



# the absolute sound Buyer's Guide to Loudspeakers 2017

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“... ONE OF THE BEST  
SPEAKER SYSTEMS I HAVE  
EVER HAD THE OPPORTUNITY  
TO LISTEN TO OR REVIEW.”

Anthony Cordesman, *The Absolute Sound*



PERSONA™

Listen, and really hear.



ARC  
ATHM™  
ROOM CORRECTION



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“You can’t tell anything about the loudspeaker until you listen to it. Don’t be in a hurry to buy the first speaker you like; audition several products.”

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*Our Top Picks in Floorstanding >\$10k*

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REL T7i  
GoldenEar SuperSub XXL





MARTIN LOGAN



## Premium sound solutions for every space.

MartinLogan excels at doing things that have never been done, like integrating exotic Folded Motion™ driver technology, inspired by our legendary high-end electrostatic designs, into the affordable Motion® Series and reference Stealth™ Architectural Series. Smooth, refined sonic performance with stunning dynamic range and jaw-dropping clarity – MartinLogan magic in an application to suit every lifestyle.



*EM-ESL X*



*Motion 40*



*Motion 60XT*



*Motion SLM*



*Motion Vision X*



*Edge*



*Axis*



*Vanquish*

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# the absolute sound

## Buyer's Guide to Loudspeakers 2017

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# From the Editor

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

Our new 2017 Guide not only features **28 full-length loudspeaker reviews** hand-selected by TAS editors, but you'll also find:

**On the Horizon** – A sneak peek at **16** of the hottest new loudspeakers to hit the market.

**How to Choose Loudspeakers** – Robert Harley offers sage advice on all the factors you should consider before buying speakers.

**Premier Reviews** – Brand-new reviews of the Starke Sound IC-H3 Halo Elite and the Crystal Cable Minissimo Diamond Edition, published here before they appear in print.

**Top Picks** – We choose our recommendations for each category, from desktop and powered, to bookshelf, stand-mount, and floorstanders.

No matter what your budget or sonic preferences, this Guide is designed to help you explore the wide range of loudspeakers across all design categories and price-points.

Happy listening!

Julie Mullins, Editor

**FOCAL**  
LISTEN BEYOND

# SOPRA

## REVEAL THE INVISIBLE

The more time I spent with the Sopra N°1s, the more eager I became to re-explore my music collection  
*Home Theater Review, Sopra N°1*

### THE PRESS IS UNANIMOUS!

“with a lot of power and control behind them, I am always amazed at how much of the flagship Focal sound is present here”  
*ToneAudio, Sopra N°3*

“For me, these speakers are my audio nirvana”  
*HiFi and Music Source, Sopra N°2*

“I was capable of playing everything with aplomb and power. The soundstage was huge, expanding beyond the speakers.”  
*Stereophile, Sopra N°3*



5 AVAILABLE FINISHES

[www.focal.com](http://www.focal.com)



SOPRA N°1  
\$8999

SOPRA N°2  
\$13999

SOPRA N°3  
\$19999

# On the Horizon

## Hot New Products Coming Your Way

Neil Gader

### KEF LS50 Wireless

The LS50 Wireless is a stylish and fully active music system whose architecture builds upon LS50's lauded acoustic capabilities. The LS50 Wireless has advanced DSP crossovers that correct for inherent time delays introduced in the crossover stage, and with KEF's Uni-Q concentric driver arrays housed in acoustically inert cabinets, remarkably even sound dispersion is now attainable in virtually every room. In his CES 2017 report, Neil Gader says of the LS50, "Sonically, it was everything I enjoyed in the original—heft, reasonable scale and precision, plus the added bass extension and control that are part and parcel of the active loudspeaker experience—a segment and solution that have achieved more high-end popularity than ever before with the advent of computer media and network music." On the specs front, the LS50 Wireless features an end-to-end 192kHz/24-bit high-resolution digital signal path, two separate DACs per channel (per speaker), and two 230-watt amplifiers powering each channel in a bi-amp dual mono configuration. The LS50 Wireless provides 2.4GHz/5GHz dual-band WiFi, Bluetooth 4.0 aptX, asynchronous USB type B, TosLink optical, and RCA analog inputs. A dedicated LS50 Wireless app (iOS and Android) facilitates network setup, streaming, playback, EQ and speaker placement options, and DSP controls. In addition to all this versatile technology, colors are available, with drivers matched to cabinet finishes for a look that should make them welcome in most listening rooms—even more so given that only a smartphone is required to complete this soup-to-nuts system. **Price: \$2199/pr. kef.com**



## On the Horizon



### Muraudio Domain Omni PX2

The utopian dream for the audiophile and music lover is to bring the live performance home. Muraudio's purpose in launching the Domain Omni PX2 was an attempt to bring that dream closer to reality. In his review (TAS Issue 258) Robert E. Greene states, "Muraudio's speakers are one of the all-time triumphs of speaker design...a huge step in a new direction." The Domain Omni PX2 electrostatic loudspeaker presents a full-range point-source image that follows you around the room much like eyes in a photograph, so the sweet-spot becomes the entire room rather than just, say, a solitary chair. The PX2 incorporates attractive design elements, such as a variety of custom trim options in chrome, brushed nickel, and gold, and an 18-layer luxury paint and finishing process. The speakers also feature the patented construction of Muraudio's compound curve ESL panels, precision-formed cast aluminum, and a resonance-free driver enclosure to offer a new level of design and music reproduction. **Price: \$79,500/pr. [muraudio.com](http://muraudio.com)**



### Manger Audio z1

Manger Audio of Germany has recently released a completely new product line of active and passive floorstanding and compact loudspeakers using its proprietary Manger Sound Transducer (MSW), a design known for its unique transient behavior. The latest model z1 is a sealed two-way bookshelf speaker. As time precision is the credo of Manger Audio, the 8" custom-made woofer works in a sealed cabinet that supports the MSW down to 40Hz with a Q of 0.6. The low crossover frequency of 340Hz supports the Manger sound transducer's point-source behavior over a wide frequency range up the 40kHz. Completing the package are state-of-the-art crossover parts, and WBT Nextgen binding posts. For the enclosure there's a choice of a full palette of RAL- and NCS-colors as well as elegant veneers. The z1 fuses cutting-edge technology with eye-catching design. **Price: \$8300/pr. [mangeraudio.com](http://mangeraudio.com)**



### Totem Acoustic Sky

Soon to be celebrating its 30th year, Totem is now shipping the Sky bookshelf monitor worldwide. Designed to appeal to a broad audience, the new Sky marries the Totem focal points of imaging, phase coherence, and bass response with amplifier-friendly compatibility and prodigious power handling. The Sky's auditory capabilities are designed to defy the usual category expectations associated with a conveniently sized cabinet. The Sky woofer possesses a longer throw than any other current Totem 5.25" driver—its 3" voice coil is wound with flat wire to avoid air gaps, and boasts a power handling rating of 500 watts. The tweeter is said to be the world's first wide-dispersion 1.3" soft dome powered by a formidable neodymium magnet that goes out to 30kHz. Available in three finishes: satin white with white magnetic grille, and black or mahogany veneer with black magnetic grilles. **Price: \$1850/pr. [totemacoustic.com](http://totemacoustic.com)**



## On the Horizon



### Spendor D9

An elegant, modern three-way, four-driver loudspeaker, the 44.3" tall Spendor D9—a follow-up to the company's acclaimed D7—is said to deliver any genre of music with a high level of resolution and realism. Features include Spendor's LPZ tweeter that is built around a stainless steel front plate, which forms a damped acoustic chamber directly in front of a lightweight woven polyamide diaphragm. Bass response extends to 27Hz thanks in part to its fifth-generation Linear Flow Port. Easy to drive and highly efficient at 90dB sensitivity, the D9 is also remarkably versatile and can be placed in any living environment. **Price: \$9995 for cherry, dark walnut, or black finishes. Premium rosewood and ebony finishes are available, \$11,995/pr. [bluebirdmusic.com](#)**



### Zellaton Statement

The new Zellaton Statement is aptly named. These magnificent, ultra-high-end, three-way, five-driver d'Appolito floorstanders represent an amalgamation of state-of-the-art technologies and materials. The latest transducer from Zellaton—one of the oldest loudspeaker manufacturers in Germany whose drivers are hand-assembled by Manuel Podszus, grandson of the inventor, Emil Podszus, who founded Zellaton in the 1930s—the Statement boasts patented, handcrafted, ultra-light rigid-foam-and-foil sandwich diaphragms. Each driver is housed in its own chamber and discretely wired with premium Schnerzinger cable. The speaker's hand-tuned, 660-pound enclosure features semi-open rear baffles. North American distributor Gideon Schwartz describes the Statement's sonics as "akin to a Quad 57 with meat on its bones." The speakers' spaciousness, exactly high resolution, superb dynamic contrasts, and effortless dispersion lend an uncannily lifelike quality to acoustic music. But the Statements can also rock out without losing their composure. During a recent showroom visit, JV and JM listened to a wide array of music through these wonderful speakers for hours with no fatigue and constant delight. **Price: \$350,000/pr. [audioarts.co](#)**



### Estelon Model YB

The new Model YB is an asymmetrical three-way design that like all Estelon speakers features a cabinet employing a proprietary composite material developed to maximize rigidity and eliminate cabinet coloration. Its shape was designed to minimize vibration and resonance, facilitate in-room placement, and optimize performance of the drive units. An 8" woofer has an extremely stiff aluminum cone for enhanced bass precision and deep natural bass. A 5.25" mid-woofer, known for its sliced paper cone technology wherein the slices are filled with damping glue, reportedly reduces breakup modes in the diaphragm to deliver accurate and natural sound. A beryllium-membrane 1" tweeter provides extreme rigidity along with very low mass and high damping. Estelon follows a meticulous handcrafted approach that includes careful testing and pair matching of drivers and fine-tuning of all the high-quality internal components for a more lifelike sonic performance. **Price: \$21,900/pr. [bluebirdmusic.com](#)**

## On the Horizon



### Raidho Acoustics D-4.1

The D-4.1 is a true three-way Raidho Diamond Driver loudspeaker designed to integrate the finest qualities, technology, and performance of the acclaimed Raidho D-5 in a smaller, more room-friendly package. The driver complement includes four bass drivers, two 4" midranges, and the famed Raidho tweeter to create a speaker that's truly full range and carries a high level of impact and refinement. It's an extreme performer for those who cherish their music and enjoy optimizing every parameter of a system. **Price: \$119,000 (black); \$138,000 (walnut).** [raidho.dk](http://raidho.dk)



### Magico S3 Mk II

The S3 Mk II is a floorstanding, three-way loudspeaker design that features a 1" diamond-coated beryllium-diaphragm tweeter, a 6" midrange driver, and two new 9" bass drivers that are all formulated using Multi-Wall carbon fiber and a layer of XG Nanographene that when combined are 20% lighter and 300% stiffer than previous cone designs. The monocoque enclosure is formed from a single piece of extruded aluminum that is sealed by a machined 3-D convex aluminum top plate and massive four-point aluminum outrigger base plate. An internal sub-enclosure made from a proprietary polymer material provides an optimized chamber for the midrange driver to operate within. Magico's Elliptical Symmetry Crossover incorporates state-of-the-art components from Mundorf in Germany designed to preserve frequency bandwidth and phase linearity, and minimize intermodulation distortion. **Price: S3 Mk II M-Cast (textured powder coat), \$28,000/pr; S3 Mk II M-Coat (smooth high-gloss paint), \$32,000/pr.** [magico.net](http://magico.net)



### B&W CI800 Series Diamond

The new CI800 Series Diamond takes custom installation performance to the next level thanks to incorporating technological innovations from the flagship Bowers & Wilkins 800 Series Diamond. These in-wall and in-ceiling speakers feature Diamond dome tweeters, Continuum midrange drivers, and Aerofoil bass cones. The models include the CWM8.3 D, the CWM8.5D, and the CCM8.5D. The CWM8.3 D is a three-way in-wall speaker conceived for the customer who requires great sound without seeing the source. The CWM8.5 D is a two-way in-wall speaker for those who want high performance from a compact model. The CCM8.5 D is a two-way in-ceiling speaker delivering high-quality acoustics in a discreet package. Drive units are located in a continuously rotatable mini-baffle allowing the user to "toe in" the drive units of the loudspeaker to customize performance. All models will be available Summer 2017. **Price: (per speaker including back box) CWM8.3D, \$4500; CWM8.5D, \$2500; CCM8.5D, \$3000.** [bowers-wilkins.com](http://bowers-wilkins.com)

## On the Horizon



### GoldenEar Triton Reference

The Triton Reference is an evolution of the award-winning Triton One, taken to a new level of sonic performance and aesthetics. All of this flagship speaker's components—the active sub-bass drivers, upper-bass/midrange drivers, and high-velocity folded ribbon tweeter—are new and have been specifically developed for use in the Triton Reference. The fully balanced crossover is engineered for the Reference, and the subwoofer amplifier and 56-bit DSP control unit are upgraded extensions of those used in the Triton One and SuperSubs. As for its style, the Reference offers a striking update to the classic Triton look, with a piano gloss-black lacquer one-piece monocoque cabinet. Sleek and statuesque, the Reference is a statement loudspeaker designed to excite listeners with its visual presence as well as its sonic performance.

**Price: \$8995/pr. [goldenear.com](http://goldenear.com)**



### Bluesound Pulse Soundbar

Bluesound, respected maker of wireless, hi-res, multi-room music systems, has launched the Pulse Soundbar, the company's first soundbar product that's said to be the world's first to feature hi-res network audio streaming. The Pulse Soundbar offers versatile sonic performance: It supports audio resolutions of 24 bits and up to 192kHz sampling rate in addition to Master Quality Authenticated (MQA) high-resolution audio streams—another first in the soundbar category. With BluOSTM, Bluesound's wireless multi-room streaming operating system, the Soundbar enables the TV room to become the heart of a wireless music system that delivers access to hi-res music to all members of the household through an easy-to-use app available for smart devices. Intended for use with flat panel displays of 42" or greater, the Soundbar offers sound quality—both for soundtracks and movies alike—that can be compared to audiophile speakers in realism, detail, and dynamics. **Price: \$999. [bluesound.com](http://bluesound.com)**



### Legacy Audio Foundation

Legacy Audio's new Foundation subwoofer launches lower-octave frequencies with ultra-low distortion and weighty transients while utilizing only 1.5 square feet of floor space. Using patented compound passive radiator technology and a pair of Legacy's renowned long-throw 12" woofers, Foundation delivers a forceful attack, rebounding without the usual mechanical shuddering present in subwoofers. Foundation offers tonality and definition previously unattainable at this price level. Supercharged with the latest ICEpower amplifier technology, it benefits from 30 amps of peak current—ultimately necessary to provide tight control to the 3-inch voice coil within the massive 30-pound magnetic structure of each cast-frame woofer. Available in a wide variety of finish options. **Price: \$3850 in standard finishes. [legacyaudio.com](http://legacyaudio.com)**

## On the Horizon



### Paradigm Persona 3F

The Paradigm Persona 3F represents the mid-priced sweet spot of the company's latest series. It's a 44" tall, three-way, four-driver passive floorstander that features Truextent beryllium cones in its 1" tweeter and 7" mid drivers. These transducers also incorporate Perforated Phase-Aligning (PPA) Driver Lenses—a patent-pending technology that actively blocks out-of-phase frequencies to smooth output without coloring the sound. The Persona 3F's mid and high frequency section delivers wide-spectrum dynamics (from a detailed well-blended 40kHz down to a deep 500Hz) while remaining virtually transparent. Handling the bass frequencies are a pair 7" high-excursion X-PAL woofer drivers mounted in a dual-directional array within isolated chambers, efficiently damped to eliminate internal standing waves. Designed, engineered, and crafted in Canada, Persona 3F is offered in an elegantly curved, heavy-duty, waveguide cabinet and is available in a variety of finishes. **Price: \$10,000/pr. [paradigm.com](#)**



### MartinLogan Renaissance ESL 15A

Renaissance ESL 15A represents a major evolution of MartinLogan's classic electrostatic loudspeaker design. At the heart of this loudspeaker is a 15" proprietary Curvilinear Line Source (CLS) XStat vacuum-bonded electrostatic transducer with advanced MicroPerf stator technology and ultra-rigid AirFrame Blade construction. The dynamic low-frequency experience is rendered with accuracy and authority courtesy of dual 12" low-distortion aluminum cone woofers. Each woofer is independently powered by a 500-watt Class D amplifier, and controlled by a 24-bit Vojtko DSP engine featuring Anthem Room Correction (ARC) technology. **Price: \$24,995/pr. [martinlogan.com](#)**



### Dynaudio Contour 60

The latest addition and fourth model in the revamped and modernized Dynaudio Contour line is the Contour 60 (pictured center), a three-way floorstander that features new dual 9" MSP woofers, a new 6" MSP midrange driver with 38mm diameter aluminum voice coil, and the latest variant of Dynaudio's top tweeter, the Esotar2 soft-dome model. The heavily damped, multi-layer MDF cabinet design sports a solid aluminum baffle and curved edges for reduced diffractions plus high-quality Mundorf capacitors and an upgraded wiring configuration for the crossover. The 60 was designed and produced at Dynaudio's newly expanded R&D manufacturing facility in Skanderborg, Denmark. The Contour 60, as the rest of the new Contour series, is offered in four standard finishes: Gloss White, Gloss Black, Walnut (satin), and White Oak (satin). Two special order finishes are available at extra cost. **Price: \$10,000/pr.**

## Book Feature

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

Robert Harley

**T**he 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.

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.

## The BBC Monitor Birth of a Legend

BY PAUL SEVDOR



**T**he "BBC Monitor" is neither a product nor a design entity defined by time. It might be more accurate to call it a set of loudspeaker parameters and specifications drawn up to meet a very precise set of goals for an equally precise set of uses and circumstances. "BBC," of course, stands for the British Broadcasting Corporation, which has been in existence since 1922 and for much of that time engaged in research into loudspeaker design and performance. The research engaged as necessary because for the high excellence of its music programming and the sound quality of its broadcasts (back in the day, that is), the BBC needed monitors that would accurately tell its engineers and programmers what its broadcasts sounded like, and it couldn't find good enough loudspeakers.

When Dudley Horwood and E. L. S. Shorter were brought on board by the research department in 1944, one of their first assignments was to investigate what was available. Their subsequent report stated to the effect that "none of the loudspeakers examined was found to meet our requirements." In particular, they noted that "the middle and high frequencies [gave] the impression of being dulled from one source, [defining] we presume, the late response extended lower than usual but was [being] in evidence, the high frequency response was deficient and the whole reproduction was heavily colorated."

The BBC eventually defined for itself two categories of loudspeakers. Grade 1 was large, with wide frequency response and the capability of playing back with lower distortion. Grade 2 speakers were to be used for critical evaluation, spaced, listening, and program checking. The BBC eventually defined for itself two categories of loudspeakers. Grade 1 was large, with wide frequency response and the capability of playing back with lower distortion. Grade 2 speakers were to be used for critical evaluation, spaced, listening, and program checking.

These two categories were not mutually exclusive. Grade 1 speakers were to be used for critical evaluation, spaced, listening, and program checking. The BBC eventually defined for itself two categories of loudspeakers. Grade 1 was large, with wide frequency response and the capability of playing back with lower distortion. Grade 2 speakers were to be used for critical evaluation, spaced, listening, and program checking.



above: Dudley Horwood and E. L. S. Shorter in 1944, the year the BBC Monitor was first designed. Below: Dudley Horwood and E. L. S. Shorter in 1944, the year the BBC Monitor was first designed.



Below: Dudley Horwood and E. L. S. Shorter in 1944, the year the BBC Monitor was first designed.

the absolute sound's

# Illustrated History of High-End Audio

VOLUME ONE

## LOUDSPEAKERS

EDITED BY ROBERT HARLEY




...now formed the 150/150, the fact, the broadcast... company, and its computer design... the loudspeaker... (that) these... packaging these... "real world"...

Reference Series... more advanced... Model 100... and mid/treble... position over the... low frequencies... extended across... James Robinson... in the UK/EPA... large and on-going... "series" already... prove itself to... the process.

**ICONIC PRODUCT**  
*Reference 102*

Reference 102, which debuted in 1977, was arguably the most ambitious speaker design ever built to date. The entire concept of building a reference series, with upgraded parts and styling of the... at times, was based for the most part on the Reference 102. It was... out the 102 incorporated numerous design elements that... that reference speaker design for years to come. "While... many of these features are still incorporated in contemporary... speakers."

The REF 102 was the first speaker to feature different drivers in... separate enclosures. This allowed each to have an optimal acoustic... environment, and distributed the need to choose one driver with... for all drivers. Instead, each driver was housed in a separate enclosure... rather than its counterpart thereby reducing distortion effects.

A further benefit of the separate enclosure arrangement was... that the drivers could be fine-tuned separately. And to ensure... to maintain that fine-tuning, REF employed a four-course... Likert-style filter in the crossover.

It was no surprise that the REF 102 drove an elite high-end. On the... three plastic cones, the 12" woofer employed a huge magnet and... was capable of handling extremely high power. The 12" midrange... driver was made of aluminum and was capable of handling 200... a proprietary PVC material. The tweeter was a 2" wave length. As... reference case with REF 102, all of these were manufactured in... Britain.

The sound of the Reference 102 was hailed by TAS and... reference case. "The sound was... and... despite the fact that REF considered "the budget" at \$5000. The... speaker's success led REF to broaden and refine Reference Series... even to this day.

# Book Feature

## McIntosh Laboratory

BY PAUL SEVOR



Ed Vidor (left) and Henry Kloss (right) in 1959. Photo by Ed Vidor.

Speaker units of frequency, and while the whole book is about the evolution of the speaker, it's also about the evolution of the audiophile. Henry Kloss and Ed Vidor were the first to create a speaker that was not just a speaker, but a work of art. They were the first to create a speaker that was not just a speaker, but a work of art. They were the first to create a speaker that was not just a speaker, but a work of art.



Ed Vidor (left) and Henry Kloss (right) in 1959. Photo by Ed Vidor.

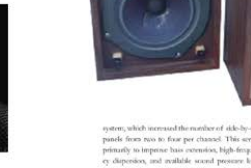
# Advent and KLH

BY DICK OLSHER

High-end audio was linked forever to the name of Henry Kloss from February 27, 1926, till January 31, 2012. Kloss was the founder of Klipsch Corporation, a company that has produced some of the most iconic speakers in the world. His work in the field of high-fidelity audio was revolutionary, and his company's products are still highly regarded today.



Henry Kloss in 1959. Photo by Ed Vidor.



A vintage Klipsch speaker. Photo by Ed Vidor.

Henry Kloss was not just a speaker designer, but a pioneer in the field of high-fidelity audio. His work in the field of high-fidelity audio was revolutionary, and his company's products are still highly regarded today. He was the first to create a speaker that was not just a speaker, but a work of art.



A vintage Klipsch speaker. Photo by Ed Vidor.

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. A limited quantity of books are still available for ordering online. **tas**



# MartinLogan

BY DICK OLSHER

## The

power of two is 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.

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 ESLs in particular, are challenging 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 Mosaik 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 CLS, arrived in 1986. But it was the Sequel, a smaller hybrid introduced in 1987, that resulted in explosive sales. During the '90s product releases came fast and furious and included some of MartinLogan's classic models such as the Quest, Aetios, and SL3, and to top off the product line with a claim on state-of-the-art technology, the massive Statement c2 loudspeaker was released in 1998.

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 "Star" The CLX Art, unveiled in 2010. It's most advanced full-range electrostatic so far. Through co-founder Gayle Sanders left MartinLogan about the same time it was acquired in October 2005 by ShoreView Industries, MartinLogan is still today a growing company with an internationally recognized brand, and a first-class design and manufacturing team.



## Feature

# How to Choose a Loudspeaker

Robert Harley

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**O**f all the components in your audio system, the loudspeaker's job is by far the most difficult. The loudspeaker is expected to reproduce the sound of a pipe organ, the human voice, and a violin through the same electromechanical device—all at the same levels of believability, and all at the same time. The tonal range of virtually every instrument in the orchestra is to be reproduced from a relatively tiny box. This frequency span of 10 octaves represents a sound-wavelength difference of 60 feet in the bass to about half an inch in the treble.

It's no wonder that loudspeaker designers spend their lives battling the laws of physics to produce musical and practical loudspeakers. Unlike other high-end designers who create a variety of products, the loudspeaker designer is singular in focus, dedicated in intent, and deeply committed to the unique blend of science

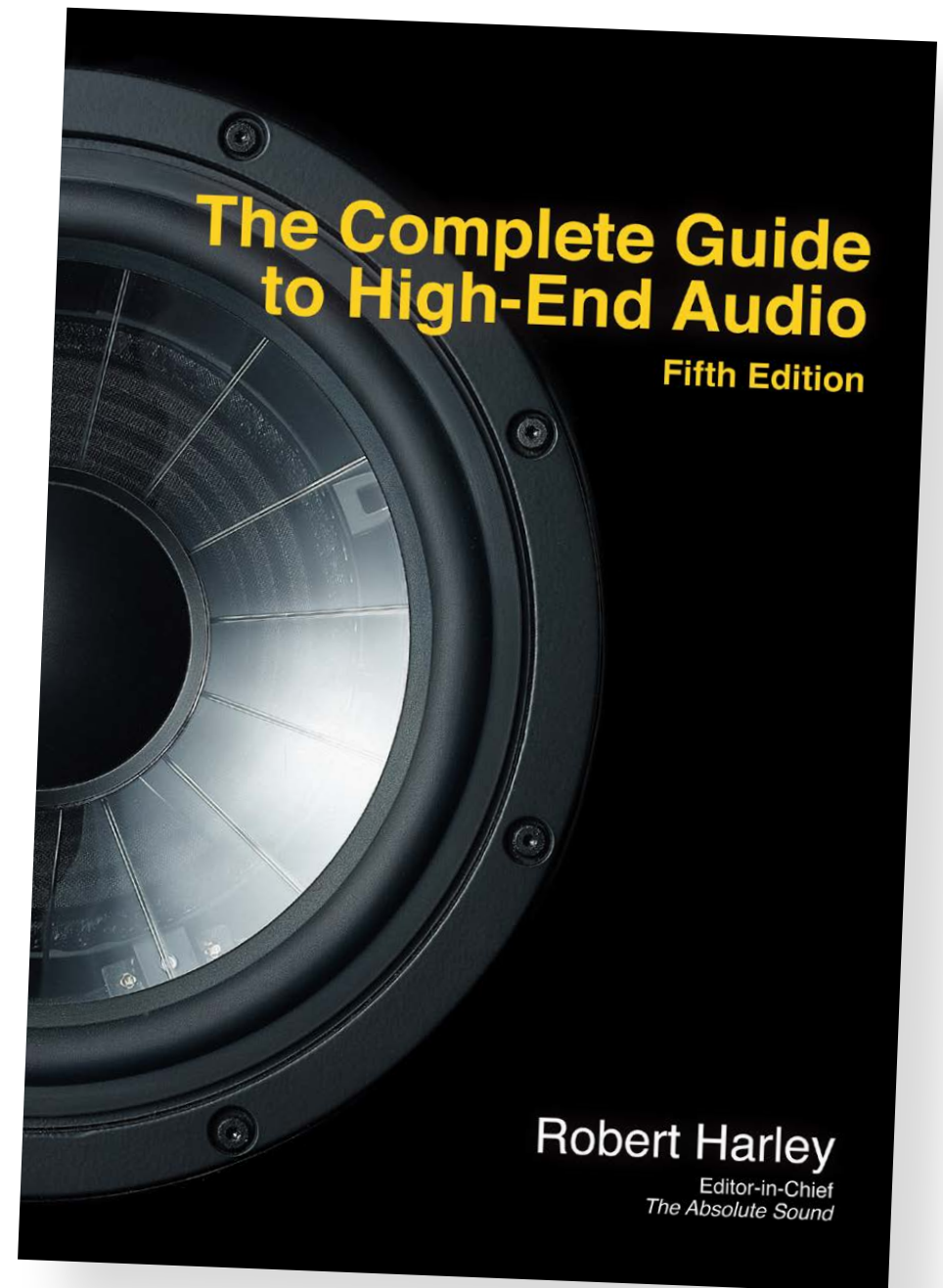
and art that is loudspeaker design.

