S7 Signature floorstander, certainly no sluggard in midbass response and speed, benefitted richly from the ministrations of the S/5.

Less obviously, the S/5 enhances the mood of

## SPECS & PRICING

Type: Front-firing  
subwoofer, with downward-  
firing passive radiator  
Drivers: 12" woofer, 12"  
passive  
Frequency response: 21Hz  
-6dB  
Power: 550W  
Dimensions: 17.5" x 18" x  
20"

Weight: 70 lbs.  
Price: \$2500  
**REL ACOUSTICS NORTH  
AMERICA**  
800 Addison St.  
Berkeley, CA 94710  
(510) 990-6005  
[rel.net](http://rel.net)

Feature:  
Speaker  
Placement  
Secrets

Preview:  
TAS  
Illustrated  
History

## EQUIPMENT REVIEW - REL S/5

a performance in the way it conveys sweeping and subtle landscapes of tonal color and timbre, gradients of shadow and light. The S/5 establishes the musical context for what is to come. For example, without the opening 30Hz organ pedal point that introduces Strauss' *Thus Sprach Zarathustra*, or the deeply ominous synth note that kicks off Dire Straits' epic "Telegraph Road," listening to these pieces would be like listening to a Shakespearean sonnet with the opening quatrain lopped off. On the tight, crisp bass intro to Holly Cole's cover of "I Can See Clearly" from *Temptation*, the REL captures the optimistic bounce and jauntiness of the instrument-character that's pivotal to the upbeat emotion of the song. Similarly, from the opening bar onward, the forward placement of Ray Brown's standup bass immediately signals listeners that the album *Soular Energy* is about the bass player as frontman, not backing musician.

Of equal importance is the ambient information that the REL reproduces. This baby can move a lot of air. Take a familiar piece like "Lux Aeterna" from the Rutter Requiem. The hall sound becomes a more active player in the performance when the S/5 is in the system. You can hear the air filling with sound around the musicians and chorus, and then hear this ambience even more clearly when the organist hits the lowest pedal points. And when the organist abruptly stops and the instrument goes silent, there is a sense of air rapidly escaping from the venue, like a balloon suddenly deflating.

A couple of tips to keep in mind: Subs do not operate in isolation. Only well-engineered main speakers with fairly neutral low-end response



## REL Wireless? Hello, Longbow!

Longbow is REL's wireless solution, available in specific models like the S Series. It was originally developed for the REL Habitat1—a 4.5"-thick, on-wall subwoofer. To keep up with the emerging—and growing—wireless trend in consumer electronics, Longbow has been designed to eliminate the look of cables and to address situations where a lengthy cable-run becomes an issue. Longbow wireless allows you to transmit wide-bandwidth signals (20Hz-20kHz) via the REL's high-level Neutrik connection. And, should you wish to use a REL sub in a home-cinema setup, it will also simultaneously send a more limited-bandwidth, .1-channel signal (250Hz and below). Unlike Bluetooth-based systems, Longbow does not compress, resulting in minimal delay. I'm hopeful that I'll be able to report on Longbow in a forthcoming issue. Price: \$299. **NG**

will excel with subwoofers. Sats with a sucked-out lower midrange and upper bass will sound a little bass-light and dynamically lean. And attempting to mask such a tonal deficit by raising the output and crossover point of the S/5 will only smear midrange detail and create a noxious midbass bump that further decreases the sense of sub/sat integration that, after all, is the desired effect. Also, with smaller compact monitors, care should be exercised in gain-matching the more dynamically limited satellite with the much higher dynamic limits of the sub.

What about value? Put it this way, if you consider that you can easily spend a \$2500 on a couple of power cords, then the real value of the S/5 comes into crystalline focus.

From time to time I meet audiophiles who continue to insist that subwoofers are the bane of their audio existence. I don't know what sort of deep-rooted, sub-bass trauma they were exposed to in their earliest high-end years, but I'm here to tell you that the only drama I experienced during my time with the REL S/5 was the emotion that its evenly weighted balance and full-range musicality brought to the fore. (Plus the separation anxiety I'm anticipating when REL calls for its return.)

In both subtle and not so subtle ways the REL S/5 completed every speaker system it partnered with. Ultimately, it's up to every audiophile to ask himself whether he wants the whole musical picture—the entirety of the soundscape. If your answer to that question is an unqualified yes, then consider yourself warned: Don't even think of plugging in the S/5 if you ever expect to use that outlet again. An exceptional performer in any class. **TAS**



## Our Top Picks in Subwoofers

### JL Audio e110/e112

**\$1700/\$1900**

Before he got the hefty little e110 with 10" driver (the e112 comes with a 12" woof), JV was anything but a fan of subwoofers, which always seemed to take more away in midrange transparency, tone color, and resolution than they paid back in bass-range extension, detail, and power. Crossed over at the right frequency—which is easy to do with the instructions that JLAudio provides and manifold built-in controls—the e110 is the very first sub he's heard that doesn't screw up the sound of the main speaker. Rather it seemed to extend that sound into the bottom octaves, producing the highest low-level resolution of bass timbres and textures from any transducer of his experience. Paired with something like a Raidho D-1 stand-mount it will give you everything (save for overall impact) that you pay the big, big money for in a massive multiway floorstander, and it will do so for a mere \$1700. JV, 244

### REL S/5

**\$2500**

The extraordinary thing about REL's latest effort is that it buries once and for all the idea that only small subs can excel off the line, and are less sonically detectable than their larger, more explosive, more ponderous cousins. Fact is the S5 is big—a 12" woofer with companion 12" downward-firing passive radiator and 500 Class D watts to provide the fireworks. Its bass extension is terrifyingly deep, yet it has the delicacy and dexterity to become one with the music, from the deepest fundamentals on up, and doing so invisibly without affecting the character and transparency of even the most highly resolved system. NG, 252

### JL Audio Fathom f112/f113

**\$3500/\$4300**

These two subs—identical except for woofer size (12" vs. 13.5") and amplifier power (1500W vs. 2500W)—raise the bar in subwoofer performance with their unlikely combination of brute-force power and tonal and dynamic finesse. Capable of delivering high SPLs at very low frequencies without strain, the Fathoms are equally adept at resolving the pitches, dynamics, and tone colors of an acoustic bass. Reference-quality performance at a reasonable price. CM, TPV 75

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