Although even the best loudspeakers can't convince us that we're hearing live music, they nonetheless are miraculous in what they can do. Think about this: a pair of loudspeakers converts two two-dimensional electrical signals into a three-dimensional "soundspace" spread out before the listener. Instruments seem to exist as objects in space; we hear the violin here, the brass over there, and the percussion behind the other instruments. A vocalist appears as a palpable, tangible image exactly between the two loudspeakers. The front of the listening room seems to disappear, replaced by the music. It's so easy to close your eyes and be transported into the musical event.

To achieve this experience in your home, however, you must carefully choose the best loudspeakers from among the literally thousands of models on the market. As we'll see, choosing loudspeakers is a challenging job.

### How to Choose a Loudspeaker

The world abounds in poor-quality, even dreadful, loudspeakers. What's more, some very bad



## Feature How to Choose a Loudspeaker

Loudspeakers are expensive, while superlative models may sell for a fraction of an inferior model's price. There is sometimes little relationship between price and musical performance.

This situation offers the loudspeaker shopper both promise and peril. The promise is of finding an excellent loudspeaker for a reasonable price. The peril is of sorting through mediocre models to find the rare gems that offer either high absolute performance, or sound quality far above what their price would indicate.

This is where reviews come in handy. Reviewers who write for audio magazines hear lots of loudspeakers (at dealers, trade shows, and consumer shows), but review only those that sound promising. This weeds out the vast majority of underachievers. Of the loudspeakers that are reviewed, some are found to be unacceptably flawed, others are good for the money, while a select few are star overachievers that clearly outperform their similarly priced rivals.

The place to start loudspeaker shopping, therefore, is in the pages of a reputable magazine with high standards for what constitutes good loudspeaker performance. Be wary of magazines that end every review with a "competent for the money" recommendation. Not all loudspeakers are good; therefore, not all reviews should be positive. The tone of the reviews—positive or negative—should reflect the wide variation in performance and value found in the marketplace.

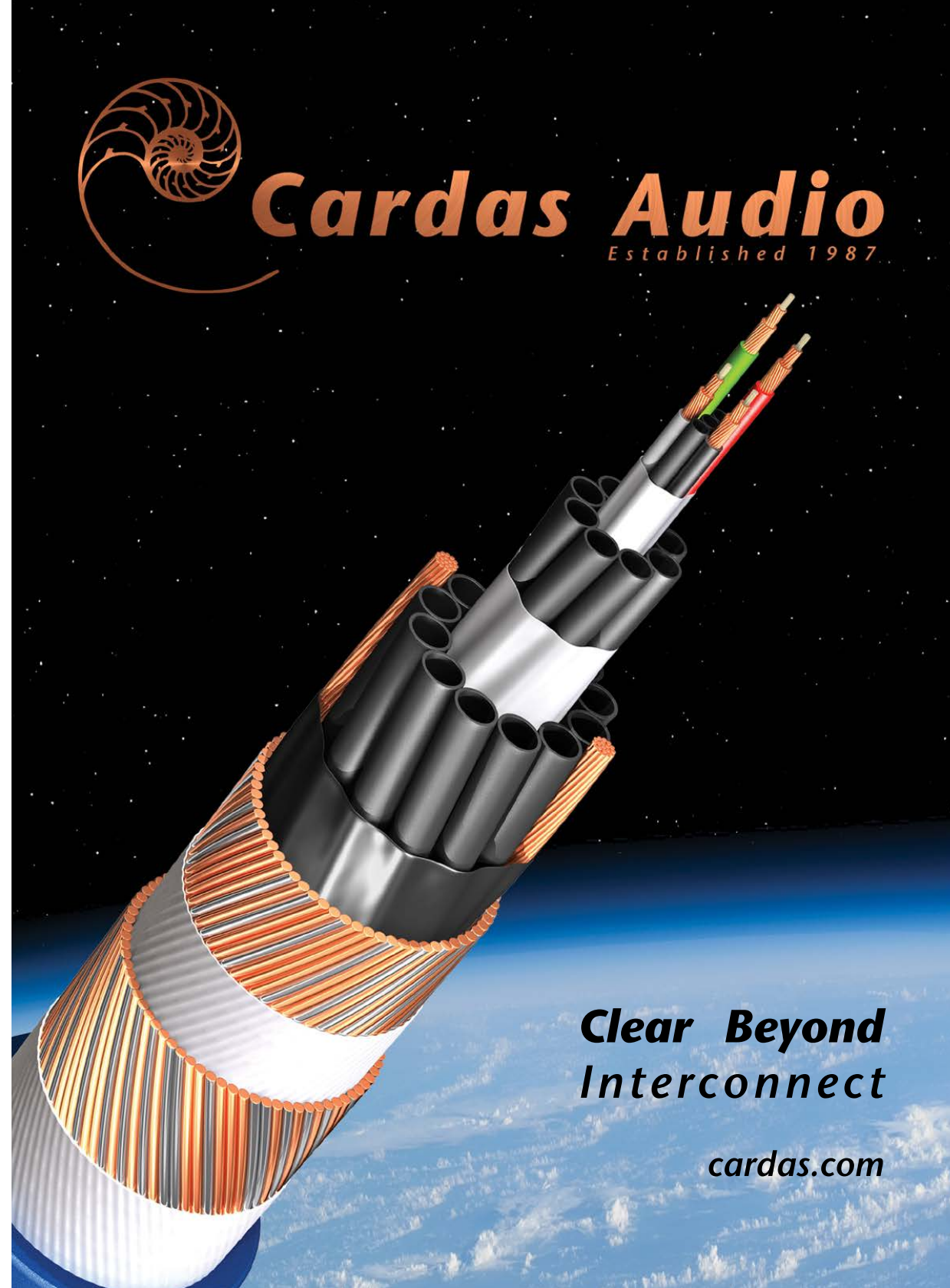
After you've read lots of loudspeaker reviews, make up your short list of products to audition from the crème de la crème. There are several criteria to apply in making this short list to en-

sure that you get the best loudspeaker for your individual needs. As you apply each criterion described, the list of candidate loudspeakers will get shorter and shorter, thus easing your decision-making process. If you find yourself with too few choices at the end of the process, go back and revise your criteria. For example, if you find a loudspeaker that's perfect in all ways but size, you may want to find the extra space in your living room. Similarly, an ideal loudspeaker costing a little more than you planned to spend may suggest a budget revision. As you go through this selection process, remember that the perfect loudspeaker for you is probably out there. Be selective and have high standards. You'll be rewarded by a much higher level of musical performance than you thought you could afford.

### 1) Size, Appearance, and Integration in the Home

After you've designated a place for your loudspeakers, determine the optimum loudspeaker size for your room—the urban apartment dweller will likely have tighter size constraints than the suburban audiophile. Some listeners will want the loudspeakers to discreetly blend into the room; others will make the hi-fi system the room's center of activity and won't mind large, imposing loudspeakers. When choosing a place for your loudspeakers, keep in mind that their placement is a crucial factor in how your system will sound. (Chapter 14 includes an in-depth treatment of loudspeaker positioning.)

The loudspeaker's appearance is also a factor to consider. An inexpensive, vinyl-covered box would be out of place in an elegantly furnished home. Many high-end loudspeakers are





## Feature **How to Choose a Loudspeaker**

finished in beautiful cabinetry or automotive paint finishes that will complement any decor. This level of finish can, however, add greatly to the loudspeaker's price.

If you don't have room for full-range, floor-standing speakers, consider a separate subwoofer/satellite system. This is a loudspeaker system that puts the bass-reproducing driver in an enclosure you can put nearly anywhere, and the midrange- and treble-reproducing elements in a small, unobtrusive cabinet. You'll still get a full sound, but without the visual domination of your living room that often goes with floorstanding speakers. Moreover, the satellite speakers' small cabinets often help them achieve great soundstaging.

Although the term "bookshelf" is often applied to small speakers, you can't get optimum performance from a speaker mounted in a bookshelf. Small speakers need to be mounted on stands, and placed out in the room. Small loudspeakers mounted on stands, sometimes called minimonitors, often provide terrific imaging, great clarity in midband and treble, and can easily "disappear" into the music. On the down side, small loudspeakers used without a subwoofer have restricted dynamics, limited bass extension, and won't play as loudly as their floorstanding counterparts.

### 2) Match the Loudspeaker to Your Electronics

The loudspeaker should be matched to the rest of your system, both electrically and musically. A loudspeaker that may work well in one system may not be ideal for another system—or another listener.

Let's start with the loudspeaker's electrical

characteristics. The power amplifier and loudspeaker should be thought of as an interactive combination; the power amplifier will behave differently when driving different loudspeakers. Consequently, the loudspeaker should be chosen for the amplifier that will drive it.

The first electrical consideration is a loudspeaker's sensitivity—how much sound it will produce for a given amount of amplifier power. Loudspeakers are rated for sensitivity by measuring their sound-pressure level (SPL) from one meter away while they are being fed one watt (1W) of power. For example, a sensitivity specification of "88dB/1W/1m" indicates that this particular loudspeaker will produce a sound-pressure level of 88dB when driven with an input power of 1W, measured at a distance of 1m. High-end loudspeakers vary in sensitivity between 80dB/1W/1m and 106dB/1W/1m.

A loudspeaker's sensitivity is a significant factor in determining how well it will work with a given power-amplifier output wattage. To produce a loud sound (100dB), a loudspeaker rated at 80dB sensitivity would require 100W. A loudspeaker with a sensitivity of 95dB would require only 3W to produce the same sound-pressure level. Each 3dB decrease in sensitivity requires double the amplifier power to produce the same SPL. (This is discussed in greater technical detail in Chapter 5, "Power Amplifiers.")

Another electrical factor to consider is the loudspeaker's load impedance. This is the electrical resistance the power amp meets when driving the loudspeaker. The lower the loudspeaker's impedance, the more demand is placed on the power amp. If you choose low-impedance loudspeakers, be certain the power

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## Feature **How to Choose a Loudspeaker**

amp will drive them adequately. (See Chapter 5 for a full technical discussion of loudspeaker impedance as it relates to amplifier power.)

On a musical level, you should select as sonically neutral a loudspeaker as possible. If you have a bright-sounding CD player or power amp, it's a mistake to buy a loudspeaker that sounds soft or dull in the treble to compensate. Instead, change your CD player or amplifier.

Another mistake is to drive high-quality loudspeakers with poor amplification or source components. The high-quality loudspeakers will resolve much more information than lesser loudspeakers—including imperfections in the electronics and source components. All too many audiophiles drive great loudspeakers with mediocre source components and never realize their loudspeakers' potential. Match the loudspeakers' quality to that of the rest of your system. (Use the guidelines in Chapter 2 to set a loudspeaker budget within the context of the cost of your entire system.)

### 3) Musical Preferences and Listening Habits

If the perfect loudspeaker existed, it would work equally well for chamber music and heavy metal. But because the perfect loudspeaker remains a mythical beast, musical preferences must play a part in choosing a loudspeaker. If you listen mostly to small-scale classical music, choral works, or classical guitar, a minimonitor would probably be your best choice. Conversely, rock listeners need the dynamics, low-frequency extension, and bass power of a large full-range system. Different loudspeakers have strengths and weaknesses in different areas; by matching the loudspeaker to your listening

tastes, you'll get the best performance in the areas that matter most to you.

### Other Guidelines in Choosing Loudspeakers

In addition to these specific recommendations, there are some general guidelines you should follow in order to get the most loudspeaker for your money.

First, buy from a specialty audio retailer who can properly demonstrate the loudspeaker, advise you on system matching, and tell you the pros and cons of each candidate. Many high-end audio dealers will let you try the loudspeaker in your home with your own electronics and music before you buy.

Take advantage of the dealer's knowledge—and reward him with the sale. It's not only unfair to the dealer to use his or her expensive showroom and knowledgeable salespeople to find out which product to buy, and then look for the loudspeaker elsewhere at a lower price; it also prevents you from establishing a mutually beneficial relationship with him or her.

In general, loudspeakers made by companies that make only loudspeakers are better than those from companies who also make a full line of electronics. Loudspeaker design may be an afterthought to the electronics manufacturer—something to fill out the line. Conversely, many high-end loudspeaker companies have an almost obsessive dedication to the art of loudspeaker design. Their products' superior performance often reflects this commitment. There are, however, a few companies that produce a full line of products, including loudspeakers, that work well with each other.

Don't buy a loudspeaker based on technical

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## Feature How to Choose a Loudspeaker

claims. Some products claiming superiority in one aspect of their performance may overlook other, more important aspects. Loudspeaker design requires a balanced approach, not reliance on some new “wonder” technology that may have been invented by the loudspeaker manufacturer’s marketing department. Forget about the technical hype and listen to how the loudspeaker reproduces music. You’ll hear whether or not the loudspeaker is any good.

Don’t base your loudspeaker purchases on brand loyalty or longevity. Many well-known and respected names in loudspeaker design of 20 years ago are no longer competitive. Such a company may still produce loudspeakers, but its recent products’ inferior performance only throws into relief the extent of the manufacturer’s decline. The brands the general public thinks represent the state of the art are actually among the worst-sounding loudspeakers available. These companies were either bought by multinational business conglomerates who didn’t care about quality and just wanted to exploit the brand name, or the company has forsaken high performance for mass-market sales.

The general public also believes that the larger the loudspeaker and the more drivers it has, the better it is. Given the same retail price, there is often an inverse relationship between size/driver count and sonic performance. A good two-way loudspeaker—one that splits the frequency spectrum into two parts for reproduction by a woofer and a tweeter—with a 6” woofer/midrange and a tweeter in a small cabinet is likely to be vastly better than a similarly priced four-way in a large, floorstanding enclosure. Two high-quality drivers are much

better than four mediocre ones. Further, the larger the cabinet, the more difficult and expensive it is to make it free from vibrations that degrade the sound. The four-way speaker’s more extensive crossover will require more parts; the two-way can use just a few higher-quality crossover parts. The large loudspeaker will probably be unlistenable; the small two-way may be superbly musical.

If both of these loudspeakers were shown in a catalog and offered at the same price, however, the large, inferior system would outsell the high-quality two-way by at least 10 times. The perceived value of more hardware for the same money is much higher.

The bottom line: You can’t tell anything about a loudspeaker until you listen to it. In the next section, we’ll examine common problems in loudspeakers and how to choose one that provides the highest level of musical performance.

### Finding the Right Loudspeaker— Before You Buy

You’ve done your homework, read reviews, and narrowed down your list of candidate loudspeakers based on the criteria described earlier—you know what you want. Now it’s time to go out and listen. This is a crucial part of shopping for a loudspeaker, and one that should be approached carefully. Rather than buying a pair of speakers on your first visit to a dealer, consider this initial audition to be simply the next step. Don’t be in a hurry to buy the first loudspeaker you like. Even if it sounds very good to you, you won’t know how good it is until you’ve auditioned several products.

Audition the loudspeaker with a wide range

of familiar recordings of your own choosing. Remember that a dealer’s strategic selection of music can highlight a loudspeaker’s best qualities and conceal its weaknesses—after all, his job is to present his products in the best light. Further, auditioning with only audiophile-quality recordings won’t tell you much about how the loudspeaker will perform with the music you’ll be playing at home, most of which was likely not recorded to high audiophile standards. Still, audiophile recordings are excellent for discovering specific performance aspects of a loudspeaker. The music selected for auditioning should therefore be a combination of your favorite music, and diagnostic recordings chosen to reveal different aspects of the loudspeaker’s performance. When listening to your favorite music, forget about specific sonic characteristics and pay attention to how much you’re enjoying the sound. Shift into the analytical mode only when playing the diagnostic recordings.

Visit the dealer when business is slow so you can spend at least an hour with the loudspeaker. Some loudspeakers are appealing at first, and then lose their luster as their flaws begin to emerge over time. The time to lose patience with the speakers is in the dealer’s showroom, not a week after you’ve bought them. And don’t try to audition more than two sets of loudspeakers in a single dealer visit. If you must choose between three models, select between the first two on one visit, then return to compare the winner of the first audition with the third contender. You should listen to each candidate as long as you want (within reason) to be sure you’re making the right purchasing decision.

Some loudspeakers have different tonal balances at different listening heights. Be sure to audition the loudspeaker at the same listening height as your listening chair at home. A typical listening height is 36”, measured from the floor to your ears. Further, some loudspeakers with first-order crossovers sound different if you sit too close to them. When in the showroom, move back and forth a few feet to be certain the loudspeaker will sound the same as it should at your listening distance at home.

Make sure the loudspeakers are driven by electronics and source components of comparable quality to your components. It’s easy to become infatuated with a delicious sound in a dealer’s showroom, only to be disappointed when you connect the loudspeakers to less good electronics. Ideally, you should drive the loudspeakers under audition with the same level of power amp as you have at home, or as you intend to buy with the loudspeakers.

Of course, the best way to audition loudspeakers is in your own home—you’re under no pressure, you can listen for as long as you like, and you can hear how the loudspeaker performs with your electronics and in your listening room. Home audition removes much of the guesswork from choosing a loudspeaker. But because it’s impractical to take every contender home, and because many dealers will not allow this, save your home auditioning for only those loudspeakers you are seriously considering.

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# DESKTOP AND POWERED

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*OUR TOP PICKS IN DESKTOP AND POWERED*

*Click any product name  
to read that review*

## Equipment Report

# Audience ClairAudient 1+1 V2+

## Not Just for Desktops

Robert Harley

**A**s enthusiastic as I've been about Audience's tiny ClairAudient 1+1 V2+ speaker, I'm afraid that I've done the product a disservice. All my references to it have described it as a "desktop" speaker, and that's where it's been categorized in the Editors' Choice Awards and our annual Buyer's Guide. I think of the 1+1 V2+ that way because a pair of them is right in front of me every day, one on either side of my computer monitor. In

### SPECS & PRICING

**Impedance:** 8 ohms

**Sensitivity:** 84dB/1W

**Maximum RMS continuous output per pair:** 104dB

**Maximum RMS continuous power per speaker:** 45 watts

**Price:** \$2345

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fact, I spend more time listening to the 1+1 V2+ than I do to my main system (ah, the downside of being the editor).

But the 1+1 V2+ is much more than a desktop speaker, as I recently discovered on a visit to the home of Audience co-founder John McDonald (he's a ten-minute drive from me). I also got a chance to hear a new revision to the speaker, made as a running update without a change in the product name. We first listened briefly to my pair of 1+1 V2s that I had brought with me, but now mounted on stands in a medium-sized living room. We then listened to the updated version at length. This new version removes an internal baffle that had isolated each of the two active drivers. The updated model also incorporates a circuit that corrects for the baffle-step function, a phenomenon that caused a steep drop in output level at 450Hz in the first-generation speaker.

The improvement to the revised speaker was immediately apparent as more weight and body in the mid and upper bass. On Brad Mehldau's piano on the superb *Blues and Ballads*, the new speaker had greater solidity to left-hand lines, and the piano lost its thin "tinkly" quality. The bass was fuller and richer, better conveying



rhythmic drive. The improved bass performance created a more solid tonal foundation for the music. This impression was even more apparent when I got the 1+1 V2+ back to my desktop where the desk's surface helped reinforce the bottom end. The bass is full enough that I wouldn't consider adding a subwoofer.

As interesting as these differences were, however, the real revelation was listening to this intimately familiar speaker in a completely different setting. Out in the room on stands

rather than on my desktop, the 1+1 V2+ shone. It had the same coherence, conferred by the crossoverless single-driver design, that made me fall in love with this speaker in the first place. But on the stands in the open room the soundstage became immense, with images fully fleshed out spatially. The stage was deep, expansive, and richly portrayed. I experienced a bit of cognitive dissonance when I opened my eyes after each piece of music and saw the tiny speakers that threw such a billowing

## Equipment Report Audience ClairAudient 1+1 V2+



soundstage.

Resolution was remarkable; the Audience speakers revealed very fine nuances in the sound of instruments and in the musicians' inflections, beautifully conveying musical meaning. The speakers did this in a completely natural and organic fashion, much the same way you hear detail in live music. There was a distinct impression of hearing nothing between me and the music—something you don't expect from a \$2345 speaker.

Although the bass response is understandably limited, the entire range from the lower mids through the uppermost treble was extremely clean, transparent, and pure. Vocals were particularly well served by the crossoverless

design, seeming to hang in space with life and palpability. Many five-figure speakers aren't this transparent and immediate through the mids. Surprisingly for a one-way speaker, the top treble had plenty of energy and sparkle. Incidentally, I know someone who sold his Quad 57s and now listens to the 1+1 V2+ as his main speaker.

The Audience 1+1 V2+ is an unusual and very special product. Although it's the ultimate desktop speaker, it works equally well in a small to medium-sized room, provided that you have realistic expectations about the bass extension and playback level. But that aside, I don't think that you'll find greater musicality for the price—whether on a desktop or on stands. **tas**

### A Most Unusual Design

There's no other speaker that I know of that's designed like the 1+1 V2+—or that sounds like it. The small, handsome, wedge-shaped enclosure houses two identical active drivers, one front-facing and one rear-facing. That driver is a full-range 3" transducer developed by Audience and refined over the past 15 years. The stiff and lightweight cone is made from titanium alloy, and driven by an unusual motor structure. The neodymium magnets, oversized voice coil, open basket, vented pole pieces, spider, and even the shape of the surround are all proprietary. The goal was to create a driver with a wide frequency response that was rugged enough to handle high excursions and produce high sound-pressure levels without compression. Audience first deployed this driver in a giant line array of 16 drivers, then adapted it to The One speaker, and later to the 1+1 and its variants. The newest version has a single 16-ohm voice coil in place of dual eight-ohm voice coils. Bass response is extended in the 1+1 by a pair of side-firing passive radiators. The V2 and V2+ designations indicate various levels of tweaky upgrades. The full-blown V2+ version reviewed here features Audience's top Au24SX internal wiring and solder-free tellurium binding posts. The wire and posts are cryogenically treated in Audience's own cryo tank, which I saw during my visit to the company's nearby shop.

## Equipment Report

# Micromega MySpeaker with MyAmp Inside

MyLittle...MyEverything

Neil Gader

**M**icromega's ever-expanding "My Range" of compact and affordable electronics has in just a few short years grown to encompass the MyDac (TAS' 2012 Product of the Year), MyAmp, MyGroov (you guessed it, a phonostage), and a headphone amp, the MyZic. Still, the French company, known for its full-fledged electronics, realized there was something missing from the overall picture, and created the MySpeaker. Or, for those who desire to bundle the entire, er, MyCaboodle, there's the MySpeaker/MyAmp Inside—the subject of this review.

At its core the MySpeaker is a conventional compact two-way in a bass-reflex configuration. It's outfitted with a one-inch soft-dome tweeter sporting an anti-reflective surround and a 5.25" mid/bass driver. The molded composite cabinet is available in a black satin or white finish. It appears durable to the touch and nicely finished to the eye. Some may look askance at the apparent economy of these enclosure materials but it's really all about the implementation. Micromega knows this territory. The fact is, there is no consensus on what material necessarily guarantees the best sonic and functional results. I've heard great

results from materials ranging from marine plywood, MDF, and solid woods to aircraft aluminum and Formula One exotics. They can all work to varying degrees of success.

The reflex port is downward-firing rather than the more typical front- or back-firing. Micromega believes that this not only aids placement options but also offers the smoothest and most linear launch of bass reinforcement into the listening space. To give the port room to breathe, each speaker is fitted with chrome footers that elevate the ported bottom panel. This makes the MySpeaker ideal for bookshelf or tabletop placement, but the user will need to carefully consider speaker stands to ensure the stands' top plates are big enough to accommodate the woofers. To take the guesswork out of choosing stands, Micromega offers a dedicated stand.

Today's wireless speakers are available in a wide array of configurations. For example, Dynaudio's Xeo series (see the Xeo 2 review in Issue 270) represents the fully wireless/actively powered school whereby only a pair of power cords are required. On the other hand Audioengine's HD6 (Issue 262) installs most of the wireless connection electronics and amplification in one speaker that connects to



## Equipment Report MicroMega MySpeaker with MyAmp



### SPECS & PRICING

**Type:** Two-way, powered compact, bass-reflex enclosure

**Drivers:** 1" tweeter, 5.25" driver

**Frequency response:** 50Hz–20kHz +/- 3dB  
Sensitivity (at 1W/1m): 90dB

**Impedance:** 4 ohms

**Dimensions:** 12.4" x 7.5" x 12.5"

**Weight:** 25 lbs./pr.

**Power output:** 30Wpc into 8 ohms

**Price:** \$999

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the passive speaker with an umbilical cable. This latter approach, taken by Micromega with the MySpeaker, is less costly but has its own virtues including simplicity of set up. Another of these virtues is a rear-panel switch that allows you to choose left or right placement of the amplified speaker. This is a *huge* benefit during setup, making it easier to connect source components, or when there's only one awkwardly located AC outlet.

The active channel contains "the brains of the operation" (the wireless electronics, decoders, and DACs) as well as the MyAmp amplifiers. The MyAmp section is built around a Class AB output stage that delivers 30Wpc into 8 ohms, a figure that commendably doubles into 4 ohms. The amplifier is powered by an advanced resonant-mode power supply, a variation of switch-mode technology that reduces switching losses common to traditional switching supplies. The communication section accepts streams via the ubiquitous aptX Bluetooth module. MySpeaker offers one stereo pair of analog inputs along with coaxial and optical digital inputs. These two digital inputs can accept sampling rates up to 192kHz. The USB input is limited to 96kHz sample rate. A subwoofer output rounds out the connection jacks.

Convenience is a must with speakers of this segment, and the Micromega didn't disappoint. MySpeaker arrives packaged with a pre-stripped bare wire speaker umbilical to run between the multi-way terminals of the active and passive speakers. Once connected, double-check to make the sure the correct voltage (110V/220V) is selected. Then using the remote control, "pair" your phone or tablet via Bluetooth with

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## Equipment Report MicroMega MySpeaker with MyAmp

MySpeaker. A blue LED flashes to indicate that MySpeaker is pairing with your device. Up to eight devices can be paired. Another nice feature: a rear-panel USB port for recharging handheld devices.

Sonically, MySpeaker put on quite a display of solid midbass/midrange dynamics and output. In balance it had a slight forward lean but possessed an openness that was arresting in this price class. Images were depicted with physical weight and dimension rather than as mere cardboard cutouts. Unusual for a speaker of this size, I could discern the actual physical presence of musicians behind the music—a greater realization of the live performance.

Vocals were smooth, and revealed a nice degree of air and lift that enhanced their expressiveness. I would have preferred a hint more chestiness with male singers, baritone sax, or cello, but you'll hear no real complaints from me on that score. There were traces of vocal sibilance during Holly Cole's cover of "I Can See Clearly" but in general the tweeter was nicely integrated into the frequency spectrum with only minor hints of localization. This slight discontinuity was most likely due to a small energy dip near the crossover point.

Bass response extended confidently into the fifty-cycle range with little apparent effort. As I listened to tracks from Ray Brown's *Soular Energy* and Jen Chapin's *ReVisions* I was able to follow acoustic bass lines with notable timbral accuracy, a tightly controlled attack, and a feeling of room-filling weight. Even big fanfare music like the National Symphonic Winds *Winds of War and Peace* didn't ruffle this game little speaker. Still, size matters. Although MySpeaker

never shied away from higher sound-pressure levels, it ultimately revealed its econo-roots nature with a little bit of port overhang—a sensation of looseness and over-bloom in the midbass that could mask high-frequency detail. In most smaller settings however, MySpeaker could deliver more than enough low-end impact to satisfy all but the most sadistic head-bangers.

One thing I've got to say for the MySpeaker: It's got guts. While it has limits, it doesn't shrink from orchestral crescendos. It dug into the crunch-groove of Michael Jackson's "Billie Jean" with plenty of gusto. During the Manhattan Jazz Quintet's rendition of "Autumn Leaves," brass transients were swift, and solo piano was reproduced with good note-to-note articulation, although some of the finer elements of ambient information and harmonic air seemed a little squeezed. As one would expect with a loudspeaker of this spec, there was some dynamic compression. But with a few exceptions MySpeaker adeptly handled just about every example of sonic fireworks I could throw at it, from Dire Straits' "Telegraph Road" to the histrionics of Tchaikovsky's *1812 Overture* courtesy of André Previn and the London Symphony Orchestra.

Versatility and convenience define the wireless game. Whether it's a small den, dorm or desktop, music or TV, Micromega's MySpeaker/MyAmp excels in this role—happy to perform for one person or an entire *Eight Is Enough* family. The fact that it's also a superior sonic performer makes it a complete musical bundle. Micromega's wireless wonder is a one-outlet winner. **tas**

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## Equipment Report

# Audioengine HDP6

## Who Are You Calling Passive?

Neil Gader

**I**n Issue 272 I left little doubt about how much I enjoyed the flexibility and musicality of Audioengine's HD6 powered loudspeaker system. For a compact barely a foot tall, this plucky bundle had it all—it was self-amplified, DAC-equipped, and Bluetooth-enabled. All that was needed was a source component. And for its target audience—the smartphone, tech-savvy millennial—it was just what the audio doctor ordered.

So what's left when Audioengine strips away the power and connectivity? Actually, a lot. You get the HDP6, where the "P" stands for passive or unamplified—the type of loudspeaker that most audiophiles are familiar with. Cosmetically this stout little compact suggests a cozy and classic British monitor, a look suitable for a small den or study. It's a bass-reflex configuration that uses a cleverly installed, rear-mounted, horizontally slotted port. It uses a silk-dome tweeter, ferrofluid-cooled, with a neodymium magnet. The woofer is a 5.5" Kevlar woven-glass/Aramid composite with a rubber surround that's housed in a cast aluminum frame for rigidity and increased heat dispersion. The crossover is unchanged from the HD6. The stiff MDF cabinets are available in several finishes,

including walnut and cherry veneers, as well as satin-black paint. The front baffle is free of unsightly exposed woodscrews, and the detachable grilles affix to magnets hidden in the enclosure.

Lacking the built-in amplification of the HD6, HDP6 owners have the freedom to use the amp and cabling of their choice. In this instance I employed the excellent Simaudio Moon Neo ACE 50Wpc music player (review forthcoming) with Audience's remarkable entry-level Ohno cabling. In my opinion, this represented gear that prospective Audioengine owners would reasonably consider pairing with these speakers.

The HD6's sonic character wasn't turned on its head with the Moon ACE amp, either. And that's a good thing. The HDP6 retained the same forgiving, ear-coddling midrange that I noted in the original review, a richer voicing allied with a level of bass response that suggested orchestral scale beyond what its petite enclosure implies. Still, the change in amplification revealed positive differences. Transparency was improved; transient attack was quicker off the mark; and image focus and detail were better. Dynamic liveliness in the midrange had more rhythmic jump. Pitch control and grip in the midbass were



also better managed than the powered version.

As I noted in my original review, neither the HD6 nor HDP6 is ruler-flat across the frequency spectrum. There's still a rise in the mid/upper bass that creates more of a general impression of bass rather than genuine low-end response. And with female vocals the HDP6 has some added emphasis in the lower treble that imparts a whiter coloration in these octaves. To be perfectly fair, however, sonic tradeoffs are part and parcel of loudspeakers in this range—the Audioengine keeps the colorations to a minimum. The Audioengine HDP6 is a handsome, high-level performer for the traditionalist—the high-ender who still enjoys the rough-and-tumble mixing and matching of components. But keep

in mind, the under-\$1000 speaker segment is one tough neighborhood. It's hotly competitive and populated by the likes of Elac, Revel, Magnepan, and PSB, just for starters. Joining these ranks is the HDP6, a worthy inductee that can hold its head high in such company. And that spells even more great news for the budget-minded audiophile.. tas



### SPECS & PRICING

**Type:** Two-way, bass-reflex compact

**Drivers:** 1" silk-dome tweeter, 5.5" Kevlar mid/bass

**Frequency response:** 50Hz–22kHz ±1.5dB

**Dimensions:** 11.75" x 7.25" x 10"

**Weight:** 12.5 lbs. each

**Price:** \$499

### Audioengine

audioengineusa.com

(877) 853-4447

## Equipment Report

# KEF Muo Wireless Desktop System

## Honey, I Shrunk the Speaker

Julie Mullins

**D**emand for personal, wireless, and on-the-go audio has never been higher—certainly among Gen Xers, Gen Yers, and Millennials—but audiophiles of any age, or anyone else who wants a portable or desktop system shouldn't have to settle for substandard sonics. Enter the KEF Muo, a wonderful little wireless loudspeaker that delivers the sonic goods well beyond expectations, especially given its petite dimensions. Intended for those who want quality listening on the go, it's a tiny two-way that pumps out big, full, and expansive sound with respectable resolution—and even reproduces some sense of soundstaging on many recordings.

Achieving both great sound and portability is a tall order. Even in this crowded market segment, it's not easy to find that combination in a small, sleek, and smartly designed package. Producing big sound from a small speaker also presents big engineering challenges. Fortunately the UK-based loudspeaker manufacturer KEF has industrial designer Ross Lovegrove in its corner. Lovegrove, who designed the company's acclaimed Muon flagship floorstander, also conceived the

Muo, which represents the opposite end of the speaker spectrum size-wise and price-wise. Yet the two have plenty in common: Many of the Muon's key design elements have been reproduced in the Muo, though obviously on a smaller scale. The Muo's smooth, modern exterior is made from the Muon's same acoustically inert, solid, brushed aluminum that minimizes resonances (though with the Muo you can feel some slight vibration in the lower octaves). The Muo has a substantial weight and feel; at just shy of two pounds, it's heavier than it looks. (A pair could almost double as hand weights for arm curls.) It's available in six striking matte color options: Light Silver, Neptune Blue, Sunset Orange, Storm Grey, Horizon Gold, and a limited-edition Brilliant Rose. The form factor is vaguely cylindrical, only with three sides and gently curved edges. A pair of soft, rubberized stoppers on the bottom prevents rolling when the speaker is in its horizontal position. It can also be positioned vertically on its side/end and, when paired with a second Muo, played in two-channel stereo mode. When both speakers are positioned horizontally they're said to be in "party mode." More on this



flexible usage later.

Yes, the tiny two-way Muo is elegant looking, cute even, but don't let its stylishness belie some serious proprietary technologies inside that have been "trickled down" from the Muon. (If you shine a light and look through the grille holes on the front panel you can actually see the drivers.) Let's start with the unique Uni-Q "point-source" driver array, a miniaturized version of the Muon's. There are two identical 50mm/2-inch full-range Uni-Q drivers, each with a decoupled central dome tweeter and midrange, in addition to one auxiliary long-throw radiator in between for better bass extension. When two drivers are placed closely together in a small enclosure, stereo imaging becomes difficult to extend beyond a limited sweet spot close to and directly in front of the speaker. High-frequency interference can distort and color the sound outside this area. In the Muo, only one Uni-Q driver handles the full frequency range, while the other driver plays only low and midrange frequencies. This configuration enables a "gentle" crossover for wider overlap and better sonic dispersion. Indeed, the Muo not only sounds like a larger speaker than it

is, but its sound can fill a small-to-midsized room quite capably. In addition, either one (or a pair) is handy for desktop use, offers portability for travel, and paired most easily with my iPhone. (On practical note, I'd suggest that a slipcover case might be a worthy addition for a future model to help protect against marks and small surface scratches on the aluminum.) You can stream via Bluetooth 4.0 aptX from your computer or mobile device, or listen via an auxiliary input (DAC, NAS, etc.); plus there's a micro-USB input, which can be used for charging and firmware updates.

The Muo comes with a mini-USB (3.5) cable and a selection of international plug-in chargers (which vary by region) for its Li-ion battery; KEF has also just introduced an optional pocket-sized portable charger (\$50) shaped like a mini Muo (which can also be used to juice up your smartphone or other devices)—not that you constantly have to worry about that: A full charge lasts for up to 10–12 hours of listening time, depending on playback SPLs. Also included is a small quick-start guide booklet (available as a PDF download on KEF's website as well) with mostly pictorial-based explanations and less text. Better still, there's a free KEF Muo app for both Android and iPhone (available via the Google Play Store and the Apple App Store). It contains clearer wireless setup instructions than the quick-start guide

### SPECS & PRICING

**Drivers:** 2 x 2" tweeter/midbass, 1 x bass radiator

**Inputs:** Bluetooth 4.0 aptX codec, 3.5mm aux

**Dimensions:** 8.3" x 3.1" x 2.3"

**Weight:** 1.8 lbs.

**Price:** \$350 each  
kefdirect.com

## Equipment Report KEF Muo Wireless Desktop System

and offers handy access to your phone's iTunes library.

### Setup and Synchronization

Basic setup when paired with my iPhone 6 was quite user-friendly, but connecting with my Mac computers proved more challenging (as I'll describe shortly). You can pair the Muos in their vertical position for stereo use, or place them horizontally for "party mode" listening (that is, two speakers each playing in mono for increased volume potential); an internal DSP sensor automatically shifts the output based on the speaker's orientation. The smart little Muo even remembers up to seven devices and can prioritize pairings based on their initial chronological order.

The Muo has four buttons on one end: the main power and multi-function button (round one in the center), a smaller round one for synchronizing one speaker with another (via Bluetooth) for stereo mode, and a button each for volume up and down. Various chime tones indicate power on and off, as well as Bluetooth connection, disconnection, and synchronization.

To connect one speaker to your iPhone, turn the speaker on by pressing the center button for about three seconds, make sure your Bluetooth is on (under Settings native app), then select "KEF MUO" from "My Devices." You're all set. Connecting a pair of Muos in stereo mode (vertical position) requires another couple of button-presses (plus a little patience). First connect one—and only one—Muo to your phone via Bluetooth, then turn on the second Muo. On the first speaker, press and hold down both the main button and the smaller round one at the same time for

two or three seconds. Repeat this on the second speaker (right channel). Sit tight while the Muos synchronize—about ten to thirty seconds or so, depending on the strength of the Bluetooth connection. You're ready for two-channel playback. You can also shift the speakers into horizontal position while they're playing, and they automatically reset from stereo to dual-mono or "party mode." Various combinations of two or three tones and a small ring of LED light (that switches colors) around the main button indicate changes in connection, disconnection, and power.

I experimented some with placement for stereo playback, varying distances between the speakers. Distances of up to 6 or 8 feet between the Muos with just a little toe-in seemed to work well for stereo, but I found I did as much nearfield listening at just a few feet. Though I listened less in dual-mono or party mode, up to 10 feet apart seemed do-able there.

Setup is quite similar with computer sources. As I'm a Mac gal, I used both a MacBook Pro (mid-2012) running OS X 10.9.5 and a MacBook Air (2015) running OS X 10.10.5. (The folks at KEF informed me that the connection process is quite similar for PCs—as expected.) In contrast with my iPhone source, I encountered a couple of minor glitches along the way—hardware-related as it turns out. I found I needed to reboot the laptops once or twice for the Bluetooth to "find" the Muo. In stereo mode, the Bluetooth connection was dropped in the right channel a couple of times but only very briefly. My MacBook Pro was running an older OS that didn't support Bluetooth aptX, but I was able to find a workaround. If possible, I'd recommended updating to El Capitan or Yosemite, which both seemed to work fine.

### Sonically Speaking

How does the Muo sound? What struck me most was how engaging the presentation was; I didn't expect the degree of detail, coherence, and immediacy. How they packed this remarkably clean- and clear-sounding configuration into this sleek, petite form is a wonder—and a testament to the Muo's clever design.

I mostly listened to Tidal streaming (hi-res version in Chrome) and tracks from my library ranging from lousy mp3s and Red Book CD rips, to high-resolution tracks. The Muo certainly made the most of the lossy/low-res files, presenting them with better sound than they had any right to have. Cuts from Tori Amos' *Under the Pink* (2015 remastered version) streamed via Tidal (in its hi-res version) revealed excellent midrange prowess and presence. The Muos were able to convey the emotion behind her plaintive, pleading vocals. Sibilants seemed spot-on. Tori sounded like Tori, and her Bösendorfer piano also sounded quite true-to-life (though miniaturized). A listen to Miles Davis' "So What" and other cuts from *Kind of Blue* via Tidal delivered pretty quick transient attacks and delicate decays, particularly on Paul Chambers' double bass, and pacey energy throughout. Cymbal taps were quite clean and nuanced, with effortless loud-to-soft dynamics across all percussion. As one would expect of such small speakers, soundstaging in stereo mode wasn't huge; nevertheless, some sense of the musicians' distances from each other was maintained.

The Muo is light and quick in balance, which lends it a pleasing sense of effortlessness—an advantage of certain smaller speakers. But the Muos can also rock out, as I discovered on the

White Stripes' heavy-duty, brash and bluesy "Ball and Biscuit," where the speakers flexed their muscles to reproduce Jack White's growling guitar licks admirably. I was told the Muo goal was to maintain cleaner sound over louder sound, even if that means sacrificing a little dynamic headroom or bottom-end. Obviously the Muos don't sound like floorstanders, but they sound larger than they are, and their ability to image in stereo is more than respectable, albeit miniaturized. Careful placement also helps.

Priced at \$350 each, the Muo might not be the cheapest in its category, but its sound and robust build-quality would give a good many compact, portable, and wireless speakers a run for their money.

### Conclusion

In the areas the Muo is designed to play in, it plays very nicely indeed. As I've described, it's a scaled-down "mini-me" version of the Muon. Though it contains many of that flagship model's materials and technologies, the little Muo could hardly be expected to deliver comparable sound. But the point here is about leveraging what can be reapplied—such as the design of the driver array—to elevate the portable and wireless speaker experience. As such, it's an overachiever in many aspects. It's no small feat to make a speaker of this size sound as big, expansive, and remarkably detailed as it does. I'd enthusiastically recommend the Muo (probably a pair) to non-audiophile friends who are music lovers. I'd even give it a thumbs-up for certain audiophile friends (those who listen to digital, that is). Further proof that great things can, and do, come in small packages. **tas**

## Our Top Picks Desktop and Powered



### Audioengine A2+ \$249

Easily one of the best deals in high-end audio, these 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, Issue 241



### KEF Muo \$299

This wonderfully portable wireless loudspeaker delivers the sonic goods well beyond expectations, especially given its petite dimensions. Intended for those who want quality listening on the go, it's a tiny two-way that pumps out big, full, and expansive sound with respectable resolution—and even reproduces some sense of soundstaging on many recordings. It also features a mini version of the same driver technology found in the maker's Muon flagship. JM, 265



### Audioengine HD6 and HD6P \$749

The powered, DAC-equipped, Bluetooth-enabled, two-way HD6 is comfortable on a desk or shelf, flanking a flat panel or set out in the room on a pair of stands. It's basically a complete audio system that only needs a source as humble as a smartphone to get up and running. Sonically it has a forgiving signature in the treble range, and an ear-coddling midrange with a warmer, slightly darker voice that is effective at conveying big sound from a small box. It's hard to imagine a loudspeaker that does more for less. A crossover product like few others. NG, 262



### Audience The One and 1+1 V2+ \$995, \$2345

The One 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. The One is the second-best desktop speaker reviewer Steven Stone has heard (after the Audience 1+1). SS, 236  
The Audience 1+1 V2+ greatly improves on this fundamental design, adding a second rear-facing driver and dual side-firing passive radiators. The bass is weightier, fuller, and deeper, and the other refinements result in even greater resolution and detail. Although the 1+1V2+ is the ultimate desktop speaker, it works equally well in a small to medium-sized room, provided that you have realistic expectations about the bass extension and playback level. RH says that you won't find greater musicality for the price—whether on a desktop or on stands. RH, 273

# BOOKSHELF, STAND-MOUNT

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*OUR TOP PICKS IN BOOKSHELF AND STAND-MOUNT*

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to read that review*

## Equipment Report

# Air Tight Bonsai AL-05

## Tiny but Mighty

Julie Mullins

**I**f you think mini-monitor means small sound, the Air Tight Bonsai will have you thinking again. Forget mini; the sound here is decidedly, uh, maxi. For starters, the speaker's wide dispersion and voluptuously full and rounded imaging will fool you into thinking you're listening to a far larger transducer. Plus, in the midband the Bonsai delivers an exciting sense of immediacy and a bold presence, coupled with remarkable detail, that also belie its size and single 4" driver. It's a thing of beauty to behold, to boot.

Air Tight, founded by the legendary Atsushi Miura and based outside of Osaka, Japan, is known first and foremost as a manufacturer of extraordinary handcrafted tube electronics. Indeed, the single-driver Bonsai is currently the sole loudspeaker bearing the marque's name. But it's quite a special speaker and one that's certainly a delight to have around. Before I delve into why, let's begin with a little background.

Mr. Takanori Ohmura, formerly of Luxman, designed the Bonsai's driver and enclosure. An expert on speaker diaphragms, Mr. Ohmura has focused his research on full-range drivers for more than 15 years. His connection to Mr. Miura and Air Tight dates back to their days at

Luxman, the company Mr. Miura's father-in-law founded and that Mr. Ohmura joined in 1976. (For more about Mr. Miura, see JV's recent Hall of Fame feature on the designer in Issue 268.) Mr. Ohmura now runs his own factory in Malaysia called AMM Laboratory where the Bonsai's driver is made and where the speaker is assembled.

The version of the Bonsai I auditioned, also known as the AL-05, marks the monitor's third iteration over a decade and a half; the previous versions are the MSM-1 and the AL-03. The "AL" designation refers to the multi-core Alnico magnet used in the driver assembly.

According to information provided by Air Tight, Mr. Ohmura's ongoing interest in full-range drivers lies in their general phase correctness. All versions of the Bonsai have had 10cm-diameter diaphragms. (Ohmura-san has never increased diaphragm size—to obtain louder volumes and deeper bass—as this would lead to a loss of phase coherence due to time delays.) To offset single-transducer disadvantages—specifically, a lack of scale, impact, and power—Ohmura-san has not only improved the enclosure through the years, but has also concentrated on finding the most suitable coating

materials and multi-polymer paints to apply to his nano-woven glass-fiber diaphragm to achieve the quickest transmission speeds. The Japanese have a long cultural tradition of polymer chemistry and lacquering techniques—and Ohmura-san's chemistry degree helps, too, as does his studies of violin finishes and piano lacquers.

Speaking of finishes, the Bonsai's wooden enclosure is available in either a high-gloss rosewood or piano-black; my review samples were the elegant rosewood. There are grilles that attach to four tiny pegs on the speaker's face, but I never really used them. The drivers are too pretty to cover up! Surrounded by a near-square panel of glossy rosewood, the gold-toned coating of the diaphragm glows with a subtle sheen.

### Setup and Sound

Given their diminutive dimensions and light weight (11 pounds) the Bonsais were a snap to set up. However, you will need to consider supplying stands for them, as none are included with the speaker. I used custom ones I had on-hand, but for a time I also placed the Bonsai's atop another pair of speakers I have in house for an upcoming review. These are small guys, so

just a touch of toe-in is all it takes to get them up and running with images snapping readily into place. My listening positions ranged from about 7–12 feet away from the speakers. Up close, I heard more detail; further back, more color. My room is quite large (approximately 35 feet by 17 feet with 12-foot plaster ceilings). For my critical listening I mostly drove the monitors with the superb Air Tight ATM-1S stereo power amp—a great match. I'd heard this combo demo'd at a few audio shows, too. (See above for the rest of the system.) To keep this review to its assigned length I'm going to stick to that tube amp pairing and to LP listening. (Analog all the way!)

Broadly speaking and on most program material (especially well-recorded music), playback through these transducers resulted in a big, full, highly engaging sound. These monitors ain't no wallflowers. Thanks in part to the diaphragm's unique proprietary coating, the Bonsai's single driver offers a pacey presentation that feels evenhanded and effortless yet offers a roundness that might be described as tube-like in its dimensionality. There's also a decided mid-range emphasis (as you would expect from a single-driver speaker of these dimensions).



## Equipment Report Air Tight Bonsai AL-05

With jazzy material, such as Diana Krall *Live in Paris* on ORG's excellent 45rpm LP, vocals registered as smooth, present, and quite realistic. While I wouldn't call the soundstage the deepest or widest I've heard—these are mini-monitors, after all—the sense of venue was portrayed admirably well, with instruments placed where they should have been (given the scale here). There's an openness, size, and spaciousness to the Bonsai presentation that's surprising and pleasing. Krall's piano on "Deed I Do" was reproduced with quick-footed transient attacks and good verisimilitude—ditto Jeff Hamilton's crisp snare delivery. On top I detected a slight softening on some cymbal taps, an almost lispy effect—but this was a rare occurrence. John Clayton's upright bass seemed slightly recessed at times, but I suspect this might well have been in part because of the way it was miked. There may have been a touch of brightness to the piano's upper registers, but then I'm sensitive to brightness. I'm picking nits—the Krall LP was overall a thoroughly enjoyable experience.

Next I spun Buena Vista Social Club's eponymous album; this one is also packed with mid-range delights but contains more complex layering of instruments than the Krall disc. Here, right from the "Chan Chan" opener, the snare had energetic snap and speed while the multifarious percussion instruments were distinct and well defined. Shakers and various hand-drums displayed lovely delicacy and detail. Muted cornet sounded richly lifelike, as did Ibrahim Ferrer's lively tenor. Again, the Bonsai's pacey nimbleness carried the day; the counterpoint to which is reduced power-and bass-range color and impact. (Given the inherent limits of a single-driv-

er in a very small box, this must be considered part and parcel of the Bonsai experience. Bass doesn't go much below 100Hz and thins down well above that point.) Yes, not all of the usual high-octane gusto of this energetic album was conveyed—it could have used a dash more hot salsa in the mix. Still, the sound was quite enjoyably realistic where the speakers played.

OK, I must admit I wasn't expecting rock 'n' roll to blow me away with the Bonsais, but my old promo copy of David Bowie's "Let's Dance" on a 12-inch single (remember those?) did just that. Wow! I almost had to turn the volume down, but it was too much fun to listen loud. The whole mix came alive—from the excitement of the initial hard-hitting drum attacks to the bold, resonant swagger of Stevie Ray Vaughan's guitar to the synth effects flickering between right and left channels, to Bowie's expressive vocals, with claves clean and crisp as you please. It was hard to believe that such huge and impactful sound was coming from these little boxes with their little drivers. (Indeed I have been fooled at shows more than once into thinking that other, larger speakers were playing when it was the li'l Bonsais sitting beside them that were doing the deed!) I just about leapt up off my couch following Bowie's lead.

I feel compelled to share one more notable listening example: Analogue Productions' superb 45rpm reissue of Muddy Waters' *Folk Singer*, which sounded terrific with the Bonsais, "Good Morning School Girl" and "You Gonna Need My Help," in particular. The rapid-fire attacks of Clifton Jones' snare were suitably snappy; Muddy's vocals were realistic and reproduced with the slight reverb I'm accustomed to hearing; the

Bonsais even recovered some studio ambience, drawing me deeper into a classic taped more than half a century ago. Imaging was also impressive, as was the resolution of the details and textures of these spare arrangements—the guitar strings' subtle squeaks, the growls of Muddy's voice.

### Conclusion

The Bonsai AL-05 mini-monitors offer an extremely pleasing mix of tube-like bloom, nimble pace, snappy transients (particularly in the midband), impressively wide dispersion, and the octave-to-octave timbral and dynamic coherence that only a single-driver speaker has to this degree, coupled with higher-than-expected resolution of detail. Whatever shortcomings exist at the frequency extremes, they are more than made up for by the monitor's three-dimensionality. Transients are quite fast even if their leading edges aren't always razor-sharp.

While I wouldn't describe the Bonsais as highest-resolution speakers, they do present a remarkable degree of detail (especially on well-recorded source material), far more than one would expect for their size and type. But, oh, their presence and dimensionality! Those combined with their big, full soundstage (and almost complete disappearing act) make them winners that exceed expectations across most criteria. Where they're intended to play, they play exceedingly well, and (not surprisingly) the midrange is their strong suit. As such, and given their petite dimensions, these might make a good choice for a secondary setup, say in a study or a bedroom.

I'd imagine that Japan's smaller-scale living quarters must have influenced the Bonsai's development. They certainly fulfill the desire for large-scale sound in a small, yet beautiful package. **tas**

### SPECS & PRICING

**Type:** Single-driver mini-monitor

**Driver complement:** 10cm (4") full-range driver

**Frequency response:** 70Hz–20kHz (-10dB)

**Impedance:** 4 ohms

**Dimensions:** 170mm x 270mm x 220mm

**Weight:** 5 kg (approx. 11 lbs.)

**Price:** \$2500

#### AXISS AUDIO (U.S. Distributor)

17800 South Main St., Suite 109  
Gardena, CA 90248  
(310) 329-0187

**Associated Equipment** (specific to this review)

**Amplifier:** Air Tight ATM-1S stereo amplifier

**Source:** Acoustic Signature Challenger 3 with TA-1000 tonearm, Air Tight PC-7 cartridge

**Phonostage preamplifier:** Souolution 520

**Power conditioner and power cords:** Ansuz

**Cables and interconnects:** Shunyata Research Venom series, AudioQuest Fire, Crystal Cable Absolute Dream

**Equipment racks and amplifier stands:**

Critical Mass Systems Maxxum

**Acoustic treatment:** Stein Music



## Equipment Report

# Aerial Acoustics Model 5T

## A Compact to Covet

Neil Gader

**Y**ou don't need to be a connoisseur of compact loudspeakers to recognize that the Aerial Acoustics Model 5T is quite a looker. Short (a mere 15" in height), dark, and handsome, it's a gracefully proportioned two-way in a bass-reflex configuration. In spite of its modest \$3795 base price, the 5T in many ways mirrors Aerial's larger and pricier models, the Model 6T and Model 7T. For example, it has comparable curvilinear cabinet construction; the same luxe, high-gloss finish; the same tweeter; similar refinements to its woofer; and similar premium crossover components and wiring. At the same time it also represents an all-new design at its price point, entering the Aerial line as a replacement for the 5B.

Readers may recall that the 5B was a smaller, acoustic-suspension two-way, with lower sensitivity. Aerial's Michael Kelly says that "with the new 5T, we wanted to extend the bass, maintain good bass definition, and increase sensitivity slightly. The 5T accomplishes these things but uses about 30% more internal volume to do so." Significantly, the 5T is also purposely designed to be flexible in placement—anywhere from two inches to two feet from a wall, and equally happy on a bookshelf, a tabletop, or mounted

on a stand. (Aerial will be offering its own bespoke speaker stand later this year.)

The posh enclosure is crafted by bonding multiple layers of wood together under high pressure for 48 hours in a 20-ton press. Aerial then adds crossbracing to the already thick walls and damps the interior with New Zealand long-fiber wool. The slanted, front baffle is attached to the cabinet face with an environmentally safe damping glue. The port is front-facing and optimized with a streamlined flow for extended bass response near wall boundaries. Aerial has always been known for its exquisite finishes, and it hasn't dropped the ball with a more modest effort like the 5T, using what it describes as "architectural veneers." Four priming layers are applied followed by a ten-layer hand-polished gloss finish. The 5T is offered in Nero metallic black, high-gloss rosenut, or an all-new premium high-gloss ebony.

The driver complement comprises the same custom-made ScanSpeak 1" woven, ring-dome, dual-magnet tweeter from the 7T, with machined aluminum face plate, and a new 6.7" long-stroke, dual-magnet, papyrus-blend mid/woof, custom-made for the 5T. The high-order multi-element crossover

uses polypropylene capacitors, silver solder, and Teflon-shielded wiring. Crossover is at 2.7kHz. The back panel has two pairs of binding posts with jumpers for single-wiring, bi-wiring, or bi-amping. A thoughtful touch: There are the four adjustable spikes with protective covers for furniture or bookshelf placement.

The sonic mission of the 5T came through loud and clear—a deceptively small footprint to disarm the listener and then, ka-boom, a full bodied, big-boy, musical signature. From the fusillade of winds, bass drum, and timpani that opens Copland's *Fanfare* to the crunch-groove of Michael Jackson's "Billie Jean," the 5T stands as a rebuttal to the small compacts of yore that were not only bass-shy but carried stingers instead of tweeters.

In tonal balance, the 5T is not a speaker of extremes. It satisfies by concentrating its energy right down the middle, projecting a round, rich, colorful musical landscape that avoids any brittle, aggressive, or forward tendencies. Its balance is not of the over-hyped variety, either in the upper octaves or in the mid-to-upper bass.



It has a forgiving character that keeps sibilance in check, soothing and smoothing the reedy rasp of a tenor sax or the smoky sensuality of a Stevie Nicks vocal on, say, "Dreams." Its treble range is lightly shaded, and on occasion this lowers the ceiling of the acoustic. To my ears, the 5T was not pool-table flat over the frequency spectrum, either; yet, the overall truth of its warm midrange always kept its balance musical. In my opinion, when a fifteen-inch-tall loudspeaker trades some overall accuracy for a bit of added charm and musical flattery, it's a fair exchange.

With the 5T positioned about two feet from the back wall of my listening room, I enjoyed bass response that was smooth and tuneful, with extension into the 50Hz range. (Response weakened when the speaker was moved further out into the room, lending credence to Aerial's claim that the 5T is, indeed, optimized for wall proximity.) The 5T was also lively and nicely weighted in the critical mids and lower mids—

## Equipment Report Aerial Acoustics Model 5T

the range that captures the physical presence of vocalists, cello resonances, and the bloom of a concert grand piano. For example, during the cello solo from Nickelcreek's "Green and Gray," the 5T provided a real sense of the way the movement of the bow creates a ripple of harmonics as it passes over the lower strings. Keep in mind that in order to extract the quality of bass I was enjoying, amplifier power is important—the 5T's really start to sing with 100Wpc but will be even happier with more.

Low-level resolution was also very good. During Harry Connick, Jr.'s rendition of "A Night-

### SPECS & PRICING

**Type:** Two-way, bass-reflex compact

**Drivers:** 1" soft-dome tweeter, 6.7" papyrus-blend cone mid/bass

**Frequency response:** 48Hz–25kHz +/-2dB

**Sensitivity:** 87dB at 2.83Vrms and 1.0 meter on axis

**Nominal impedance:** 4 ohms (3 ohms min)

**Dimensions:** 15.0" x 7.9" x 12.6"

**Weight:** 23 lbs.

**Price:** \$3795/pr. (high-gloss rosenut or Nero metallic black); \$4195/pr. (high-gloss ebony)

### AERIAL ACOUSTICS

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ingale Sang in Berkeley Square"—a tasteful, intimate track for voice, sax, and bass—the textures were velvet, relaxed, and forgiving. Micro-dynamics and transient information were good, and the percussive hand-tapping upon the bass was nicely defined though not quite as crisp as I've heard it sound on my reference ATCs. Port artifacts or overhang were close to nonexistent, even when the speaker was facing the challenge of pipe organ during Rutter's *Requiem*. Only a slight looseness crept into the lower reaches of its midbass. All in all, the 5T performed uncommonly well in this regard for its modest size, and while a great small sub like the REL T7i would add to the bottom-octave festivities, the little speaker rarely left me unsatisfied.

One of the key strengths of the 5T is its reproduction of soundstage and dimension. As I listened to Audra McDonald's performance of "Somewhere" from her album *How Glory Goes*, her vocal clearly projected from a point slightly further upstage than I usually experience with this recording. Equally impressive was the manner in which symphonic music was conveyed with a depth and section-layering that often extended to the back wall of the auditorium. If you picture yourself in a concert hall, the 5T presents a row G perspective—a little further back than average but still a seat that would allow a listener to gather in the entire ensemble while also zeroing in on individual musicians. Part of the credit for this perspective might be owed to the warmer general character of the 5T, and a small drop off in the upper-mid or presence range. Also playing a role is the absence of diffraction artifacts, due to the narrow baffle.

In the final analysis, some loudspeakers feed the head, while others like the Aerial 5T touch the heart. Its performance, warm listenability, and fetching cosmetics are uncommon in

a small loudspeaker in this range. The 5T is a speaker you can curl up with and enjoy all day, everyday—as I found myself doing.

A compact to covet.

## A Few Words with Michael Kelly, Aerial Acoustics

### What are the challenges in designing a modest two-way compact?

The new 5T is the smallest speaker we make, but it has about 30% more internal volume than our previous 5B and is slot-vented. We wanted to reach lower, avoid a bass signature (a typical problem with small speakers), and improve sensitivity and dynamics while correctly balancing bass and midrange using just the woofer—also a challenge in a two-way design. I think the 5T's combination of a long, smooth slot vent with low tuning and a unique crossover design with modified crossover "knees" achieves those goals. The laminated and heavily braced curved cabinet is lavishly built and is exceptionally inert for a small speaker.

### Do you learn something from every new model—something that makes you a better designer? If so, what did the 5T teach you?

Well, it is always fun to make something small that turns out better than you expected and does almost everything right. It is my kind-of "desert island" speaker—a speaker that has sufficient bass to be satisfying on most music without a sub, is excellent from about 50Hz up,

is exceedingly natural and transparent, images well, and ages well. By that I mean it doesn't have some characteristic that over time starts to annoy you. It is always satisfying—yet small.

### Could you name a couple things that TAS readers would be surprised to know about Aerial Acoustics?

Aerial was started in 1989 and incorporated in 1991 by David Marshall and myself. Dave and I worked together at Analog and Digital Systems (ADS) for many years before that where we built all of our own drivers in-house on a large scale. I learned about driver design and manufacturing at Braun in Germany and was the guy who transferred that know-how to the U.S. Today we have custom drivers made mostly in Denmark. Our complex, high-quality laminated and curved cabinets are made in various places using the latest German and Italian furniture machinery. We have always designed and assembled 100% of our products here in our small but modern factory in Massachusetts near Boston. Our goal is to provide exceptional performance at a reasonable price that people will enjoy for a long time. **tas**

## Equipment Report

# Starke Sound IC-H3 Halo Elite

## Elite, Indeed

Neil Gader

**I** first encountered Starke Sound loudspeakers at T.H.E. Show Newport a couple of years ago. As I elbowed my way into Starke's crowded demo room, I was impressed by the buzz of excitement from the mostly younger attendees—good news as I'm always on the lookout for indicators of the high end's future. Starke's line of loudspeakers not only sounded promising; they also seemed reasonably priced, and teased the eye with splashy candy-color and metallic finishes, sparkling, thick, aluminum baffles, and copper accents. I thought to myself that this was a team trying to shake things up.

I learned that Starke Sound is a Southern California-based company founded in 2009 by a group of designers and engineers—all of them audio enthusiasts. Their goal was to create a speaker company whose products spanned the home cinema, multi-channel, and audiophile markets, and embodied top-notch technology and contemporary design. Today, Starke Sound assembles its subsystems and products in Europe, North America, and Asia. The company is vertically integrated, building its own drivers

(including beryllium transducers), cabinets, and crossovers, producing its own paints, and doing its own assembly. Its current product catalog boasts roughly sixteen models—left/right, center, and surround speakers, in-walls, and a subwoofer. Starke even offers amplification. Its lineup includes the "standard" Brio series, the Halo series, and the Elite and Signature series that include bespoke wiring and, in some instances, beryllium drivers.

There are two stand-mount three-ways in Starke Sound's Halo series. The IC-H3 Elite reviewed here is the larger of two, and it sure does know how to make an entrance. Its unique look disrupts the stand-mount-speaker social order with glossy full-color finishes set off against gently raked, brushed-aluminum front baffles that extend beyond the edges of the enclosures. These and other details lend the IC-H3 a hip look, ideal for contemporary open spaces. At nearly 26" tall, the IC-H3 is not truly a compact; it's too big to be placed on a bookshelf and too short to rest on the floor without stands. Because of the fifteen-inch depth of the speaker, the platform it sits on needs to be able

to support its 64-pound weight. To this end, Starke markets a dedicated stand—the handsome all-aluminum Stand3.

The driver complement includes a 1" soft-dome tweeter, a 4" carbon-fiber cone midrange, and twin 6.5" composite-paper woofers. The IC-H3 employs a fourth-order crossover with 300Hz and 2.9kHz hinge points. For the mid and bass drivers Starke employs its own dual-gap Linear Magnetic Field (LMF) technology—a long-coil/short-gap design where the voice coil travels through multiple gaps. The voice coil is underhung with regards to the entire magnetic structure, but overhung with regards to each individual magnetic gap. Starke says that with LMF there's no reduction in magnetic flux density in the gap. Translation: less distortion.

The sealed (acoustic-suspension) enclosure uses constrained-layer construction comprising laminated HDF and MDF boards of varying thicknesses. These are then shaped with a CNC cutter and finished with an epoxy coat to create a seamless surface for the application of piano-gloss paint. The sides, top, and rear are braced with a matrix of 25mm-thick MDF. The



## Equipment Report Starke Sound IC-H3 Halo Elite

tweeter is housed in its own machined-aluminum chamber. Starke Sound midrange drivers are similarly isolated inside a 25mm-thick HDF enclosure. The rest of the internal volume is reserved for the woofers.

Starke uses the term “hybrid” to express the multi-dimensional mission of its speakers. The word suggests a loudspeaker that can easily span the cinemaphile/audiophile divide. Dan Wiggins (Chief Technical Officer of Starke) told me that “there are different expectations [from cinema and audiophile speakers], but both must do the same thing. A cinematic speaker is often sought out because of its dynamics. Audio typically requires exacting frequency response, a very smooth and linear off-axis response (for imaging), and low distortion (to avoid sonic coloration). As cinema and audio benefit from each other’s strengths (high dynamic range never hurts in an audio situation), we set out to make a speaker that can do both.” I think the high end has always considered wide dynamics critical to the listening experience, but I grant the notion that the HT “explosion” in the 90s brought the issue into even greater prominence.

Sonically, the IC-H3 Elite was a boisterous floorstander thinly disguised as a stand-mounted compact. From the initial percussion bursts of Copland’s *Fanfare for the Common Man*, the gusto and linearity of its dual-woofered low end quickly upended any thoughts that the Starke was going to be a paper tiger. During this showpiece the sound was explosive, with considerable grip on the bass drum/timpani concussions and clean, natural decays that didn’t smudge the adjoining fiery brass and winds sections. The IC-H3 gamely handled the full weight of this piece, taking the

measure of each rippling harmonic with tunefulness and control. Such bass precision is one of the keys virtues of sealed-box loudspeakers, with bottom octaves devoid of overhang or port effects. In this instance, the Starke found a happy medium, neither truncating the note nor (as is the case with some bass-reflex designs) letting it overstay its welcome. Additionally, in the macro-dynamic sense, there was no mistaking that I was in the presence of a three-way. The typical two-way would be inviting a hernia if it attempted to summon the low-frequency dynamic energy and sheer SPLs that the Starke effortlessly displayed.

Moving upward into the lower-mid octaves, the melancholy, expressive voice of the cello during the Bruch *Kol Nidrei* was warmly reproduced—the resonant body of the instrument was fully present, and its dark sonic radiance, which conveys the power and spirituality of this music, was powerfully affecting. With Edgar Meyer’s acoustic bass, I found that the Starke hung onto the sustain with outstanding clarity and conviction. As I listened to these large-bodied instruments it struck home that the qualities that I often miss with many loudspeaker systems is the distinctive woody timbre that separates a hollow-bodied string instrument from other members of the orchestra. With its superb performance in this area, the loudspeaker seemed to be reading my mind.

As the IC-H3 ascended into the upper middle octaves and lower treble it displayed a conservative and forgiving side that was more in keeping with audiophile values than the hot metallic approach of some of the less-than-genteel home-theater efforts I’ve experienced over the years. This was not an in-your-face,

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## Equipment Report **Starke Sound IC-H3 Halo Elite**

studio-monitor type of delivery. Imaging was solid and the speaker created firm center-stage images with vocals. However, at times I felt that vocalists were a step or two recessed in the soundstage. Further, as I listened to the DSD file of Dave Brubeck's "Take Five," Paul Desmond's alto sax struck me as sweeter than I typically hear it sound—that some of the sax's reedy attack was reduced. During Evgeny Kissin's performance of Glinka's *The Lark*, the concert grand also lost some of its note-to-note clarity and intensity during lightning-fast trills. Was the IC-H3 slightly overdamped in the upper mids and lower treble? Perhaps a bit, but I don't want to exaggerate this impression. While you won't mistake the Starke for an electrostat, the losses of transparency and speed are minor reduc-

### SPECS & PRICING

**Type:** Three-way, acoustic-suspension, stand-mount loudspeaker  
**Drivers:** 1" tweeter, 4" carbon-fiber mid, (2) 6.5" aluminum woofer  
**Frequency response:** 38Hz–22kHz  
**Nominal impedance:** 4 ohms  
**Sensitivity:** 90dB  
**Dimensions:** 11.8" x 25.6" x 15.4"  
**Weight:** 64 lbs.  
**Price:** \$6495

### STARKE SOUND, LLC

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tions that most listeners will easily factor out of the overall listening experience. I found that the Starke more than made up for these losses thanks to its tremendous soundboard weight and sustain in the lower registers.

What about movies? It's a dirty little secret but there are more than a few audiophiles who, on occasion, are also looking to satisfy that home-theater sweet tooth—and I admit to being one of them. In my modest listening room, a pair of H3s all by its lonesome (no sub or center channel) was in its element. Soundtracks heavy with dialogue, like the film *Fences*, were articulate but not overly assertive. Movies that featured pyrotechnics and assorted special effects, such as *Star Wars: The Force Awakens*, were a showcase for the Starkes. During battle sequences, and even in lieu of surround channels, they twisted the air in the listening room with an authority and fury that created an atmosphere of intergalactic immersion. Their wide dynamic range unleashed the energy of the John Williams-conducted, ninety-piece symphony orchestra with almost casual ease.

My first encounter with Starke Sound and its IC-H3 was one of the more memorable blends of style and substance I've come across lately. With its combination of two-way delicacy and thrilling low-frequency slam, it carves a unique niche for stand-mounted speakers in today's market. When you add its bold, eye-catching, contemporary design, you get the kind of speaker that creates a stir in a hobby that is often a little too conservative and insular.

An auspicious debut, and an enthusiastic thumbs-up to a company that I will be watching with anticipation in the coming years. **tas**

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## Equipment Report

# Crystal Cable Arabesque Minissimo Diamond Edition with Subissimo Subwoofer

Grace under Sound Pressure

Julie Mullins

**W**hen high-end audio manufacturers delve into the so-called “lifestyle” category they must tread lightly to avoid giving the impression that they’re prioritizing good looks at the expense of great sound. Sure, there are many approaches to product development and how budgets get divvied up, just as there are audiophiles who crave not only high-fidelity musical reproduction but also gear that’s a pleasure to have around—to look at and live with in their home, to enjoy interacting with it. Can’t one have the best of both worlds? Certain companies seem to think so (Sonus faber, Burmester, McIntosh, among many others), and this brings us to the inimitable Crystal Cable led by Edwin and Gabi Rijnveld, the husband-and-wife team who are the creative minds behind the Netherlands-based company. Crystal Cable stands out for its seemingly endless capacity for innovation, its high-end technology (thanks to Edwin’s engineering prowess), and its exquisite design across all product offerings, from loudspeakers

and amplifiers to top-tier cables and accessories—and now a subwoofer too, the Subissimo, which I paired with the rather exotic loudspeakers under review here, the Arabesque Minissimo Diamond Edition two-way stand-mounts. Even their names are apt and clever.

First off, this isn’t a new speaker *per se* (see Andrew Quint’s review of the original Minissimo in Issue 256), but rather a major update, the centerpiece being a new namesake diamond tweeter. Other changes include an upgrade to Absolute Dream internal wiring featuring mono-crystal silver conductors, bi-wiring capability via a double set of solid-silver WBT NextGen terminals, internal cabinet damping refinements, and even more rigorously pair-matched mid/bass drivers (which use a strong neodymium air-optimized magnet structure and a carbon-fiber-reinforced sandwich paper cone diaphragm). A single Absolute Dream MonoCrystal Jumperset (JD-1) is also included.

If you’ve ever seen—and hopefully heard—either the original or the Diamond Edition



## Equipment Report Crystal Cable Arabesque Minissimo Diamond Edition with Subissimo Subwoofer

model of the Arabesque Minissimo, chances are you'd remember or recognize it as much for its sweeping, curvy "comma"-shaped form factor and quartet of unexpected high-gloss color choices—Aquamarine blue, Pearl white, and Solar orange (like a Dreamsicle)—as for its incredible resolution, musicality, dispersion, and "disappearing act"—which make this two-way an all-around standout that defies any number of category expectations.

**It occurred to me once again that I didn't expect such in-your-face muscle and raw power from these elegant little speakers.**

Its cabinet, which is machined from a single solid piece of metal resin composite, looks modern and elegant but its smooth shape is more than just whimsical; it's also functional, minimizing resonance and facilitating wider dispersion. Interestingly, the speakers can be placed—as a mirror-imaged pair—with the fuller, rounded parts of the enclosures facing inward or outward for different sonic results, depending on your room and preferences. Per the user manual, the former configuration is said to provide a deeper soundstage, while the latter, a soundstage of greater width. The Minissimos were designed to perform well across a variety of room sizes—from 110 to 1300 square feet or more.

The Minissimos are shipped securely connected to self-contained stands, but they can also be separated from these and placed on

a special dampening mat for shelf or surface mounting. The stands' heavy steel tubes are filled with fine-grain sand and their weight ensures mechanical and sonic stability—indeed, they are said to be resonance-free. Another striking design detail is the artfully and mathematically designed laser-cut grille that serves both to protect and further showcase the diamond tweeter. And yes, it's acoustically transparent.

Partway through my review timeframe, Crystal Cable sent me a pair of Scala weighted forms to be placed atop the speakers to enhance stability, reduce resonance, and improve dispersion. These beautifully machined solid-aluminum accessory pieces with wavelike, textured, 3-D layers follow the Minissimos' curvilinear forms and rest like "hats" on their tops. There's a rubberized coating around the perimeter of each to secure placement and block the transmission of vibration.

Crystal Cable's Subissimo subwoofer was developed concurrently with the Minissimo Diamond Edition speakers and designed to "integrate simply and seamlessly" with them (or other speakers). For my review purposes I was provided with a single Subissimo, a hefty unit in the same Pearl White color enclosure as my speaker samples. Also, like the speakers, for more natural sound, lower distortion, and diffraction-free dispersion the sub cabinet has no corners, only curves. The sandwich cabinet, reportedly resonance-free and highly stable, was designed using the Comsol Multiphysics software platform for physics-based 3-D modeling and simulation. As the Subissimo is a powered sub, each woofer has its own dedicated amplifi-

er and is mechanically coupled within a special frame designed to cancel resonance. The top and bottom plates of the enclosure are made of 2-1/4"-thick solid aluminum that serves both to build up the sub's structure and to help cool its powerful internal amps. The sub rests on six adjustable feet that come fitted to the base. There's a toggle switch for polarity that can be set to 0 or 180 degrees. Conveniently, the Subissimo can be left on, as it has auto-on/-off

detection and will enter standby mode after 20 minutes without signal. Of course, a pair of subs will provide greater dynamic impact as well as drive the room more evenly, but as you'll see in my comments below I was very pleased with the results of a single sub.

The way the Minissimo and Subissimo work together is a bit like a pair of Olympic figure skaters—an all-around aesthetically pleasing combo displaying a blend of power, strength,

### SPECS & PRICING

#### Minissimo Arabesque Diamond Edition loudspeaker

**Type:** Two-way, full-range stand-mount

**Driver complement:** Diamond tweeter, neodymium magnet structure with carbon-fiber-reinforced sandwich paper cone diaphragm for mid/bass

**Frequency response:** 47Hz–50kHz (–3dB) near-wall position

**Impedance:** 8 ohms nominal

**Sensitivity:** 83.5dB @ 2.83V

**Weight:** 56 lbs. each, including stands

**Price:** \$19,999 without stands; \$21,499 with stands (Scala stabilizing accessory, \$1199/pr.)

#### Subissimo subwoofer

**Type:** Powered

**Driver complement:** 2 x 13" long-throw paper cone units in a force-canceling configuration

**Integral amplifier power:** 2 x 600W power amps (one per driver)

#### Frequency response (low point in-room):

–6dB @ 16Hz

**Crossover frequency range:** 35Hz–70Hz @ 12dB/octave; 35Hz, 70Hz, 120Hz @ 24dB/octave

**Inputs:** Stereo low-level RCA and XLR; stereo high-level 4mm banana

**Dimensions:** 16" x 32" x 22.8"

**Weight:** 159 lbs.

**Price:** \$13,999

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## Equipment Report Crystal Cable Arabesque Minissimo Diamond Edition with Subissimo Subwoofer

and technical abilities tempered by effortless grace and gorgeous musicality. They gain points for both technical prowess and overall presentation. One partner supports the other, and they must interact seamlessly as a unit, while minding the laws of physics.

### Setup and Sound

The Minissimos were quite easy to set up and readily maneuverable (even by li'l ol' me) so long as you pay attention to their weight distribution on their connected stands. Just a tiny bit of toe-in adjustment did the trick to get the sound to my liking. Happily I didn't need to shift the subwoofer much at all, as it's a fairly heavy beast weighing roughly 160 pounds. Based on my listening room dimensions (approximately 18' wide by nearly 35' deep with over 12' ceilings), I kept the speakers in the "tail out" configuration (as opposed to the inverse placement mentioned above). The Subissimo was located between and equidistant from the Minissimos, at a distance of approximately five feet from each.

But let's talk sound and listening experiences. As far as musical interests and tastes, I'm very much an omnivore across genres. Perhaps like many of you, what I choose to play depends upon my mood at the moment. It's often been the case that during many a loudspeaker review (or electronics review, for that matter) I've come to the conclusion that some gear just seems to perform better when playing back certain types of music. (This depends on the source recording and other system factors too, naturally.) What struck me most with the Minissimos (with and without Subissimo, but especially with) was

their amazing versatility—how hard they could rock out in addition to excelling with classical and acoustic fare. Although I had heard this Minissimo/Subissimo combo at a couple of shows, I realized I had listened to—and enjoyed tremendously—mainly classical and some chamber music along with jazz through those demo systems. So I wasn't expecting to be hankering to listen as much to heavy-hitting pop and rock.

These are quite high-resolution transducers that (once set up and tweaked properly) pull off a marvelous disappearing act, sounding natural and steadfastly musical across genres. As the Minissimos are pretty efficient speakers I did the majority of my critical listening with a relatively low-powered Air Tight ATM-1S stereo tube amplifier driving them (it sounded far better than a solid-state amp I tried). For my phonostage and preamplifier, I shifted between a Soullution 520 phono/pre and an Audio Consulting Silver Rock phonostage in front of the 520. My analog source was an Acoustic Signature III turntable and TA-1000 tonearm fitted with an Air Tight PC-7 cartridge. As recommended in the owner's manual, I initially set the Subissimo to cross over at 70Hz at 12dB, though I also shifted it to 65Hz later, which seemed to work better in my room, for critical listening.

I started off with an obscure LP recently given to me, a fantastic recording of the Shostakovich cello sonata on the Czech label Pantón. The playback of the cello and piano was so crystal-clear, natural, and gorgeous, it literally stopped me in my tracks while I was taking care of a mundane household task before taking a seat. Such a true sense of life was conveyed through detail and di-

mensionality that I felt I could visualize cellist's upper body shifting and moving in time as he played his heart out. Magnificent!

Speaking of standout strings, I gave a listen to an old favorite, Leonard Cohen's *Live in London* LP set, where Bob Metzger's gorgeous guitar intro on "Bird on a Wire" resonated throughout my room nearly as believably as if I were at the O2 Arena. Ditto the mandolin on "Dance Me to the End of Love." And "Ain't No Cure for Love," boasted an impressive chucking bass line nicely differentiated from the kickdrum. In fact, all the instruments, also notably Hammond B3 and clarinet, were rendered with remarkable dimensionality and reasonably accurate placement in space, although the soundstage didn't feel particularly deep. The detail on the individual vocalists' separation and enunciation—from Cohen and backup singers Hattie and Charley Webb—was realistically portrayed, down to their imperfect unison. All aspects of this great recording were presented with palpable presence, lifelike energy, and effortless neutrality. The speakers and sub really allowed the music to shine.

To really get down with the sub and experiment with its filter I needed to bring some more bass into the mix, so (of course) I pulled out El Vy's *Return to the Moon* LP. The only options for the subsonic filter are either "on" or "auto-filter" mode. There is no "off" per se. With the Subissimo's subsonic filter on, the sound seemed clearer, more focused, and at times, even more detailed. When the filter was in auto mode, the sound was more homogenized but also more bloomy and expansive. As you might expect, some material (perhaps even the major-





## Equipment Report Crystal Cable Diamond Edition with Subissimo

ity of my selections) was more ear-pleasing and tended to be more neutral with the filter on.

Returning to El Vy, the title track felt a bit thick and even slightly congested with the filter on auto mode. With it fully on, the funky bass line was well articulated and maintained solid presence without getting overblown. However, I was surprised that I preferred the ironic antics of "I'm the Man to Be" with the filter in auto mode, because it unleashed a greater sense of spaciousness and swagger. It also occurred to me once again that I didn't expect such in-your-face muscle and raw power from these elegant little speakers (recall the skaters metaphor).

An LP that really blew me away—via the Minissimos and Subissimo with the filter on—was Buena Vista Social Club's eponymous debut. This soundtrack features a cornucopia of instruments in deliciously complex arrangements—almost like a layer cake. All the ingredients were there, ordered and measured in artful (and delicious) balance. On "Chan Chan" various parts gently came to the foreground and then receded in turn—a laúd here, trumpet there, now fiddle, then mournful steel guitar. Yet there was a wonderful sense of urgency in the presentation, with rapid-fire transient response keeping everything exciting and realistic. More than ever before, I was keenly aware of Compay Segundo's "second" vocals—his last name is said to reflect his trademark bass harmony second voice—just beneath Eliades Ochoa singing lead.

Not all systems have fully delivered this album's infectious stream of energy. I was going to try just a few tracks, but couldn't resist listening to the whole thing—and I insisted JV hear

it too. You could really sense, almost feel, the effort of fingers plucking guitar strings, palms snapping on drum skins, all of which brought an engaging and authentic intimacy to the performance.

**You could really sense, almost feel, the effort of fingers plucking guitar strings, palms snapping on drum skins.**

I also gave a listen to the Willie Dixon/Memphis Slim *Willie's Blues* LP from Analogue Productions. In this stripped-down session, percussion and guitar were placed a bit forward in the mix, particularly cymbals, on "Nervous" and "That's My Baby." With the subsonic filter on auto, the piano registered just a hint of brightness and the bass was more subdued, with a backseat feel on "Good Understanding" too. The differences with and without the filter read more subtly here; with it on, instruments seemed more separated in space yet still part of a whole. Upright bass had more presence, energy, and definition—all good things.

No speaker or system is perfect, so I'd be remiss not to mention a couple of minor quibbles. In spite of experimenting with speaker placement, soundstaging wasn't always the deepest around, yet instrumental placement seemed quite on-point, even if not always pin-point; spaciousness mattered more. However, the Minissimos' big sound and wall-to-wall dispersion combined with incredible dimensionality and realism more than compensated for any such shortcomings. JV and I also discussed some possible suckout

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## Equipment Report Crystal Cable Diamond Edition with Subissimo

within the power range to achieve greater transparency, resolution, and speed, but throughout all of my time listening to these speakers and sub I can't say I ever felt bereft—I enjoyed every minute.

### Summary

All told, the Minissimo and Subissimo proved to be a winning combo—and a highly addictive one. The pair strikes all the right chords among beautiful aesthetics, top-tier construction, and truly sound engineering driven by Crystal Cable's ongoing desire for innovation. The Minissimo Diamond/Subissimo offer a wholly pleasing balance of structure, substance, and detail retrieval (without skewing analytical), alongside a generous dose of openness. The combo finds and delivers unflagging musicality in whatever material you throw at it. Call it a speaker and sub for all occasions, and a system I am loathe to let go of. Be warned: If you audition these—as with anything else involving the word “diamond”—be prepared to part with a rather princely sum of cash; the Minissimo and Subissimo are easy to love and rather habit-forming.

### JV comments:

As was the case the last time I paired up with Ms. M for a review (of the Magnepan .7), I don't have much to add. Ms. Mullins' thoughtful take on the aesthetics and sonics of this strikingly cool-looking and excellent-sounding mini/sub combo is precisely on target. Thanks in part to their clever, diffraction-free enclosures, the Minissimos pull off a truly superb disappearing act, and thanks to their diamond tweeters their transient response and resolution of fine detail

are audibly superior to that of most other minis.

Of course, some of this apparent speed and resolution is bought at the price of a bit of suckout in the power range and the absence of low bass (as JM noted), both of which tend to lean out tone color, draw attention to midband detail, and spotlight upper-midrange transients, thereby heightening the illusion of “transparency.” I also detected a touch of added sparkle in the topmost treble, though the Minissimos are nothing like “hot-sounding.” In fact, with their little hats (the Scalas) in place, they are very open and bloomy.

Much of the Minissimo's slight power-range suckout and all of its inherent (for a two-way) low-bass issues are solved by adding the fast, clear, deep-reaching Subissimo woofer. Though I wish Crystal had thought to include a continuously variable phase control on the unit to dial-in the sub/sat blend, even without precision phase-matching between the Minissimo's mid/woof and the sub's woofer, the fusion of sub and sat was near seamless.

My only real reservations about the Minissimo/Subissimo, in so far as I have any, aren't sonic; they're fiscal and aesthetic. Yes, both of these highly engineered *objets d'art* are uniquely stylish. High style is part of what Crystal is selling here. Still, at roughly \$35k for sats and sub, you need to make damn sure that you (and your significant other) are completely satisfied with their distinctive looks. That said, their exceptional sound quality speaks for itself. **tas**

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## Equipment Report

# Dynaudio Xeo 2 Wireless

## To Wire or Not To Wire

Neil Gader



**T**he Xeo 2 is the smallest and perhaps cleverest model in Dynaudio's rapidly expanding universe of wireless active loudspeakers. You heard correctly—it's a truly wireless, internally amplified system. It uses aptX Bluetooth as its wireless conduit for BT-compatible sources, all the while employing its own DSP and internal power to transmit the signal to each loudspeaker. Translation: *no* speaker cables. (I think I just felt a shudder rippling through the wire-maker community.) Yes, you can hook up a CD player or digital source component if you're so inclined. But you don't have to. In fact, Xeo 2 presents the easiest hook-up recipe in audio: Remove the contents of the box, plug them in, and take a couple of seconds to pair your music-loaded, Bluetooth-capable device. If you're an old cable-handler like me it is a truly bizarre feeling just plugging the Xeo 2 into the AC—and boom, instant music. Look Ma, no wires!

The \$1500-per-pair Xeo 2 is a two-way, bass-reflex design. It stands a mere ten inches tall but exudes quality with flush-mounted drivers and clean design elements. It sports a 27mm soft dome tweeter and 14cm mid/bass driver that includes a rigid, one-piece, ther-

mo-formed proprietary MSP (Magnesium Silicate Polymer) cone and an oversized 38mm pure aluminum voice coil. The crossover kicks in at 3.1kHz and employs a 24dB-per-octave slope. Dynaudio designs and makes its own drivers in-house in Denmark. In fact, Dynaudio is one of the world's largest manufacturers of high-quality drive units.

The cabinet is a molded composite bolstered by an aluminum baffle to further stiffen the enclosure. The downward firing port is cleverly hidden from view behind the rear cover plate where the power cord and selector buttons are housed. The entire package is fully self-contained with bi-amplification rated at 65W to each transducer, and DSP and Bluetooth streaming with aptX and AAC support. The Xeo 2 also sports a sophisticated digital crossover and true time-coherent, phase-linear FIR filters in the integral DACs. Additionally, Dynaudio uses its own Sound Power and Adaptive Bass Technologies to enhance low-end output.

Dynaudio has conveniently equipped the Xeo 2 with touch-button control for volume and power atop *each* speaker. The button also doubles as an input selector. My only nitpick was its extreme sensitivity to even casually light

pressure. And, I soon learned just how loudly the Xeo 2 would play when I unwittingly rested my hand on its top a couple of times. The Xeo 2 is designed to fit in small, even difficult spaces, stand-mounted, on-wall, or bookshelf. To that end there is a three-position eq slider switch on each speaker to contour the sound for the realities and compromises of speaker placement. The three settings compensate for corner, wall, or neutral positioning to provide the most even response. Not missing a beat, Dynaudio offers optional table stands and wall brackets as well.

Furthermore, there are three zone settings that allow the use of multiple pairs of Xeo 2s in a multi-room/multi-zone system with independent source connectivity and independent volume control. Dynaudio offers the optional, reasonably priced Xeo Hub or Dynaudio Connect wireless transmitters for these more sophisticated installations. Wisely, wired inputs haven't been completely jettisoned but they are purely optional. The Master speaker is equipped with digital (TosLink 24-bit/192kHz) and analog (RCA and 1/8" mini) inputs. All incoming signals are digitized. A remote control is included but its lackadaisical response will encourage you to use whatever paired smart device you've got handy.

## Equipment Report Dynaudio Xeo 2 Wireless



very small BT board. The Xeo 2 has the antenna integrated inside the Xeo 2 cabinet, but at a safe distance from the main electronics board and wiring.

Sonically, the Xeo 2 has a bold, confident voice that neither screams with treble lift nor shrinks into the background with midband suck-outs. It's a midrange-centric sound that doesn't play favorites with male or female vocalists; it does justice to both, conveying intelligibility and a level of the tactile and physical underpinnings of the performance. There's a slight presence range dip but the impact on musicality was minor. It's a darker, warmer character overall, a more conservative balance, which is not necessarily a bad thing in a compact speaker. Small speakers often default towards rising top octaves that suggest detail of an

order that never existed in the recording. On first listen this might get the speaker noticed but such hyper-detail and etching wear thin over the longer haul. Rather than drawing my attention to the tweeter, the Xeo 2 projected relatively smooth, coherent, energetic mid-range dynamics, with a long-term listenability that prompted me to put iTunes on shuffle and let the music carry me away.

Due to its active biamplification I expected

Xeo 2's bass response to be weightier than the average passive loudspeaker of similar spec, but I wasn't disappointed. Its response was crisp, with punch, drive, control, and scale that easily belied the speaker's puny footprint. This loudspeaker has a big voice that imparted much of the body and resonance characteristics of the rhythm section during the opening bars of Shelby Lynne's "Just A Little Lovin'."

Xeo 2 might be a full-time wireless system but I still listened closely for sonic fingerprints that might be more related to the physical structure of the Xeo itself. To these ears it did at times sound a little overdamped, as if the cabinet were absorbing some of the natural transient crispness of percussion and winds. Also there was some general veiling that I could hear as a slight reduction in image individuation, as well as a flattening of dimensionality. The port does an admirable job filling in the midbass spectrum, but a ten-inch-tall mini-monitor can't be expected to sound like a Wilson or a Magico.

Paramount to the Xeo 2 experience—and wireless in general—is using the system day in and day out. My findings? In two words, pure pleasure. Connectivity was as easy as pairing with your iPhone. The plug-and-play aspect delivers as promised—quickly and with no hiccups. The speaker eq slider was helpful in resolving room-induced acoustic issues. Owners should consider experimenting freely with these settings, as no two rooms are exactly alike. For example, I found that in my smallish room the speakers sounded more neutral in the "wall" setting rather than the more bass-heavy and overbearing "neutral" setting. The "corner" setting in comparison rolls off the

mid and upper bass more than the "wall" setting—a roll-off consistent with the extra acoustic reinforcement that comes with corner placement.

The common wisdom in the audiophile world is "wired *good*, wireless *bad*." Well, Dynaudio and its Xeo 2 really upset these assumptions. Not only did its combination of packaging, performance, and convenience find a receptive audience with yours truly, but the Xeo 2 was also a hit among my tech-savvy millennial nieces and nephews. Will it make believers of proud audiophiles with big, dedicated, fully wired systems? Nope, but that would be beside the point. As a no-fuss, no-muss option that brings Dynaudio's vaunted musicality to virtually anywhere in the rest of the house, Xeo 2 proves that under the right set of circumstances sometimes wire-less turns out to be a lot *more*. **tas**

### SPECS & PRICING

**Type:** Active two-way, bass-reflex loudspeaker

**Driver complement:** 27mm tweeter, 14cm woofer

**Frequency response:** 40Hz–24kHz

**Weight:** 8.8 lbs.

**Dimensions:** 6.8" x 10" x 6"

**Price:** \$1499 (white or black finish)

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## Equipment Report

# Harbeth Monitor 40.2

## Alan Shaw's Masterpiece

Paul Seydor

A few days after I took delivery of the Monitor 40.2, the third version of Harbeth's flagship loudspeaker, a close friend fell by for a listen. He's a Los Angeles studio musician (a violinist who's played many high-profile film scores, often serving as concert master), who is also a long-time audiophile, a member of my informal listening group, and an extremely discerning listener. Within about a minute or two of listening, he asked, "Aren't you tempted?" He had no idea. I had a sinking feeling from the moment the speakers were delivered—they were already well broken-in—and I started listening that it was going to be extremely difficult to part with them. Several months later I gave into temptation and bought the review pair. This is the sort of admission we reviewers typically reserve for the climax of a highly enthusiastic review, the *coup de grace* that drives home the full measure of our enthusiasm for those special products we elect to buy for ourselves. But under the circumstances I thought it might be prudent to declare it from the outset, because this *is* going to be a rave review. In the grand scheme of things, one man's opinion doesn't matter much more than the next's. But if actions really do speak louder

than words, then in the strictly personal sense my action is a pretty large statement in view of my history, because for the last quarter-century not only have my reference speakers been Quad ESLs, beginning with the 63, then the 988, and since 2005, the 2805 (in my view still the finest speaker Quad has ever made, though I also have a fully restored vintage pair of original Quads), Quads have also been the *only* speakers during this time that I've purchased for personal use as my main speakers—until now.

In order to keep this piece within a manageable length, I'm going to skip the usual detailed product description and design history because much of this is covered in the accompanying interview with Alan Shaw, the owner of Harbeth and the designer of its products; and for a fuller discussion of his methods, his philosophy, and his roots in the great tradition of loudspeaker research and development pioneered by the British Broadcasting Corporation, I refer you to my review last year of Harbeth's SuperHL5*plus* at [theabsolutesound.com](http://theabsolutesound.com) and to my articles on the BBC Monitor and Harbeth in TAS's *Illustrated History of High-End Audio, Volume 1: Loudspeakers*.

The .2 suffix indicates the new model is the third iteration of the original. Physically, it's a

large rectangular box, approximately 30" x 17" by 15", with a 12" double-ported bass driver that crosses over at 500Hz to an 8" midrange that in turn crosses over at 2.5kHz to a 1" soft-dome tweeter (these figures are rounded-off), front-mounted behind a removable grille cloth (that's intended to be left on), with a single pair of heavy-duty binding posts on the back. The speaker in fact looks rather larger than it actually is mostly because, apart from the beautiful (and perfectly matched) wood veneer, there is no attempt to make it look like anything other than what it is: a large rectangular box whose only purpose is to reproduce sound and music. The traditional look and simplicity belie the sophistication of the design, manufacturing, and engineering, particularly as regards the crossover networks, the almost unprecedentedly low levels of coloration achieved by the RADIAL2 material in the midrange driver, and the way the cabinet, thin-walled but very solid be-

cause sturdily braced, has been constructed to control and damp resonances. (I should add that I personally find the speakers to be very attractive, but then I prefer a traditional look, while speakers that resemble globules, are painted like automobiles, or made to look like large industrial structures or *objets d'art* are rarely to my taste and often strike me as pretentious. I'd rather have an honest box, panel, or tower that knows what it's supposed to be and does it.)



## Equipment Report Harbeth Monitor 40.2

The 40.2's remarkably flat impedance curve of 6–8 ohms presents a benign load that makes for excellent results with all good quality or better amplifiers. As it happened, the evaluation period overlapped with the reviews of several amplifiers, the comparing and contrasting of which the Harbeths made child's play of, sonic differences instantly audible. They can also handle prodigious amounts of power without stress or strain yet will yield eminently satisfying results with amplifiers rated as low as 35 watts per channel.

Stand-mounting is required (17" high or enough to place the tweeters more or less at ear level), as is placement away from surfaces, while on or near on-axis listening is strongly recommended for accuracy of frequency response and precision of imaging, both of which will be compromised if you aim them straight ahead. Inspired by the BBC, Shaw has spent over three decades researching how to make loudspeakers perform optimally in real-world domestic settings, and all of that knowledge has gone into this speaker. Shaw himself regards the SuperHL5*plus* as his statement of what a domestic loudspeaker should be, but I think this new Monitor 40.2 is his masterpiece. Although designed as a studio monitor for the BBC—a professional version is available with a utilitarian finish—the sizes of the BBC's control rooms and studios are more or less equivalent to the vast majority of domestic rooms, so the speaker is as much at home at home as it is in the studio (see the accompanying interview for more on this). Despite full, deep, and powerful bass response, the Monitor 40.2, like other Harbeths, is easier to place for optimal perfor-

mance in ordinary rooms than almost any other full-range dynamic speakers in my experience. This may be one reason why they excel at trade shows. I've heard them several times at Newport, where most exhibitions do not sound particularly good, yet Harbeth's rooms are always, as I've written several times, oases of musical naturalness and relaxation.

### Sound

Let's start with the midrange—that's where everyone seems to start when it comes to Harbeth speakers. Trouble is, what's left to be said? How many variations can you ring upon "beautiful," "luscious," "ravishing," "gorgeous," "drop-dead gorgeous"? Let me approach it a different way. The Monitor 40.2 is flat throughout the *entire* midrange, from the lower midrange/upper bass all the way through the upper midrange and into the presence region. This translates into an all but peerless tonal neutrality and naturalness that was evident from the moment the speakers were set up and playing.

All Harbeths shine on voices, this one such that you feel you're hearing voices the way they really sound in reality. One of my toughest acid tests is the Anonymous Four, four female singers who do their best to sound indistinguishable from one another (and whom I've heard in concert several times, most recently on their farewell tour a couple of weeks before I took delivery of the Harbeths). This is, of course, impossible, but it does take a speaker of rare resolution to allow you distinguish among them as discerningly as the 40.2 does, literally sailing through the challenge. The same applies to instruments, which are reproduced truthfully

in all their range, variety, and individuality of timbre and character. Many years ago James Levine recorded a Strauss program for DG with the Metropolitan Opera Orchestra, an ensemble that for sheer opulence of instrumental color was almost without equal at the time, featuring *Death and Transfiguration* and *Don Quixote*. Being multi-miked, the recording doesn't present the illusion of hearing an orchestra in a concert hall. However, I've been reliably informed that a great many musicians are very fond of it because the instruments actually sound like real instruments in timbre and character. I've never heard it reproduced with quite the richness and variety that the Monitor 40.2 reveals, not even by my beloved Quads, with that elusive impression of listening back through the chain to the source itself.

Perceived levels of coloration and distortion are astonishingly low on this speaker, easily rivaling those of my Quads. Two examples, both of them vocals: *The Alamo* soundtrack features two speeches by John Wayne taken directly from the movie's soundtrack. The recording was made outdoors, so there are no room acoustics as such to deal with, and it seems to have been processed with absolutely minimal control-room processing (I doubt there was any at all—these were pre-Dolby days). It will tell you a great deal about materials colorations, box resonances, and tonal anomalies. For all Wayne's bravado and physical size, his voice is surprisingly light and pitched rather higher than you might think, despite some gravel from years of drink and tobacco. There should be no false underlining to it, and no bogus nasality apart from a mild vestigial nasality (which never

approaches honkiness) in the voice itself.

The other is a fascinating recent reissue of Patricia Barber's audiophile hit *Café Blue*, released in its original mix-mastered form before the final mastering. The difference is eye (ear?) popping, and not just, or even principally, because it was mixed in the analog domain using Capitol Records' fabled analog chambers for ambience and reverb. At first you may be struck by how relatively dead it all sounds by comparison to the versions you're used to; but soon enough you realize that what you're hearing is the absence of all the usual kinds of processing that goes into most popular recordings. The resultant purity is instructive, even revelatory, and it doesn't take much comparative listening before the typical colorations and anomalies in the reproducing chain are exposed. Through the Harbeths I heard nothing that I could attribute to the speaker, and the reproduction was extraordinarily "characterless" apart from the intrinsic character of the performers.

By beginning with the midrange, please do not assume I consider the Monitor 40.2 deficient anywhere else along the frequency spectrum. On the contrary, this is one of the very few loudspeakers in existence that can without crossing your fingers behind your back be called a true full-range monitor of reference caliber. So it is hardly a surprise that the high excellence of the midrange extends all the way up through the top end and all the way down into the bottom-most octave. The transition to the dome tweeter is, to my ears, inaudible, a testament to the fanatical care Shaw has lavished upon the crossover. Long-time readers of mine will know that I find the vast majority of current speakers

## Equipment Report Harbeth Monitor 40.2

all along the price spectrum entirely too bright because their response rises in the top two octaves (5k–10kHz and 10k–20kHz). There is no equivalent to this in live music, especially music made by acoustic instruments in the usual venues where music is performed, such as recital and concert halls and opera houses. Next to the bright and vaguely glassy or mechanical-sounding tweeters I'm used to hearing even in very expensive loudspeakers, the miracle of the 40.2's soft-dome is that it is extended without sounding in the least hyped. If you play a recording that is very bright, like Bernstein's New York *Appalachian Spring* on Sony, the 40.2 reproduces it that way, but it doesn't make it any brighter or more aggressive than it already is.

Another recording that is somewhat brightly lit is Von Karajan's famous mid-Sixties *La Mer* with the Berlin Philharmonic. The orchestra plays like gods, but the strings are bright enough that I typically employ a treble cut (let's hear it once more for tone controls!) to make it sound more natural. On most contemporary speakers the treble cut can be considerable, whereas on the Harbeths it is moderate. But the key point here is that the 40.2 reproduces the brightness but doesn't accentuate it: The Harbeth won't make a bad recording sound any better than it is, but, as is not the case with speakers that are not accurate, neither will it exacerbate any of the things that make it bad. This is one reason why so many people who hear this speaker are struck by the beauty of the reproduction.

One thing I've observed of past Harbeths I've reviewed, which is related to the excellence of their high-frequency response, is how well they reproduce ambience. One of my refer-

ence recordings is *Sing We Noel*, the program of Christmas music by Joel Cohen and the Boston Camerata. There is one cut where there is a speaker in one channel, a singer in the other. When the speaker speaks and the singer sings, they remain firmly situated in their respective spots but the way their voices carry across the spectrum should be continuous and seamless, because you're hearing the characteristics of the acoustical space of the venue. In the closing piece, as the singers recede, you are clearly aware they are moving out of the microphone field and are more enveloped in the ambience of the venue (it's also evident they're moving closer to a reflective surface—the back wall, I suspect).

And so we come to the bottom end. The original Monitor 40, which remains one of Robert Greene's reference speakers, employed a twelve-inch driver that Harbeth outsourced. Without warning, the manufacturer informed Shaw the driver would no longer be available, hence the reason for the 40.1 modification. Along the way, Shaw changed some of his ideas about bass behavior in small rooms—by small rooms, I mean even large listening and living rooms, since referenced to concert halls, opera houses, stadiums, etc., all domestic rooms, even pretty large ones, are considered small, and small-room acoustics present a very different set of problems, notably in the bass. The original Monitor 40 exhibited a quite appealing sense of bloom and warmth throughout the bass region. But because its bass response was so expansive, even robust, it could prove difficult to place in some rooms. In the 40.2 Shaw judiciously reduced some of the mid-

and upper-bass response while extending the low-end a bit more, the -3dB point now 35Hz, which means that with boundary reinforcement the -3dB point will approach 30Hz in most rooms. Yet the speaker retains the warmth and overall musical balance of the original, nary a trace of that thinness in the warmth region—what friend of mine likes to call the "baritone" range—of so many current speakers that bill themselves as full-range. In other words, Sinatra, Fischer-Dieskau, and Belafonte sound like the baritones they are, not optimistic tenors.

This in turn translates into an ideal mediation among warmth, definition, extension, and power. These last few years I've taken a keen interest in the great conductor Leopold Stokowski, who favored a symphonic sound picture weighted toward the cellos and doublebasses. It's fabulously rich and voluptuous, sumptuously on display in his famous recording of *The Moldau* and Liszt and Enescu rhapsodies, not to mention his several symphonic syntheses of music from *Tristan und Isolde* and the *Ring*, which the Monitor 40.2s reproduce in all their storied glory. Indeed, there's not another speaker I'd rather listen to orchestral music on than the Monitor 40.2, so true is it to spectral balance to the real thing.

Is a subwoofer necessary? I would say that in any practical sense, no, at least for most kinds of music. Even the 32Hz organ pedal point at the beginning of *Also Sprach Zarathustra* is reproduced with as full a volume as the recording will allow (assuming the note is really *on* the recording). But that isn't to say it won't benefit from a subwoofer. Subwoofers, like equalization, are most successfully used when a speaker already

has excellent bass response, and all you're after is the reinforcement necessary to give a greater sense of weight and ultimate extension with organ recitals or augmented orchestras in music like the Berlioz and Verdi requiems or Mahler symphonies (or maybe you just want to hear the subways running under the cathedral in the St. John's Choir's Christmas recordings?). A good subwoofer that reaches into the bottom octave, especially the bottom half-octave, can also often capture a sense of the spaciousness

### SPECS & PRICING

**Type:** Dynamic three-way vented

**Drivers:** 11.81" Harbeth bass unit; 7.87" RADIAL2 mid; 0.98" ferro-cooled soft dome tweeter

**Frequency response:** 35Hz–20kHz ±3dB free-space, grille on

**Impedance:** 6–8 ohms, easy to drive

**Sensitivity:** 86dB/1W/1m

**Amplifier suggestion:** 35Wpc minimum

**Power handling:** 650W program

**Dimensions:** 17" x 29.5" x 15.27"

**Finish:** Cherry, eucalyptus, rosewood, tiger ebony

**Stands:** Approx. 17", sufficient to bring tweeter to ear level

**Weight:** 83 lbs. each

**Price:** \$14,999 (cherry)

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## Equipment Report Harbeth Monitor 40.2



of these venues in a way nothing else can quite manage. The 40.2 is an ideal candidate for subwoofer reinforcement precisely because its bass response is *already* so excellent. But be sure you get a subwoofer that goes really deep and that allows you to set its crossover really low, at least as low as 40Hz. Otherwise you'll just mess up the 40.2's superb bass response. (Harbeths are especially well matched to REL subwoofers because RELs are designed to be less subwoofers as such than true *sub-bass* sys-

tems. For more on this, see my review of the REL Series R528SE at [theabsolutesound.com](http://theabsolutesound.com).)

So far I've emphasized the 40.2's essentially flat frequency response, tonal neutrality, and natural tonal balance. But it is outstanding in several other ways as well. For one thing, it's extremely transparent, rivaling without surpassing my Quads. Its resolving capability is equaled by few speakers in my experience and surpassed by none. Its resolution is as high as the most detail-oriented speakers I've heard, but it will keep detail in its proper perspective and it is never merely analytical: To give an exhausted metaphor a little more work, it's not a missing-the-forest-for-the-trees presentation, rather a forest-*and*-the-trees presentation. Its imaging capabilities are essentially determined by the source or the source component, its perceived distortion is extremely low, and it is vanishingly low in coloration. It is also astoundingly clean and clear, obvious testimony to Shaw's masterly implementation of the BBC's philosophy of thin-walled panels, sturdy bracing and damping, and also the RADIAL compound he's developed for his midrange drivers. There is, moreover, a coherence, a tonal integrity, and the ability to speak as if of one voice that is unsurpassed in multiple-driver loudspeakers of my experience, while its dynamic range and loudness capabilities exceed anything you are likely to be able to stand in any appropriately sized room the speaker will be used in. As important, if not more so, is its ability to play at near-whisper levels without the tonal dropout typical of so many dynamic speakers when played at very low levels—getting close to my Quads in this respect (though nothing surpasses Quads for

ultra low-level listening).

Owing to its neutrality and tonal balance and because my musical tastes lean that way, I've been talking mostly about the Monitor 40.2's performance with acoustical music. But while rock 'n' roll doesn't occupy a large part of my listening, the rock I like I *really* like a lot, and the 40.2 renders it sensationally. I've never heard *Graceland* more excitingly or engagingly reproduced, with more clarified textures and dynamic range, power, and legitimate punch, the same for any number of Rolling Stones recordings. Philip O'Hanlon of *On a Higher Note* recently gave me a DSD file of "American Pie," my nomination for maybe the greatest rock 'n' roll song ever written (it's surely one of the few that transcends the genre), which over the Harbeths is stunning in its vitality and emotional affect. I've always found it a bit ironic that so many rock fans tend to like speakers that are thin in the warmth region and pitched up top because they like the way that makes the music sound punchier and aggressive. In fact, many rock musicians, notably those of my generation, have been rather vocal in expressing their preference for a lot of energy in the warmth region, as it happens precisely where symphony orchestras also have a lot of their energy. This is one reason so many rockers gravitated toward McIntosh tube amplifiers. I predict that for these musicians, the 40.2 will prove something of a revelation. (If you need further proof, try some Buddy Holly.)

In the sum, the Monitor 40.2 possesses that difficult to define but instantly apparent impression of *authority* on any and all kinds of music. From the simplest to the most demanding, from a whisper to far louder than

you can stand, you have the sense there is no kind of music that it cannot take in easy stride and reproduce as truthfully, beautifully, and faithfully to the source as the current state of the art will allow.

Incidentally, thanks is extended to Pass Labs for lending their XP-10 preamplifier and X150.8 power amplifier so that I could have a representative example of a really high-powered amplifier for the 40.2. I should add that the combination was absolutely superlative, with genuinely effortless performance even with very demanding sources.

### Limitations

The Monitor 40.2 is not perfect, but in any practical sense it has no limitations that matter to me as a music lover and audio consumer. This is consistent with Shaw's design brief for this and all his speakers, which is to say that each model is designed for specific applications to reproduce music and sound as accurately as possible in rooms, whether in studios or in homes, that fall under the broad category of normal-sized. They're not intended for sound reinforcement or for use in *extremely* large rooms of the kind that you might find in baronial estates or castles. Otherwise, its ability to play loudly and cleanly exceeds any reasonable standards in any application or venue for or in which it is designed or likely to be used. If you need more loudness than that, then you must look elsewhere (though I'd be seriously concerned about hearing damage).

As with all true full-range speakers, you must be sure your room can accommodate the bass pressures they can generate. If your room is



## Equipment Report Harbeth Monitor 40.2

not large enough to allow you to keep a pair of 40.2s reasonably well away from the front- and side-walls and you still want the Harbeth sound, then the superb SuperHL5*plus* or Monitor 30.1 would be more sensible choices. My listening room is a little over 2500 cubic feet (8" x 15" x 21"); Robert Greene's is close to that, but differently dimensioned. Mine are about seven feet from the front wall, Robert's about five feet (I'd estimate) but only about two feet from either side-wall and aimed at the listening position in each room. The Harbeths perform superbly in both settings. (I've never heard better reproduction, and only very rarely as good, of symphony orchestras on any system anywhere than in REG's dedicated room when he's got his Harbeths really dialed in.)

If you are a fan of the best planar loudspeakers, such as Quad ESLs or the Sanders Model 10e, as I surely am, the 40.2 will not match their ultimate openness and freedom from boxiness, but it is not far behind, and its performance in these areas is nevertheless superb by any other standard. To my ears the Sanders 10e is even more tonally neutral than the 40.2, but the latter possesses an elusive quality of richness, timbral naturalness, and vitality that I have not experienced even with my beloved Quads.

Although the 40.2 is capable of reproducing a really big sound, what it will not do, if this is important to you, is reproduce the height of performers in your living room the way taller speakers like the Sanders, MartinLogans, Magnepans, Wilsons, etc. do. Mind you, the Harbeths are very good in this regard and with some instruments—like a string quartet, for example, or a piano—they can suggest life-size scale and dimension-

ality. But if you must have the impression of a six-foot singer standing six feet tall in your room, the 40.2 will come close but it will not get you there, although, like me, you may be so seduced by its reproduction of voice that you'll never miss the height factor.

### Conclusion

Inasmuch as I gave away the punch line at the outset, let me finish by saying that if I were asked to recommend a loudspeaker to someone who loves a really wide variety of music and wants it reproduced accurately, naturally, and beautifully such that he or she truly can listen for hours without fatigue, my recommendation in the here and now would unhesitatingly be the Monitor 40.2. As the review period has lasted several months, during which time I've had to evaluate several other components, I've also come to appreciate the Harbeth's value as a tool for reviewing equipment and recordings. This is one speaker that really will tell you the truth about any source or any components feeding it.

As for my 2805s, no, I'm not about to sell them—once a Quad man, always a Quad man—but they must henceforth share house space with the Monitor 40.2 as my idea of how a reference loudspeaker should sound and perform. Now that the evaluations have ended and the review finished, truth in reporting requires I point out I've felt no pressing urge to bring the Quads back into the listening room, so satisfying are the Harbeths. The Monitor 40.2 is now my reference loudspeaker, and so it shall remain for a long, long time to come: I choose the speakers I buy for my personal use *very* carefully and I do not change them capriciously. **tas**

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## Equipment Report

### Revel Concerta2 M16

#### A Class-Leading Compact

Neil Gader

**T**o paraphrase the famous TV commercial about a trusted brand, “When Revel talks, I listen.” Revel, a brand from the Harman Luxury Group, is a company that takes its speaker designs very seriously. Its models are released for the long haul, not willy-nilly, and updated if—and only if—the R&D and performance rewards actually merit a change. Having taken this approach, Revel and the team led by Acoustics Technologies Manager Kevin Voecks have sustained a noteworthy track record for the brand’s model-to-model musical and technical chops. One most recent example is the impressive mid-priced Performa3 that I track-tested in Issue 234. Revel’s latest series revamp is the Concerta2—and it might be even more impressive. Representing the company’s value line of loudspeakers, the collection includes a pair of towers, the F36 and F35, the C25 center, and the S16 surround alongside the sole stand-mounted compact, the \$900-per-pair M16, the subject of this review.

Visually the line has been refreshed and refined with smartly contoured enclosures, high-gloss finishes, and elegant design accents. There are no visible front baffle screws and hardware; the grilles are magnetically affixed.

The flush-mounted drivers seamlessly fit into the front baffle. Similarly well finished is the spotless back panel that houses the rear port, along with a nicely inset board for the single-wire speaker terminals. Informed by Performa3 technology, upgrades and advances include the one-inch aluminum tweeter with an integral phase ring that is mated to a new, fourth-generation Acoustic Lens Waveguide. This apparently simple device optimizes the blend between the tweeter and woofers and improves off-axis performance over a wider listening area. The 6.5” mid/bass driver features an aluminum cone that minimizes distortion by improving rigidity without increasing mass. These improvements are designed to achieve the goal of ideal piston behavior across the frequency spectrum—the Holy Grail for cone transducers.

From my earliest impressions to my final fare-thee-well, the M16 extolled classic Revel virtues: sonics that were striking in dynamic freedom, a neutral midband, good overall speed, and excellent inter-driver coherence—characteristics that unite to generate a tonal ripeness and image scaling that belie the M16’s stature. There’s a level of refinement and lack of artifice in the M16’s performance that helped express



the tenderness and longing of Alison Krauss’ “You’re Just A Country Boy” within the intimacy of a live small-venue performance. Similarly, there was the distinctive metronomic strumming of a lone acoustic guitar during Rosanne Cash’s “If I Was A Man” that (when the volume was dialed in just so) was eerily present in my listening room.

Revel doesn’t design wallflowers that sonically shrink into the background, and the M16 followed suit with a certain forward swagger. Its midrange was tonally quite even but with an overlay of richness that was enhanced by the breadth of its nicely extended midbass, a diffi-

cult region for small monitors. Treble frequencies were also extended and detailed but did not possess quite the lightness, air, and bloom of the more sophisticated Performa3 tweeter. Still the M16’s overall character came down on the warmer side of the tonal fence and steered clear of the lean, brittle signature of many small monitors.

Nor was this speaker a “special effects” product that tried to capture the ear with false tweeter detail or recessive midrange energy in an effort to enhance depth and dimensionality. I noted a minor boost in the sibilance range that

## Equipment Report **Revel Concerta2 M16**

added some juice to the lower treble harmonics of brass and wind instruments, but it was more a benign enhancement than an off-putting distraction. Transients were nicely portrayed—quick but not overly etched or prickly, and invariably coupled to the reality of a live performance.



The M16's low-frequency response floored me. It extended with confidence well into the midbass region of 50Hz or so. Allowing for room gain in my small listening space, there was easily perceivable output into the forty-cycle

range. I could discern a little rise in the midbass region in my room setup that attached some big-speaker chestiness to baritone sax, acoustic bass, and male vocals but also shaded inner detail a smidge. However, the M16's pitch stability and dynamic energy provided a steady and heavy anchor to pop rhythm sections. These same attributes—which were plainly demonstrated during Fleetwood Mac's "Dreams" and "Gold Dust Woman"—will also appeal to rock music aficionados. Port noise, however, was very well controlled with virtually no overhang. And the cabinet imparted little in the way of colorations or the absorption of transient energy that can tend to slow or soften the snap of a performance.

As the transducers neared their limits, bass resonances and natural sustain and decay were a little beyond the M16s' reach; nonetheless, this level and quality of extension in a fifteen-inch compact created an illusion of orchestral weight, scale, and hall ambience that was hugely rewarding in a sub-thousand dollar speaker (even if it didn't quite fool you into believing you sprung for Revel's world-class Salon2 flagship).

How does the M16 compare with the M106, its upscale Performa3 sibling (\$2000/pr.)? Quite well, actually. If you auditioned them side-by-side the sonic family resemblance would be obvious. Both exhibit the enveloping soundstage and foundational weight, the verve and energy of a midrange in sparkling balance.

However, there are distinctions. For example, during cellist Pieter Wispelwey's rendition of Bruch's *Kol Nidrei*, low-level edge detail softened slightly, with the proximity of instruments

to one another less focused; in addition, the cello's attack off the bow lacked the last dollop of dynamic intensity. In sum, at two grand the Performa3 M106 does what it was meant to do, but at less than half the price the Concerta2 M16 can hold its head high in this more elite crowd.

Perhaps the M16 performance's most enthralling aspect is the fullness and cohesiveness of its soundstage and image presentation. The M16 doesn't paint small sonic landscapes. Revel's state-of-the-art multichannel systems make this manufacturer no stranger to creating immersive sonics, and clearly much of that expertise has rubbed off on its two-channel efforts. Indeed, the sense of three-dimensionality and "widescreen" scale were two of the M16's most distinctive characteristics.

A prime example would be Frank Sinatra's *Only the Lonely* classic "One for My Baby," a track filled with enough ambience and spatiality to create the illusion of being in a smoky, late-night bar, the slightly muted piano in a dark pocket of a melancholy space, the listener sitting just a couple bar stools from the singer and the barkeep. It's a cut that succeeds or fails based on capturing this mood. Little speakers don't often have the sophistication and range to retrieve these key elements—the M16 did.

A good part of this capability is owed to the speaker's excellent dispersion, à la the improved waveguide and Revel's general philosophy about optimizing in-room power response (a measurement that factors in both of off- and on-axis performance). In this aspect the M16 bears a striking resemblance to the Performa3. There's no beaming. It's the antithesis of the authoritarian type of "sweet

spot" that commands the listener to sit as still as a statue to glean the magic. And I didn't need to tilt, twist, or tweak them into hyper-specified positions. Unlike most compacts. I just set them down and got out of the way.

The Concerta2 M16 is a class-leading compact. It operates at a level of refinement and excitement that belies its relatively easy affordability. I've surveyed quite a few compacts in the entry-level ranks recently and the choices are bountiful. Some recent blue-plate stars include the \$499 Elac Uni-Fi UB5 and the under-\$300 Elac Debut B5/B6—brilliant contenders that currently own their class. However if, wallet permitting, you're considering stepping it up another notch, the Revel M16 is my choice for the compact monitor to beat in the one-grand-and-under segment. **tas**

### SPECS & PRICING

**Type:** Two-way, bass-reflex  
**Driver complement:** 1" aluminum dome tweeter, 6.5" aluminum woofer  
**Low-frequency extension:** 55Hz (-3dB)  
**Nominal impedance:** 6 ohms  
**Sensitivity:** 86dB  
**Dimensions:** 14.75" x 8.6" x 10.76"  
**Weight:** 16 lbs.  
**Price:** \$900/pr.

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## Equipment Report

### B&W 805 D3

#### A Compact That Acts Like a Flagship

Neil Gader

**W**hat is the first thing that comes to mind when you hear the term “flagship” loudspeaker? Its size, of course. Such speakers tend to be impressive, full-range statements—multi-driver platforms that cast long shadows in the room, their sheer size cowing listeners into respectful, worshipful silence. But grandiosity alone doesn’t make the argument all by itself. So the question I’ve been asking myself ever since I began listening to the B&W 805 D3 is: Can a two-way compact, a segment defined by modesty and yes, limitations, be considered a flagship product? Hold that thought.

The 805 D3 represents the sole compact in Bowers & Wilkins’ new lineup known as the 800 D3 Series. By new, I’m not suggesting a mere a tweak here or a twist there. The engineers at B&W implemented a top-down reboot of the venerable series, and in some instances virtually every part, screw, and bolt was replaced. The overhaul was so comprehensive it even prompted a factory renovation to the tune of several million dollars (see my B&W factory tour report, Issue 257). The 800 D3 series comprises seven models: four floorstanders, a single stand-mount, and a pair of home-theater

center-channel speakers.

In the 805 D3, B&W retained the rigid enclosure of its predecessor while refreshing some of the trim and accents in accordance with its new transducers’ requirements. Also retained is the distinctive FlowPort with its golf-ball-like dimpling that B&W developed to minimize port turbulence. Visually, it’s a gorgeous piece of industrial design—all sweeping curves and no parallel surfaces. And compared with the cool tech-chic of a CNC aluminum enclosure, the 805’s smoother organic lines and traditional wood finishes are softer on the eye. Personally, I like high-end gear that I can warm up to just a little bit.

The B&W team also concentrated commensurate efforts on the drivers. The model 805 was already renowned as the only stand-mounted compact with a diamond tweeter, but now its outboard housing, formerly cast of zinc, is a single aluminum billet. This creates what is essentially a massive heatsink for the diamond tweeter motor, and its design is much more inert which reduces ringing. The most obvious visual difference is the 6.5" mid/bass driver. B&W retired its yellow Kevlar midrange cone material, a B&W mainstay since 1974. The reason? While

B&W’s front office insists that Kevlar remains a good performer and measures well in terms of motion and breakup, the engineers wanted to take advantage of today’s more advanced computer-modeling techniques and testing. The result is the Continuum cone. In development for some eight years and seventy iterations, the (still patent-pending) technology is a woven composite material based on the concept of optimized and controlled breakup. The material markedly improves upon Kevlar by providing ultra-quick settling time and therefore no ringing.

Sonically the 805 is a fiercely confident and bold performer. Its character is quite neutral with hints of lower mid/bass warmth, yet it’s open, presenting uncluttered imaging. B&W has long been a creature of the recording studio and in true studio-monitor fashion, you can thrash the 805 D3s with heaping gobs of volume (recommended power is 50–120Wpc) and they never lose their composure, constrict, or harden. Short of putting your ears at risk, virtually nothing fazes the 805.

Its midrange signature was a near-seamless combination of speed, wideband dynamic contrast, and dense tonal color. Vocals exhibited a slightly forward emphasis, a trait consistent



with B&W’s experience in the pro-studio-monitor world, yet the 805 was not an aggressive “in-your-face” loudspeaker either. And it won’t pretty up a lackluster recording; it will expose it. Its upper bass and lower mids were surprisingly vital for the small cabinet volume, and this gave the dueling cello and acoustic bass from *Appalachian Journey* a nicely defined and richly realized resonant structure and a strong impression of air movement that is often AWOL in

## Equipment Report **B&W 805 D3**

small compacts. However, for the final deep and sustained growl of acoustic bass under Edgar Meyer's bow you'll still need a fast subwoofer.

Readers might be wondering whether my own listening room results comported with the impressions I got at B&W's SRE (Steyning Research Establishment), where I was given the opportunity to listen to the 805 D3 next to its predecessor, the Kevlar-driver 805 D. To reiterate, I found that they had some sonic similarities, but the D3 version was cleaner, smoother, and a more confidently defined and open performer. The D3 also had more dynamic snap, and soundstaging was far better realized, thus creating a more detailed sense of space and dimension. If anything, the gulf between the new 805 and the old version turned out to be even wider in my own listening room.

The civilizing influence of the 805 D3's superb diamond tweeter cannot be overstated. Its character was almost chameleon-like in the way it adopted the character of the source material. Terrifically expressive and liquid, it could sound brilliantly illuminated, even dry, or warm and richly shaded—it all depended on the recording. It imparted a finely graduated textural palette that extended from the high-gloss sheen of a piccolo trumpet or the delicacy of an orchestral triangle to the stinging grit and rosin from a country fiddler's bow. Or, take the exquisitely detailed leading-edge attack of the trumpet solo during The Carpenters' "Close To You," and the tuning of the multiple tom-tom skins for each drum fill. In all, there's a purity and transparency to the D3's performance that are as startling as if the very air in the listening room had been scrubbed clean with HEPA filtration.

Images were rock-stable and focused from dead center stage to the widest points of the soundspace, and even mono recordings such as the recent MoFi 45rpm reissue of Jefferson Airplane's *Surrealistic Pillow* came across with a stunning amount of reverberant depth and, yes, *layering*. For soundstage and scale, the 805 doesn't have a big footprint on the order of floorstanders like the Vandersteen Treo CT or Wilson Sabrina but it is very impressive for such a modest size spec. While it cannot impersonate a big speaker, it still presented large-scale music such as Dvořák's "New World" with a reasonable impression of orchestral weight, attitude, and symphonic dimension. Add a smallish subwoofer such as the REL T7i (\$999) to flesh out the half-octave below 40 cycles, and much of the orchestral weight is restored; still, it's no floorstander.

### Even mono recordings came across with a stunning amount of depth and layering.

A decisive factor in the 805's excellent performance was the integration between its port and its already-excellent inter-driver coherence. There's nothing more disappointing in an otherwise promising loudspeaker than having a pair of transducers speeding along to the finish line like Triple Crown winners and the port bringing up the rear like a Budweiser Clydesdale. But as I listened to the sinuous opening vamp from Michael Jackson's "Billie Jean" followed by the dance remix of David Bowie's "Let's Dance"—

tracks that will give "slow" reflex designs fits—the venting was indistinguishable as a source. The speaker yielded near-sealed-box speed and control but with the oomph and extension of a ported enclosure. Commendation also goes to the 805's rigid, non-resonant enclosure that never betrayed its boxy roots, neither softening transients nor dulling immediacy. All in all, port management is among the best I've heard in a two-way bass reflex.

I've gotten hooked listening to Tony Bennett's "Small World" from the recent Impex twin-LP release *Bennett/Brubeck, The White House Sessions, Live 1962*. Beyond the minimalist processing, what makes this live recording so satisfying is that you can hear in Bennett's singing the sweat that goes into the performance, the moment by moment concentration of the singer performing outside of the controlled atmosphere of the recording studio—no safety net, retakes, or edits. In that same vein are Intervention Records' remasters of Joe Jackson's *I'm the Man* and *Night and Day* albums that reflect the recording minimalism of their era—a pre-auto-tune simplicity, speed, and immediacy that lets you hear past the machinery and join the musicians inside the studio.

It doesn't happen very often that I sit down to listen to a loudspeaker, notepad and pen at the ready, and suddenly find that the stylus has hit the run-out groove, and my notepad is resting in my lap completely forgotten. This has occurred with only a handful of loudspeakers. I can recall the TAD CR-1, the Wilson Sabrina, the Vandersteen Treo CT, Elac's superb li'l cheapie Debut B5, the ATC SCM20SL (bought 'em, still have 'em)—different speakers in so many ways yet

all had a musical charisma that seduced me into listening for hours at a stretch.

Returning to my original premise: the compact speaker as flagship. If sheer size or dizzying price is the only criterion, then it's obviously game over for the 805. However, if the standard is premium quality, sonic eloquence, and untrammelled musicality, then the 805 D3 ascends to flagship-level importance. I can count on the fingers of one hand the times I've ever thought of a small, two-way, stand-mounted speaker in this way. Compact or not, the 805 D3 is loudspeaker to be reckoned with, at any price, in any company. My highest recommendation. **tas**

### SPECS & PRICING

**Type:** Two-way vented compact

**Driver complement:** 1" diamond dome tweeter, 6.5" cone mid/bass

**Frequency response:** 42Hz–28kHz (±3dB from reference axis)

**Nominal impedance:** 8 ohms (4.6 ohms min.)

**Sensitivity:** 88dB

**Dimensions:** 9.4" x 16.7" x 13.6"

**Weight:** 28 lbs.

**Price:** \$6000

### B&W GROUP NORTH AMERICA

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## Equipment Report

# Focal Sopra N°1

## Hard to Say Goodbye

Andrew Quint

**T**here's something to be said for a high-end loudspeaker manufacturer actually making its own drivers. The number of companies that do this is relatively small, though many try to obfuscate the matter by declaring that their woofers and tweeters are made to their exacting "specifications" by outside sources. In fact, many fine loudspeakers *are* produced by this latter paradigm. But having complete control over driver manufacture in-house can facilitate efforts to optimally integrate the performance of transducers, crossover, and enclosure. Since very close to its beginnings in 1979, Focal (at the time known as JMLab—Jacques Mahul started the company and remains at the helm) has produced both raw drivers and complete speaker systems. For 25 years, Mahul sold his drivers to other marques. But especially with the development of an automotive speaker line, the demand became too great and now the French company keeps all of its drivers for its own products.

The Sopra speakers—there are two currently, the \$8999 Sopra N°1 and the \$13,999 Sopra N°2—occupy a position in the Focal product range between the Electra line and the take-no-prisoners Utopia series. The Sopra N°1 is

the top half of a Sopra N°2 turned upside down and mounted on a dedicated stand. A mini-monitor? It sure doesn't perform like any other mini-monitor I've heard, and if you're thinking of employing a subwoofer along with these loudspeakers, maybe yes—but maybe no.

The two transducers in the Sopra N°1 exemplify Focal's long history of driver design. The W-sandwich cone was developed for the earliest Utopias in 1995, a Rohacell foam core covered on both sides with a thin layer of resin-impregnated glass tissue. These drivers, efficiently fabricated at Focal's St. Etienne factory, manifest the Holy Trinity of high rigidity, low mass, and excellent self-damping characteristics that translate into transparency, excellent phase response parameters, and low distortion, compared to drivers made from other commonly employed materials such as Kevlar or aramid fiber. Focal tweeters, of course, have been the standard for high-frequency reproduction for decades. Before starting JMLab/Focal, Jacques Mahul worked at Audax where he developed the first dome tweeter. At his own company, he pioneered the beryllium tweeter and, in 1981, introduced the inverted dome topology, which leverages the advantages

of having the tweeter similar in shape to the cone to better integrate the two drivers.

The key features of the beryllium tweeter and sandwich cone have been in place for years and, to cite a Focal technical paper, "the only way forward was to work more closely on the driver suspension." Using computer-modeling methods to investigate the effect of adding mass to a driver's suspension (a technique that's been used to assess automobile suspensions and anti-seismic systems for tall buildings), Focal developed its TMD (Tuned Harmonic Damper) suspension, configured as a pair of circular rings that oscillate to neutralize the resonance frequency of the driver's surround. The result, says Focal, is a greater than 50 percent reduction in distortion around the critical area of 2000Hz, which results in improved imaging, delineation, and timbral accuracy. Sopra speakers also take advantage of some "trickle-down" technology from the massive EM drivers found in Utopia models, and other refinements of the EM circuit that Focal sees as a work-in-progress, calling it the Neutral Inductance Concept, or NIC.

Focal set out to implement its improved drivers in a relatively compact design. The tweeter is positioned in a progressively damped



horn-shaped duct that leads to the back of the loudspeaker and preserves real estate for the Sopra N°1's low-frequency driver enclosure. In its continuing effort to create new initialisms representing its technological advances, Focal calls this IHL, for Infinite Horn Loading

## Equipment Report Focal Sopra N°1

and states that measurable distortion in the midband is reduced to a degree complementary to that achieved by the new driver design. The cabinet is fabricated from MDF—Focal feels strongly that an enclosure that is *too* stiff can push resonances up into a more audible range, plus this material is easy to work with in creating the curved enclosure shapes that confer the advantages of less diffraction of sound and more structural rigidity. A variety of standard finishes are available: My review sample was an attractive Dogato walnut veneer, though I'm sure the brilliantly colored high-gloss lacquer finishes you see in the Focal ads are more frequently requested. On the back panel is a single pair of five-way binding posts, thoughtfully spaced about 2" from center-to-center, that are effectively tightened by hand, even over thick spade terminations. Grille covers are easily removed, and should be.

The Sopra N°1s arrived in two rather small cardboard boxes that could only mean one thing: "some assembly required," as the saying goes. It took me around two hours to unpack the speakers with their included stands and put them together, though I'm sure if I had to do it again, it would take half as long. The stand's robust supporting pillar must be bolted to the heavy glass base, a top metal plate to the pillar, and then—this is the frustrating part—the speakers are bolted to the top plate. Getting the threads in the Sopra N°1's bottom surface to align with the holes in that top plate so that the final set of bolts can be inserted and tightened is definitely a two-person job. This is something your dealer should do for you—presumably in recognition of the fact that you didn't audition

the speakers for three hours in his showroom and then buy them for \$200 less somewhere else. Added value, remember?

**Dynamics and loudness, of course, are not the same thing and one has to be reasonable about how loud you ask the Sopra 1s to play.**

Positioning the Sopra N°1s was surprisingly easy. Once assembled, I plopped them down in the location where other, smallish stand-mounted speakers have worked well. The tonal balance and imaging were pretty good, even though the speakers weren't broken-in at all. The minimalist users manual provides a formula for placing the speakers and when I plugged the numbers in, they were sitting pretty much exactly where Focal said they should be. A little fiddling with toe-in and leveling with the easily adjustable floor spikes, and the deal was sealed. Preceding the Sopras in the reproduction chain was my usual reference gear. I used digital sources exclusively, either an Oppo 93 (as a disc transport) or the Baetis Reference music computer, both feeding data to my Anthem D2v for D-to-A conversion and control. Amplification was by a pair of Pass XA 60.8s and all cabling was recent vintage Transparent, save for the Shunyata Anaconda AES/EBU cable from Baetis to Anthem. In lieu of any physical room treatment, I ran Anthem's DSP room-correction program, utilizing measurements taken at eight room locations, and employed it up to 2kHz

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## Equipment Report Focal Sopra N°1

after inspecting the frequency response curves generated by the software. Focal says that the Sopra N°1 is an appropriate loudspeaker for rooms up to 275 square feet and my space is 15' x 15', with the ceiling height varying from 11' to 13'—so my room should have been a felicitous match.

It was indeed. From the get-go—and especially after a few days of break-in—the Sopra N°1 was utterly enthralling. Focal's beryllium tweeter is surely the best in the business, and the air, openness, and delicacy of the top octaves equaled or even surpassed what's achieved with many electrostatic or ribbon transducers. Musical data living largely in the upper frequencies had a penetrating energy and presence without a trace of aggressiveness. I learned a lot about what the Focals could do in this regard from listening to digital representations of 1970s rock/pop material. Here is music that was recorded with analog gear and intended for vinyl playback. From a CD or even high-resolution digital file, the "shortcomings" of these recordings come to the fore—a lack of deep bass and a potentially wearying peakiness to voices and instruments with lots of upper partials such as cymbals or closely miked acoustic guitars. By way of example, I'm told that Joni Mitchell used Martin guitars equipped with steel strings to record her classic album *Blue*. With an average vinyl pressing, the dynamic immediacy and rhythmic impetus of Mitchell's accompaniment provides a perfect counterpoint to the vocal contour of a song like "Little Green." Too often, even the finest digital representations (the HDtracks 192/24 version, for instance) have the guitars seeming jarring

### SPECS & PRICING

**Type:** Two-way, bass-reflex

**Driver complement:** One 1" inverted dome tweeter, one 6 1/2" bass/midrange

**Frequency response:** 45Hz–40kHz (+/- 3dB)

**Sensitivity:** 89dB

**Recommended amplifier power:** 25–150 watts

**Nominal impedance:** 8 ohms

**Dimensions:** 16.75" x 11" x 15 1/2"

**Weight:** 42 lbs.

**Price:** \$8999, stands included

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and jangly, to the point of becoming a distraction from the gentle wistfulness of the song. The Sopras restored the indefectible unity of the lyrical and instrumental aspects of "Little Green," as heard from the hi-res file. I felt much the same about other material I love from this era, songs supported primarily by acoustic guitars—CS&N's "You Don't Have To Cry" or Todd Rundgren's "Love of the Common Man," and so many others.



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## Equipment Report Focal Sopra N°1

The Sopra's faithfulness to the overtone structure of more unusual musical sounds is another manifestation of the level of performance achieved with the loudspeaker's top end. In Igor Stravinsky's faux-baroque masterpiece *Pulcinella*, based on music by Pergolesi, at the close of the "Scherzino" movement, the composer wants to imitate the sound of a lute. The obvious modern instrument for the job is the harp—but the pared-down orchestration for *Pulcinella* doesn't include one. So Stravinsky, good student of Rimsky-Korsakov that he was, figured out another way to accomplish his end, by having cellos play pizzicato open fifth harmonics. Stravinsky's ingenious solution—cellos imitating harp imitating lute—has the desired effect and we hear it clearly through the Sopra N°1s. Of course, the stellar performance of the tweeter wouldn't matter if it weren't successfully transitioned to the mid/woofer driver. The materials comprising the W-sandwich cone and the improvements to the suspension evidently make for an extraordinarily uncolored midrange. The crossover frequency is a high-ish 2.2kHz and the handoff is accomplished invisibly to assure the integrity of solo voices, male and female, and all instrumental sonorities.

Detail retrieval is first-rate. It's a cliché to make an observation such as this, but small felicities in complex pop mixes that had escaped my attention for decades suddenly seemed utterly essential: claves on the title cut from Paul Simon's *Graceland* or the nuances of the Eagles' background harmonies on "New Kid in Town." The subtleties that one used to

have to go under headphones to appreciate are evident through loudspeakers operating in the potentially detail-obscuring environment of a room. Imaging, typically a strength of small stand-mounted speakers, is exemplary, making chamber music and small jazz group recordings



especially absorbing. Dynamics are striking for a loudspeaker this size, or any size, really. Powerful, virtuosic piano music makes the point nicely. Listening to the violently driven "Precipitato" finale of Prokofiev's Piano Sonata No. 7 (played by Matti Raekallio), Messiaen's "Regard de l'Esprit de joie" from *Vingt regards sur l'enfant Jésus* (Alice Ader) or Liszt's *Mephisto Waltz No. 1* (Minoru Nojima) was the intense and potentially exhausting experience it should be with a good performance.

**Perhaps the most telling part of the audiophile loudspeaker review process is what happens when all the critical listening has finished.**

Dynamics and loudness, of course, are not the same thing and one has to be reasonable about how loud you ask the Sopra N°1s to play. The fairly small size of my room may explain why I was usually able to achieve satisfying volume without a sense of stress, even with music meant to be experienced at attention-getting dB levels—hard rock, Mahler, 19<sup>th</sup> century French organ music. Just don't turn it up to 11; settle for eight-and-a-half. Then there's the issue of bass. The Sopra N°1 is down 6dB at 41Hz (-3dB at 45Hz) but is capable of providing the necessary visceral bass/drums foundation of well-recorded rock or the weight of an orchestra's string bass section. I did, of course, try adding a subwoofer. I have a good one, the passive Wilson WATCH Dog,

powered by a Parasound A23 bridged to produce 400 watts. I spent a good deal of time methodically varying the low frequency roll-off for the Sopras, the upper frequency roll-off for the sub, and tried numerous volume, polarity, and phase adjustments to the subwoofer signal. There was no problem increasing the amount of bass in the room but not without compromising the of-a-piece sonic fabric that this Focal speaker creates on its own. Enlarging the scale of the low end so it was disproportionate to the rest of the frequency spectrum was counterproductive. If you like what the Sopra does for the highs and the midband but feel underserved when it comes to bass or volume, you need a bigger Sopra. The Sopra N°2 ups the ante considerably when it comes to low-end output and coherence at high levels; by the time you're reading this, the even larger Sopra N°3 (\$20,000) will be available as well.

Perhaps the most telling part of the audiophile loud-speaker review process is what happens when all the critical listening has finished. In many instances, when I feel I'm ready to write, I'll pack up the speakers under consideration and fire up the reference Wilson Duette 2s that have been waiting patiently in the hallway off the listening room. With the Sopra N°1s, I felt compelled to hear them play music until the last possible moment. The truck picking up the Focals for the trip back to their U.S. distributor, Audio Plus Services, showed up earlier than anticipated. The driver called up from the street and I told him to return later as I scrambled to finish disassembling the Sopra N°1s and get their constituent parts back into the cardboard boxes. Sometimes it's hard to say goodbye. **tas**

## Equipment Report

# Gamut Superior RS3i

## A Premium Compact from Denmark

Kirk Midtskog

Photography by Dennis Burnett

**M**y first encounter with a top-model Gamut two-way stand-mounted speaker, the L3, was at a friend's house about eight years ago. It performed well in my friend's system and also in my own system, as my friend was kind enough to let me borrow the pair for a few days. The current RS3i's predecessor, the S3, sounded gorgeous when I heard it at the Gamut headquarters in Årre, Denmark, in 2012. However, the new RS3i is a complete redesign of the S3. Only the general cabinet shape and size are similar to the S3.

Gamut's Benno Meldgaard has taken over the design work—both for speakers and electronics—from Lars Gollar. I admire and respect Gollar's contributions to Gamut over the years, but I will say that whatever Meldgaard is now doing to take those designs further is well worth a fresh listen. If the demos of the RS3i, RS5, and RS7 at the 2015 Rocky Mountain Audio Fest are indicative of Gamut's new efforts, I am impressed. After living with the RS3i for several months now, I am doubly impressed.

The RS3i has remarkable bass extension and dynamic range for its size. Even so, it will not outplay most multi-way floorstanders in ulti-

mate bass extension and full-throated dynamic output. I presume, though, that anyone who is considering a loudspeaker like the RS3i is also likely to be fully aware of the limitations of the mini-monitor genre and is specifically seeking one because it is more likely to integrate well in a small- or medium-sized room. If you are on such a quest, and you especially like small speakers that "sound big," and your budget can accommodate its \$19,990 asking price (including integral stands), the RS3i should be on your audition list. I will discuss its design and market context later, but allow me to address its sound first.

### Listening

Right from the beginning, the RS3i sounded remarkably expressive and immediate—that is to say, free-flowing, unprocessed, and open rather than reserved, forced, and restrained. Its overall sound improved after about 200 more hours of music signal had been played through the speaker, but its appealing "liveliness" never waned. Normally, when I encounter a lively speaker, I also hear a fatiguing "hyperactive" aspect to its presentation, as if the speaker were forcing the signal through a musical turbocharger of some



## Equipment Report Gamut Superior RS3i

kind. To Gamut's credit, the RS3i never veered into sounding irritating or exaggerated. On the contrary, the more I listened to the RS3i, the more I loved its form of "musical enthusiasm." Playback seemed to more closely approximate live music's dynamic presence than I have ever heard from a speaker of the RS3i's size—and from a good many larger ones, for that matter. I found myself simply getting lost in the thrill of listening to music, sometimes for hours, occasionally waving my arms around enthusiastically because the music sounded so compelling.

Even though the RS3i is quite revealing—capable of fleshing out subtle details like guitarists' fingers on strings or the faint, shimmering quivers of lightly struck gongs, it is also well behaved. Mike Garson's lightning-fast piano runs on "Count Your Blessings" from *The Oxnard Sessions, Volume Two* [RR], for example, did not have zones of notes that unnaturally jumped out of the mix. Singers such as Alison Krauss, Alanis Morissette, and Björk retained their rather penetrating timbres, but their voices did not veer into shrillness, as can be the case through some other speakers. Instead, the appeal of these singers—perhaps partly derived expressly because of their high vocal ranges—came through alternately with soaring power and touching vulnerability. (By the way, I am pretty sure the LP track of that Mike Garson piano solo of "Count Your Blessings" is a different take or version than that on the CD track of the same title. Has anybody else noticed this, or can anyone confirm it?)

Bass extension was remarkably good in my setup. Gamut publishes a 34Hz low-end limit (without the usual -3dB tolerance). The RS3i

reproduced a 30Hz test tone, the lowest tone available on my test LP *Check and Double Check* [Westminster], with strong amplitude, not just a faint rumble. Some of this response is probably due to some room-induced reinforcement, but it's still pretty impressive. (Keep in mind, the speakers were placed with their tweeters 62" from the backwall, so it is not as if I deployed the speakers specifically to increase their bass response.) In my 12.5' x 17' room, most large-scale orchestral music was well served. A bigger, more bass-extended speaker can bring more heft to the presentation, but the RS3i still delivered enough in the low octaves to give a solid foundation to large orchestral music. As far as I could tell, only organ music would require a sub-woofer. I brought out some of my big-sounding pop LPs such as Jeff Beck's *Emotion and Commotion*, Peter Gabriel's *Up* [Real World], and Alison Krauss' and Robert Plant's *Raising Sand* [Rounder] just to hear what the RS3i would make of them. Listening delivered satisfying levels of rhythmic drive and remarkable bass power for a speaker of this size. The lowest synthesizer notes on the Aphex Twin *Syro 24/44* WAV file [Warp] were missing, but we're talking about very low bass notes there. Also, the almost menacing quality of power rock like that of Tool's *Lateralus* [Volcano] was muted compared how it sounds on more full-range, multi-way speakers like the YG Acoustics Kipod Signature II, Ariel 7T, and YG Sonja 1.2. Still, the RS3i turned in a respectable showing.

The RS3i's wide macro-dynamic scale also goes a long way to making it sound much larger than it looks. In fact, I have never heard a more dynamically powerful stand-mounted, two-way

speaker, period. The kick-drum and bass lines on Alanis Morissette's "One" from her *Supposed Former Infatuation Junkie* LP [Maverick] were viscerally impactful, imparting considerable weight and solidity. The full orchestra *forte tutti* "slams" at the opening of the "Infernal Dance of King Kastchei" movement from Stravinsky's *The Firebird Suite, 1919 Version* [RR] were stunning in their explosive, thundering impact. The speed of the transient leading edges followed by the notable *control* over the resulting huge dynam-

ic "body" of those blasts were much more in keeping with a larger speaker than those of a typical mini-monitor. Of course, the partnering electronics and general speaker setup also impact any transducer's performance, but just the fact that I could bring out such truly responsive and forceful dynamics from this small speaker proved what it could do.

My Dynaudio C1 II mini-monitor sounds more bass-heavy, but the C1 does not have nearly the same definition and resolution in its low end as

### SPECS & PRICING

**Driver complement:** Two-way; one 1.5" ring-radiator tweeter, one 7" sliced, natural-oil-impregnated paper cone

**Frequency response:** 34Hz–60kHz

**Sensitivity:** 86.5dB/2.83V

**Impedance:** 4 ohms minimum

**Crossover point:** 2150Hz

**Dimensions:** 8.9" x 41.7" x 18"

**Weight:** 61 lbs. with stand

**Price:** \$19,990 (including integral Gamut stands)

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### ASSOCIATED EQUIPMENT

**Analog source:** Basis Debut V turntable and Vector 4 tonearm, Benz-Micro LP-S cartridge

**Digital sources:** Ayre C-5xeMP universal disc player, HP Envy 15t running JRiver MC-20, Hegel HD12 DAC

**Phonostage:** Ayre P-5xe

**Linestages:** Ayre K-1xe, Hegel P30

**Integrated amplifiers:** Hegel H80 and H360

**Power amplifiers:** Gamut M250i, Hegel H30

**Speakers:** Dynaudio Confidence C1 Signature, YG Acoustics Sonja 1.2

**Cables:** Shunyata Anaconda ZiTron signal cables, Gamut Reference signal and power cables, Nordost Heimdall 2 USB, AudioQuest Coffee USB and Hawk Eye SPDIF, Shunyata Anaconda SPDIF, Shunyata Anaconda and Alpha ZiTron power cords

**A/C Power:** Two 20-amp dedicated lines, Shunyata SR-Z1 receptacles, Shunyata Triton and Typhon power conditioners

**Room treatments:** PrimeAcoustic Z-foam panels and DIY panels

## Equipment Report Gamut Superior RS3i

the RS3i has. The RS3i is, in fact, more resolving across the board. Of course, it costs about two-and-a-half times more than the C1, so one should expect better performance. The RS3i's bass and midrange blend seamlessly with its upper frequencies into a coherent whole so that nothing stands out as a misstep. Its entire range sounds agile, with no part of it lagging or seemingly stumbling ahead. Some of this may have to do with the crossover's graduated slopes; I will cover these in more detail later.

Precise imaging, wide-open soundstaging, and the cabinet's disappearing as sound sources are indeed part of the RS3i's repertoire, just as you would expect from a deluxe stand-mount. Soundstage width and depth were fantastic, extending well beyond the outer edges of the cabinets and about five feet behind them. The real treat here is that soundstage height was much closer to that of a multi-way floorstander than many people would expect. Some folks (including at least one reviewer for this magazine, I believe) have criticized small, stand-mounted speakers specifically for their limited soundstage height, presumably because such mini-monitors don't have enough drivers in a vertical array to project much height. Well, I can assure you, when properly set up, the RS3i is fully capable of matching some multi-way floorstanders in this regard. On some playback material, the RS3i had a soundstage height range from about 14" from the floor up to about 5.5' high—in other words, floorstander-like performance.

### Design and Construction

How does Gamut do it? To start with, the speak-

er has a 7" Scan-Speak, paper-fiber mid/woofer with angled radial "slices" which, according to Gamut, help dissipate unwanted resonances in the cone. Gamut also treats the cone with a special oil to help mitigate a dry, papery quality it believes is present in untreated cones. The tweeter is a Scan-Speak 1.5" ring-radiator with a custom phase plug. The crossover point is 2150Hz, and the slopes are not a standard, linear 6-, 12-, 18-, or 24dB-per-octave types; rather, the slopes start at 6dB then get steeper, so as they approach complete roll-off, they are 24dB, says Benno Meldgaard. Meldgaard also told me that this yields the best melding of frequency and phase performance. The cabinet has a rear-firing reflex port tuned to 35Hz.

The cabinet is made from 21 layers of hand-selected, real wood sheets to provide stiffness, constrained layered resonance control, and relatively low mass. The curved sidewalls are glued and pressed under high temperature and pressure so that the resulting arc does not have any internal stresses. Gamut says this permanent curve is essential to achieving the kind of ridged, low-resonance performance it needs for the overall design to work. The cabinet is low mass because Gamut believes that high-mass cabinets—even well-damped ones—still retain unwanted resonances, and they radiate them "later" than lower-mass cabinets do. Apparently, listeners subliminally perceive this delayed resonance releasing as a phase smearing, and therefore as less realistic sounding. Gamut uses real wood layers for another reason: The company believes they help its speakers sound more like real instruments than synthetic materials or metal. I am agnostic on this materials

"With the (Wavelet) correction on, there was an overall increased sense of precision in playback with my speaker system. Perceived images of performers and instruments became more clear in space with main vocals being the most obvious beneficiary of the processing."

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A. Cordesman, *The Absolute Sound* January 2017

## Equipment Report **Gamut Superior RS3i**

point. I find Magico and YG Acoustics speakers, made with aluminum cabinets for example, to sound damned good. All I can say, here, is the Gamut RS3i sounds marvelous, and so do Magicos and YGs.

Gamut asserts that internal cabinet damping materials should be kept to an absolute minimum (or eliminated altogether in the case of Crystal Cable's Arabesque speakers) because those materials also tend to dampen the overall presentation, thereby robbing music playback of immediacy and dynamic vibrancy. In fact, this approach is a key factor in the RS3i's design—the one that probably most accounts for its dynamic liveliness. All but a few dynamic, cone 'n' dome speakers have several sheets or patches of internal cabinet damping materials such as fiberglass, foam, wool, felt, or cotton batting inside their cabinets to help absorb the backwaves of the drivers. But Gamut's layered, real wood, low-mass, curved cabinets enable it to use very little damping material because its design minimizes internal standing waves and dissipates resonances quickly. In fact, each RS3i pair has a designed right and left speaker not because the respective speaker's tweeter and mid-woofer are aligned off the vertical axis, but because one sidewall has some internal damping material while the opposite side has none.

I must say, Gamut is on to something. The RS series Gamuts I've heard (and Arabesques, for that matter) all share a musical verve that does remind me of music's natural dynamic presence. Some planar speakers have some of this quality as well—as they skip the cabinet altogether—but the planars I have heard don't have as much dynamic range or palpable impact as the RS3i

has. Mind you, a good planar might, arguably, also have a more refined treble presentation, but I never thought the RS3i's upper frequencies sounded ragged, harsh, or crude.

Meldgaard has adjusted the tonal balance of the entire RS line. The RS5, for example, no longer has the midrange emphasis as Robert E. Greene noted in Issue 246. In the case of the RS3i, Meldgaard told me that he applied a shallow dip starting at about 800Hz that extends all the way up to about 9000Hz—with one speaker measured on axis at one meter. He went on to say that when he measured the combined output of two speakers playing together in a typical domestic room and at a typical listening position, he found that he needed to back off the midrange output and some of the upper frequencies to make the pair of speakers sound more natural. Now, this tonal shaping might give one the impression that the RS3i might have a recessed soundstage, a bloated midbass, and a zippy top end. Actually, it has none of those qualities. It sounds well balanced and reminiscent of live music within its range.

The included stand is not only a perfect match to the beautiful cabinet visually—some friends commented just how nice the review samples looked—but it is also integral to how the speaker is designed to work. The stand employs combinations of metal, layered wood, and what looks like a wood/resin material similar to Panzerholz. It has a cable routing slot running up the back and stainless steel outriggers with large threaded footers to allow for more than an inch of vertical travel for height adjustment, irregular floor leveling, and back and forward tilting. This ability to affect front/back tilt is



## Equipment Report **Gamut Superior RS3i**

key to expanding the speaker's overall vertical soundstage zone—not just the top limit of the soundfield's height, mind you, but the ability also to make the bottom of the soundstage descend quite a bit below the plane of speaker cabinets' bases. The outriggers have small Delrin, rubber-tipped set-screws to lock in the spike level settings and to help dampen resonances between the floor and the stand. The substantial spikes are easily adjustable from the top with a hex wrench, a nice touch; Gamut also supplies matching spike cups to protect non-carpeted floors.

The grille, which consists of two vertical metal rods with fairly widely spaced elastic cords stretched between them, had negligible impact on sonic performance. The speaker actually looks more complete with the grille on, in my opinion. The two sets of binding posts on my review sample were Gamut's custom variety, which were designed to work primarily with stranded bare wire, but also to accept banana connectors. However, Meldgaard told me Gamut would be switching to a more standard binding post so the speaker can also accept spade connectors—a welcome development. (By the way, Gamut also makes a complete line of very nice-sounding signal and power cables. The RS3i is wired with Gamut's Reference line cabling.) According to the published sensitivity specifications, the RS3i should be fairly difficult to drive at 86.5dB/2.83V and 4 ohms nominal impedance. In practice, though, I found the RS3i to be easier to drive than both the YG Kipod II Signature and the Dynaudio C1 II. I did not need to crank up the volume to achieve satisfying sound levels (without any signs of speaker strain, either) or to make the speaker “wake up,”

so to speak. The 75-watt Hegel H80 integrated amp was able to drive the RS3i to satisfying levels. Of course it sounds much better, and yields the sort of performance I have been describing, with Gamut's own M250i mono amp. I ended up buying the M250i loaner samples in conjunction with my review of the D200i stereo amp from Issue 229. (See sidebar for more about the M250i.)

### Market Context

At \$19,990 for a pair of RS3is, there are a few other even more expensive stand-mounted speakers on the market. I don't have experience with any of them in my own system, but I have heard the following models at audio shows (all prices including dedicated stands): Raidho C-1.1 (\$18k) and D-1 (\$28.5k), the TAD CE1 (\$24k) and CR1 (\$42k), the Magico Q1 (\$26,500-\$28,995), and the MBL 120 (\$23,030). The two TAD models also had wide dynamic ranges, but tended to inch toward sounding a bit dry and matter-of-fact. They are both three-way designs, by the way, and cost more—\$22,010 more in the case of the CR1. The Raidho models sounded very accurate and musically enjoyable, but I am not sure how much dynamic power the Raidho quasi-ribbon tweeter can handle to allow them to really rock out, as it were, like the RS3i can. I don't believe I heard the low bass extension from either the Magico Q1 or the MBL 120 that I have been getting from the RS3i, but there are just too many variables to make much of my impressions here. I also am not at all sure how well the RS3i might stack up against the others in terms of fidelity to sources and upstream electronics. My point is that the RS3i has plenty of



## Equipment Report **Gamut Superior RS3i**

price company in the deluxe mini-monitor category and may, actually, be price competitive. The RS3i sounds like a musically accomplished speaker that just happens to be small.

### Caveats

While I believe the RS3i renders upper frequencies quite well and is indeed quite extended and complete sounding, I suspect even greater refinement and resolution of fine details and textures may be available from other über mini-monitors such as the Raidhos and Magicos mentioned above. My speculation along these lines comes from hearing the other speakers at audio shows, as mentioned, and so it is a “hunch” and should be taken as such.

Another caveat: The RS3i stand’s outrigger set-screws, while a clever feature, could have been mounted at an angle to make for easier user access. The shipping crate is quite large because it houses both the speakers and their attached stands. Two smaller crates (one speaker and stand per crate) would be more easily maneuvered for unpacking, storage, repacking, and shipping. Most of my nit-picks are purely matters of convenience. I had to really search to come up with a few things to criticize, lest I lose some credibility.

### Conclusion

From the moment I first connected the RS3i without much regard to optimizing its placement and just let music play, I heard something compelling about the speaker. It only got better with time and fine-tuning. Its liveliness never proved less than entertaining and engaging. In fact, the more I listened to the RS3i, and the more albums

I threw at it, the more I admired its winning ability to dig bring out the music’s essence and do so with a beguiling *joie de vivre*. Its bass extension and dynamic power are up there with the best of the mini-monitor breed. The RS3i combines all the advantages of a small stand-mounted speaker—illuminating imaging and wide-open soundstaging—with stunning dynamic presence. Capable of sounding much bigger than it looks, it is a honey of a speaker and should be on anyone’s short list for a small-to-medium-sized rooms. Enthusiastically recommended.



## Gamut M250i Monoblock Amplifier

When I reviewed the Gamut D200i 200W stereo amplifier in Issue 229, Gamut also sent along its 250W mono amp model for me to listen to. I have been using it off and on since mid-2012 and have come to love its sound even more than when I first wrote a sidebar to accompany that D200i review. I liked it so well that I bought the loan samples as my own reference amplifiers. What follows is an edited reworking of my original M250i sidebar.

The M250i has several important improvements to make it perform at a significantly higher level than its smaller sibling. At \$26,000 per pair, the jump in price is also considerable. More than double the price to go from 200 watts to 250 watts? All other things being equal and when driving typical speaker loads, this is not an appreciable power increase. Even so, there is much more going on, sonically and technologically, than a bit more power and two chassis instead of one.

... revealing,  
well balanced,  
dynamically  
alive, and  
remarkably  
expressive ...

In a nutshell, what you get from the M250i is considerably more of the positive performance characteristics of a D200i and fewer of that amp’s forgivable weaknesses. The M250i casts a much larger and more open soundstage and exhibits a lower noise floor. Please keep in mind, the D200i stereo amp does not suffer from undue noise levels at all; my point is merely that the M250i’s ability to enlarge the soundstage and reveal more details—as well as to sound more relaxed and natural in the upper frequencies—yields significant sonic benefits. The M250i expands the whole presentation and invites you to discern the musical constituents more easily and become more involved. On an intellectual level, you can more readily follow various parts in the mix, hear venue space and reverberation cues in addition to recording quirks. On an emotional level, you can more readily follow the subtle differences in dynamic intensities (which musicians use to impart meaning), more easily forget about system playback, and simply become more immersed in the artistic world conjured by the musicians.

The 250i also promotes a greater sense of physical presence through larger, snappier dynamic swings and more power in the bass. Here is where I speculate that the particular way the 250i uses its output power invests everything with greater solidity and dramatic life. (Its output increases to 480 watts into 4 ohms, 900 into 2, and 1700 [peak] into 1.) Marshaling increased current behind the watts, separating each channel with its own chassis, and a few other improvements really do seem to work together to elevate the M250i’s overall performance.

The Gamut M250i strikes me as a solid contender in its price category. It is revealing, well balanced, dynamically alive, and remarkably expressive of music’s natural appeal. It’s not inexpensive, but its level of refinement and musical realism are addictive—at least they have me hooked. **tbs**

## Equipment Report

### Elac Uni-Fi UB5

#### Lightning Strikes Twice

Neil Gader

**H**ow do you follow an act like the Elac Debut B5? The pint-size, two-way compact simply crushed it with its big, hearty sound and puny \$229 price tag (reviewed in Issue 260). In a rare convergence of enthusiasms, it won the hearts of high-enders and mainstreamers alike. However, for Elac's VP of Engineering Andrew Jones, a longtime advocate of concentric drivers (look no further than his work at KEF and Pioneer/TAD, for examples) there was unfinished business. Hence, Uni-Fi: a new line of affordable Elac loudspeakers, including the UB5 compact under review here, plus a UC5 center-channel, and the floorstanding UF5. The UB5 features concentric midrange/tweeter transducers in a three-way driver configuration.

The UB5 is a stand-mounted compact with a bass-reflex design that uses a rear-firing dual-flared port. Just shy of thirteen inches tall, it's easily one of the smallest three-ways ever made and its compact size is almost entirely owed to the concentric driver's remarkable space-saving properties. Also known as a coincident (or archaically as a coaxial) driver, it's a sophisticated

design that insets a one-inch soft-dome tweeter at the center of a four-inch aluminum midrange. Its crossover point is 2.7kHz. Also specially designed for the Uni-Fi line is the five-inch aluminum woofer. Apart from some minor trim changes, the UB5 is a near-spitting image of the B5 with some classy touches added, such as premium binding posts and the magnetically attached fabric grille. The result is a sturdy MDF-braced enclosure that adds a mere couple of inches in depth. Like the Debut line, it's nicely finished in black brushed vinyl.

In a conversation about the UB5's conception, Jones said, "The enclosure is a development from the B5. It wasn't fully planned when I did the B5, but when starting work on the UB5 it made sense to use the same frontal dimensions so that I could use the same grille tool. I changed the logo and changed from push-pins to magnetic fastening to differentiate it from the B5. To get the required volume and to compensate for the space taken up by the separate midrange chamber, I added depth to the enclosure. I chose to make the midrange enclosure part of the cabinet construction, rather than a tube on

the back of the midrange, so that it could add bracing to the cabinet. In addition I added an extra brace, all to help stiffen the cabinet."

As for the change from the B5's woven mid/bass to the UB5's aluminum bass driver, Jones explained, "The B5 used woven aramid because it was a two-way system, so the bass driver had to perform double-duty as bass and midrange. Once I went to a three-way system I was free to use a material that could be optimized specifically for bass reproduction. This includes having the correct mass, and being able to get the required stiffness without having to worry about cone breakup messing with the midrange. The bass driver motor structure was then fully optimized to give me better bass performance than was possible with the B5. Likewise, the midrange could be optimized as just a midrange driver, and because of the cone size and voice-coil size I could get the breakup-mode to be a high 8kHz (by contrast, the TAD beryllium driver, although larger, was only marginally higher at 9kHz)."

Sonically, if you loved the B5—and any



self-respecting audiophile should—you're gonna love the UB5 just a little more, and

maybe a lot more. The UB5 is the B5 gone to finishing school. It boasts fewer box colorations and smoother, more accurate tonality, and is emboldened by the greater output and dynamics that befit a dedicated three-way design. It's still a bit dry in the treble but nicely detailed without being offensive. Basically, it's everything the B5 already is plus all the extras Elac could stuff in while still graduating with a \$499 sticker. In musical character, the UB5's voice will be familiar to all who have encountered the B5 (you mean you don't already own a few pairs?), or the Pioneer SP-BS22, or even the state-of-the-art TAD CR-1. The \$42k TAD? No, I'm not being glib. All these examples share (within reason) a similar overall voice—one that is anchored by a balanced and dynamic midrange, a forward energy (no suckouts), and a persuasive lower midrange and upper bass.

It was easy to appreciate how the UB5's dedicated woofer and concentric driver have been put to use. Two key issues stand out: The first was



## Equipment Report Elac Uni-Fi UB5

the point-source-like coherence that the coincident created. Because the coaxial arrangement creates a near-ideal time alignment, the experience is more akin to a single full-range driver with the benefit of the two transducers both operating within their specified frequency ranges; this can yield a significant improvement in output and dynamic payload, and with less distortion. Compared with the two-way B5, there's an added specificity, steadiness, and focus to

images that are trademarks of the concentric driver. This tighter imaging allows vocalists an even more distinct stage presence that I find especially attractive. Add to that a sibilance range that was natural, sharp, and quick (as in life) but not overdone to the point of drawing attention—qualities I plainly noted during the title track

on Jennifer Warnes' *The Hunter* LP [Impex]. Another great example was Rosanne Cash's version of the *My Fair Lady* tune, "Wouldn't It Be Lovely" taken from a PBS in-studio broadcast. Here the UB5 conveyed all the close-miked intimacy of the performance, gently accented with warmth and a you-are-there immediacy. At the more dynamic end of the vocal spectrum, the UB5 reproduced BS&T's frontman David Clayton-Thomas with all the unbridled brio he's known for. His raspy, full-throated performance of "More and More" was captured in



all its nuance and electricity.

Bass quality was the other most notable improvement—a development I expected in light of the addition of the dedicated woofer (its crossover point is 270Hz). There was rock-solid fifty-cycle midbass output similar to the B5 but qualitatively much more controlled, and perceptibly less reliant on the port. For a dance track such as Michael Jackson's "Billie Jean" there was a hip-gyrating amount of midbass

slam and door-rattling pulse. Timbral definition in this range could become a bit woolly and indistinct at moments, but having that crucial low-end energy was a tradeoff that more than makes up for this minor issue. To be sure, actual bot-



tom-octave bass (sub-40 cycles) was beyond the UB5, but by any standard this was one game little loudspeaker. Soundstaging was about average in width and depth; nonetheless, Rutter's *Requiem* "Lux Aeterna" still conveyed at least some sense of venue dimension and expanse, with discernible boundaries and depth. The height component could have been more convincing too.

To the UB5's credit and throughout this evaluation I found myself comparing it to far pricier speakers, such as the excellent KEF LS50 (\$1500) or the Revel Concerta2 M16 (\$900, review forthcoming). Given its meager \$499 price tag, it shouldn't come as any surprise that the UB5 has a couple of weaknesses. Transparency was very good for this segment; still there is a bit of veiling. The UB5 doesn't fully shed the bounds of its enclosure—its cabinet doesn't fully disappear like those of a handful of more expensive small monitors do. Thus during the Rachmaninoff *Symphonic Dances*, images often seemed more localized in the box. The tweeter was generally well behaved but when pushed hard, a hint of glare snuck in during the aggressive piano solo from the Manhattan Jazz Quintet's "Autumn Leaves." So no, the UB5 is not perfect but the primary point is that it isn't easily pigeon-holed. It was fiercely competitive with speakers well beyond its price segment.

With the Debut and Uni-Fi series Jones has cemented his bona fides in the realm of entry-level loudspeakers. And once more—this time with the UB5—he has caused us to recalibrate

our expectations for affordable speakers. Like a Michelin-starred chef, Jones is a guy who can grab any handful of ingredients and whip up a five-star meal. However, as outstanding as they are, the B5, UB5, and their floorstanding brothers are still entry-level and akin to "small plate" appetizers for many high-end gourmets. Transducer tapas, you might say. But not for long I imagine, at least if the news I've been hearing from Elac comes to fruition in 2017. So, whatever Jones and team might be cooking up in Elac's kitchen it should be quite a feast. Meanwhile enjoy the bounty that is the Uni-Fi UB5. It might just be the best five hundred bucks you'll ever spend. **tss**

### SPECS & PRICING

**Speaker type:** Three-way, bass-reflex

**Drivers:** 1" soft-dome tweeter, concentrically mounted; 4" aluminum-cone midrange; 5.25" aluminum-cone woofer

**Frequency response:** 46Hz to 25,000Hz

**Sensitivity:** 85dB

**Recommended amplifier power:** 40 to 140Wpc

**Nominal impedance:** 4 ohms; minimum 3.4 ohms

**Dimensions:** 7.87" x 12.75" x 10.75"

**Weight:** 16.5 lbs.

**Price:** \$499

### ELAC AMERICA

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## Our Top Picks Bookshelf and Stand-mount



### Elac Debut B5

**\$229**

It's little; it's clad in vinyl; it's cheap; and it sounds terrific. The B5 compact represents the first effort in what should be a long and fruitful collaboration between Elac and the celebrated designer Andrew Jones. NG instinctually connected with the basic honesty of the B5 sound and was confounded by its bargain basement price. What Jones and the Elac team have managed to wring from this most humble design is nothing short of exceptional. NG, 259



### Elac Uni-Fi UB5

**\$499**

Sonically, if you loved the Debut B5, you're really going to love the UB5—it's the B5 gone to finishing school. There's greater specificity, steadiness, and focus to images—all trademarks of its concentric drivers. Add to that a sibilance range that is natural, sharp, and quick—like the live event. Plus there is rock-solid 50Hz midbass output similar to the B5 but more controlled, and less reliant on the port. This just might be the best five hundred bucks you'll ever spend. NG, 266



### Revel Concerta2 M16

**\$900**

A feast for the eyes and ears in this segment. The look has been refreshed and refined with smartly contoured enclosures, high-gloss finishes, and elegant design accents. Sonically, Revel doesn't design wallflowers that shrink into the background. A sense of immersion and "widescreen" scale are two of the M16's most distinctive characteristics. A compact, budget loudspeaker that maintains classic Revel virtues. NG, 268



### KEF LS50

**\$1500 (wireless/active version, \$2199)**

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. May be destined to become a classic. A new active version with wireless connectivity expands the LS50's considerable appeal. NG, 231

## Our Top Picks Bookshelf and Stand-mount



### Air Tight Bonsai

**\$2500**

The tiny but mighty one-way Bonsai, also known as the AL-05, epitomizes what a single driver can do—in this case, a 4" hand-made paper cone devised by a former JBL engineer. The Bonsai's exemplary crossover-less design gives the speaker a full-range presence and immediacy and surprising spaciousness that all belie its petite size. Ideal for small-to-mid-sized rooms, the Bonsai's are capable of reproducing a wide range of music with astounding coherence. JM, 272



### Aerial Acoustics Model 5T

**\$3795–\$4195 (depending on finish)**

This gracefully proportioned two-way in a bass-reflex configuration shares much in common with Aerial's larger and pricier models—the Model 6T and Model 7T—including comparable curvilinear cabinet construction, luxe high-gloss finishes, the same tweeter, similar woofer refinements, and similar premium crossover components and wiring. Among the key strengths of the 5T are its reproduction of soundstage and dimension, and low-level resolution. Its performance, warm listenability, and fetching cosmetics are also uncommon in a small loudspeaker in this range. In short, this is a compact to covet. NG, 272



### Focal Sopra N°1

**\$8999**

Reviewer Andy Quint wrote this about these superb two-way mini-monitors with articulating cabinets from celebrated French manufacturer Focal: "Perhaps the most telling part of the audiophile lowudspeaker review process is what happens when all the critical listening has finished. In many instances, when I feel I'm ready to write, I'll pack up the speakers under consideration and fire up the reference Wilson Duette 2s. With the Sopra N° 1s, I felt compelled to hear them play music until the last possible moment." AQ, 266



### Harbeth 40.2

**\$14,699–\$15,699 (depending on finish)**

A large three-way that requires stand mounting, this is one of those rare speaker systems for which the term "monitor" is not in the least pretentious because it is literally accurate as a description of the speaker's function and as a statement about its own intrinsic accuracy. The 40.2 is the virtual embodiment of tonal neutrality, and with a frequency response from 38Hz–20kHz (+/-3dB, but near ruler-flat across most of that range) it possesses an authority almost nonexistent in PS' experience. By this he means there is an ease, effortlessness, and lack of strain in the reproduction that translates into a listening experience that draws all the attention to the music. This is now PS' new reference when it comes to reproducing music in all its natural power and glory. PS, 269

# FLOORSTANDING <\$10K

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to read that review*

## Equipment Report

# MartinLogan Motion 60XT

## Reference Quality

David Martson

**M**artinLogan (ML) has long been associated with the design and manufacture of electrostatic loudspeakers (ESL). And while ML considers itself “a loudspeaker ‘technology’ company and not just an ‘electrostatic’ company,” its hybrid ESL models continue to be the products that music lovers are most familiar with. Nevertheless, following the introduction of the Descent subwoofer in 2001, the company introduced the Design Series (2003)—its first non-electrostatic, full-range speakers.

The current Motion Series of non-ESL (dynamic-driver) speakers from ML encompasses some thirteen models ranging from bookshelf to floorstander, with the 60XT the premium offering. In addition to three floorstanders, the series includes the ultra-slim (less than 2" thick), SLM models, as well as dedicated center-channel and sound-bar speakers targeted at home theater.

### Cosmetics and Setup

In size, the Motion 60XT is substantial, though not a monster at 48" in height and 66 pounds in weight. (The assistance of a friend would be a

wise precaution during setup, especially when unpacking the loudspeakers from their shipping containers and placing them in the room.)

The flawless black cherrywood finish (the speaker is also available in piano black) of my review samples was visually stunning, their rich-grain finish work exquisite. Taking a styling cue from its ESL relatives, the satin-black, perforated-steel grille covers are magnetically attached, and flat except for a series of embossed louvers physically located over the tweeter. The black, anodized outrigger feet, provided to minimize the chance of speaker tip-over, are constructed from solid aluminum billet and come with both rubber footers and floor spikes. The richness of the speakers' appearance is rounded out by beautiful, yet functional binding posts that will accommodate anything from bare wires to spade lugs to banana plugs.

Initially, I used the excellent and specific placement guidelines in the user's manual to set up the 60XTs. The accompanying diagrams, with both dimensional and pictorial overviews of listening rooms and the speakers' placement within, were most helpful. I referred to them frequently.



### Components

Compared to its other floorstanding stablemates, the 60XT and its siblings are more than just skin-deep “dimensional upgrades” (i.e., bigger boxes equipped with larger drivers). For example, though all Motion Series woofer cones (as well as midranges, in three-way models) are anodized aluminum, only the 60XT's

dual 8" woofers are constructed with extra-rigid cast-aluminum baskets, rather than the cast-polymer baskets used in lesser models.

The 6½" midrange driver, like the woofer, utilizes an anodized-aluminum cone with a cast-polymer rather than an aluminum basket. In the 60XT, the midrange is located on a virtual plane with the listener's ears, maximizing

## Equipment Report MartinLogan Motion 60XT

its output and dispersion characteristics, while maintaining overall tonal balance where it bridges the gap between the woofers and the tweeter. (This is very important as many of the spatial cues present in a recording reside in the midrange.) The midrange driver's placement, combined with the tonal balance it shares with the tweeter and woofer, greatly enhances the speaker's overall uniformity of timbre.

ML's Folded Motion tweeters are derived from the Oskar Heil air motion transformer (AMT) design first patented in 1972. Compared to conventional dome tweeters, AMTs typically have more extended bandwidth, faster transient response, lower distortion, and greater output capability. According to MartinLogan, a single accordion-like Folded Motion driver is equivalent in surface area to eight (ten, in the case of the Folded MotionXT version) typical 1" dome tweeters. The XT variant tweeter (used only in the 60XT and 35XT bookshelf models) has specified dispersion characteristics of 80 degrees x 30 degrees (horizontal/vertical), giving it a projection closer to that of ML electrostatic panels rather than to that of a conventional dome tweeter. The combination of the XT tweeter's dispersion characteristics with its physical location results in excellent synergy between it and the midrange, adding life and air to the frequencies within their combined range.

Following unpacking and initial setup, I first connected the 60XTs in a single-wire configuration to the voltage output of my Sunfire 300-two power amplifier, using the speaker HF input terminals linked to the LF terminals via ML's supplied bars. In this configuration, Linda Ronstadt's vocals on "A Different Drum" from

the Stone Poneys' *Mellow Sixties* [CD, Warner] sounded forward, with excessive treble energy. When I moved the input connections from the 60XT HF terminals to its LF terminals, the excessive treble energy all but vanished, as did the forwardness of Ronstadt's vocals. I then switched to a bi-wire configuration, connecting the Sunfire's voltage output to the loudspeaker LF terminals and its current output to the 60XT HF terminals. The sonic differences between it and the single-wire configuration were subtle but significant; Ms. Ronstadt's voice was better placed in the soundstage, exhibiting other incremental improvements overall.

After initial break-in, I adjusted the speaker placement to obtain the deepest, smoothest, and most natural-sounding bass, obtaining best results with the speaker face approximately 32" from the rear wall. Regarding toe-in, the manual states that "superior stereo imaging" is achieved when the speakers are aimed toward the "primary listening position." Loudspeakers utilizing planar magnetic drivers can sometimes be susceptible to beaming or glare, and given the tremendous output that the AMTs in the 60XT are capable of, I started by gradually increasing toe-in outward from my ears until the soundstage began to collapse, then slightly inward until I got the best compromise between tonal balance and soundstage width and depth.

A final question was whether the speakers sounded better with or without their grille covers. To that end, I listened to "Brite Nightgown" from Donald Fagen's *Morph the Cat*, and noted that the differences with and without grilles were similar to those between an airbrushed photograph and its original—dynamic transi-

tions (edges) became softer and somewhat less distinct with a slightly rounded texture with the covers installed. Preferring the naked speakers, I listened to the speakers sans grilles for the remainder of the review.

### Listening

Once the break-in period had elapsed, my curiosity and interest whetted, I chose Patricia Barber's "Inch Worm" from *Café Blue* [HDCD, Premonition] for my initial close-listening test. Immediately, I was taken aback; the broad, sharply defined soundstage extended well beyond the width of the speakers, the vocals sounded eerily lifelike, and the instrumental timbre natural, with a depth so palpable I could practically reach my hands into it. I followed that with Leon Russell's *Stop All That Jazz* [CD, Shelter], a stark musical contrast to *Café Blue*, and perhaps one of Leon's greatest albums. Listening to "If I were a Carpenter," Leon's textured, raspy voice possessed a realism, presence, and sonic texture reminiscent of a recent, live concert performance. "Spanish Harlem," an instrumental track, begins with bongo-like percussion deep in the left channel, sequentially adding individual percussive instruments, layered on top of one another and alternating between the right and left channels. With the 60XT, this layering was phenomenal. Transparent and deep, each percussive addition overlaid its predecessor cleanly without smothering it, with the placement of every instrument pinpointed in the soundstage.

The AMT tweeter's fast transient response and dispersion characteristics, coupled with its precise crossover with the midrange, remind-

ed me of an ESL, though with a tad less delicacy. Perhaps the best example of the tweeter's transient response was "Unsquare Dance" from Dave Brubeck's *Time Further Out* [CD, Columbia/Legacy], with the 60XT capturing the crisp, near-live, stick-on-steel of Joe Morello's drumstick rimshots as few speakers can. The simultaneous juxtaposition of Eugene Wright's upright bass in the lower-midrange/upper-bass region was coherent and solid—producing a realistic representation of all but the deepest octaves. From top to bottom, the matching of the drivers and crossover was excellent, resulting in a very live and lifelike-sounding performance.

According to the manufacturer, the minimization of floor bounce was a design goal for the Motion Series models, with the dual 8" woofers of the 60XT vertically positioned to "fill in the 200Hz–300Hz area." Another benefit of the woofers' positioning (their centerline is approximately at abdomen level when seated), combined with the rear ports, is enhanced visceral and dynamic midbass impact, belying the speaker's frequency roll-off in the bottom octaves.

Curious how the loudspeakers handled more energetic content, I listened to Rare Earth's *Ma* [CD, Motown]. The instrumental "Hum and Dance Along" absolutely rocked! On "Big John Is My Name," the vocals were audacious, realistic, and moving, and the bass quite good though not earthshaking. Cranking up the volume, however, I suddenly became aware of how much treble energy the tweeters were able to produce.

As mentioned earlier, the owner's manual makes no specific mention during setup of the wall behind the listener, but the air motion

## Equipment Report MartinLogan Motion 60XT

transformer tweeters used in the Motion 60XT are capable of producing such significant output levels that the presence of a nearby and/or undamped wall can cause reflections, making the speaker sound overly hot, and distorting its true tonal character. Choosing a better seating position or using appropriate sound-absorption material on that wall can minimize, if not alleviate, the impact of this effect.

Shifting source material, this time to classical music, I listened to Erich Kunzel and the Cincinnati Symphony's rendition of Tchaikovsky's *1812 Overture* [CD, Telarc]. Perhaps one of the most dynamic recordings of this (or any) symphonic work, with levels ranging from the delicate ringing of a triangle to the explosive melee of artillery at the work's conclusion, the recording is a test of any loudspeaker's ability to reproduce extreme dynamics. During the work's climax, the 60XT fell short of making the earth move, but it was nonetheless enjoyable.

A characteristic noted repeatedly throughout my listening, regardless of source material, was the resolution of these speakers, both in definition and amplitude, and the resultant width and depth of the soundstage it conveyed. Whatever the recording, the sense of depth—in some cases previously unnoticed even on very familiar recordings—was startlingly realistic.

### Amplifier Requirements

A loudspeaker is a transducer, converting applied electrical energy into acoustic energy, and when it comes to evaluating a transducer, perhaps no single component can affect that conversion, and ultimately, the loudspeaker's performance, more than the power amplifier that

drives it. Loudspeakers present complex and sometimes difficult demands on amplifiers, due to many factors, such as input-impedance and crossover anomalies. To evaluate the impact the 60XT's nominal 4-ohm input impedance on different amplifiers, I listened to it with several power amplifiers of various construction, quality, and output power.

I first replaced my reference (solid-state) Sunfire amplifier with a Bob Carver Silver Seven 700 tube amplifier (current production, not to be confused with the legacy Carver model with a similar name). While certainly not requiring the massive power (700Wpc) that this tour-de-force, four-chassis tube amplifier can produce, especially in light of the 60XT's 94dB/2.83V/1m (91dB/1W/1m) sensitivity, the MartinLogan nonetheless responded beautifully to the amplifier's sonic character, excellent dynamic range, and low noise floor.

The Silver Seven 700 has dedicated output taps for 8, 4, and 2-ohm loads. Given the Motion 60XT's nominal 4-ohm input impedance, I initially connected the speakers to the amplifiers' 4-ohm taps. Listening again to the Stone Poneys' *A Different Drum*, I found Linda Ronstadt's vocals sounding easy and lifelike. When I switched to the amplifier's 8-ohm tap and replayed the same song, the performance seemed thin and lacking in dynamics. Repeating the sequence once more, this time with the 2-ohm taps, resulted in a dull sound and a muddy performance. I used the 4-ohm tap for the remainder of my listening session.

With the prerequisites out of the way, I began assessing the combined performance of the Silver Seven 700 amplifier and the Motion 60XT.

Though the speakers already sounded exceptional driven by the Sunfire amp, it didn't take long to hear differences in the presentation with the Silver Seven. The ESL-like delicacy of the treble that, when using the Sunfire, sometimes became slightly edgy when played loud, was softened, remaining light and delicate even at higher volumes, until the AMT tweeter output finally began to beam a bit. The bass, already well presented with the Sunfire, took on a character and depth previously unheard, with 3-D spatiality perhaps the most improved sonic characteristics I noted. Although the Sunfire amplifier had previously raised the bar for Fleetwood Mac's "Woman of a Thousand Years" from *Future Games* [CD, Warner] to the highest level in my experience, the Silver Seven 700 revealed a never-before-experienced depth and dreaminess in the recording.

The manufacturer specifies that the 60XTs are "compatible with 4-, 6-, or 8-ohm rated amplifiers." To test that claim, I replaced the Silver Seven 700 in my system with an available Kenwood KM-209 stereo power amplifier (150Wpc into 8 ohms)—a mass-market model from a few years back—using the previously described bi-wire connections. It became readily apparent that the necessary drive current for the 60XT's 4-ohm load was not available from this amplifier, which sounded weak and flat no matter the source material. Given the speaker's efficiency, a suitable amplifier need not be exceptionally powerful, but must be able to provide adequate drive current into lower-impedance loads, and have a slew rate fast enough to satisfy the transient-response characteristics of its AMT tweeter. If one has any concerns about an amplifier's

### SPECS & PRICING

**Type:** Four-way, dynamic, floorstanding loudspeaker

**Drivers:** Folded Motion XT tweeter, 6.5" aluminum-cone midrange, two 8" aluminum-cone woofers

**Frequency response:** 35Hz–25kHz +/-3dB

Sensitivity: 94dB/2.83 volts/meter (91dB/1W/meter)

**Impedance:** 4 ohms

Crossover frequencies: 400Hz, 2.2kHz

**Recommended amplifier power:** 20–400W

**Dimensions:** 11.4" x 48" x 14.4"

**Weight:** 66 lbs.

**Price:** \$2999 (piano black); \$3299 (black cherrywood)

### Associated Equipment

Rega P5 Turntable with TT-PSU upgrade, RB700 tonearm, Shure V15VxMR cartridge; Rotel RCD-1072 CD player; Sunfire Vacuum Tube Control Console; Sunfire 300~two amplifier; Sunfire TS-EQ10 True Subwoofer; Sunfire CRM-2 Cinema Ribbon loudspeakers; Kenwood KM-209 stereo power amplifier; Bob Carver Silver Seven 700 amplifier (manufacturer loan)

### MartinLogan

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## Equipment Report MartinLogan Motion 60XT

ability to satisfy such demands with this or any other loudspeaker, it is a good idea to arrange a demo using the amplifier in question prior to purchase.

Finally, returning to the Sunfire amplifier, I integrated my Sunfire TSEQ-10 subwoofer into the system, adjusting it to complement the 60XT's response. On the *1812 Overture*, this time with the subwoofer connected, the cannon fire left me blown away! Listening to "Flight of the Cosmic Hippo" from Bela Fleck's album of the same name [CD, Warner Bros.], Victor Wooten's low, low bass was amazingly matched, both tonally and in output, with Fleck's electric banjo, sounding almost as if they were in my listening room. Rounding (or perhaps I should say, bottoming) out the already superb sound of the speakers with an appropriate subwoofer makes these speakers outstanding performers overall, regardless of cost.

### Summing Up

The Motion 60XT does many things not only right, but magnificently, provided a suitable amplifier is used to drive them. I can't remember when I enjoyed listening to a speaker as much as I did these. As they were designed in Lawrence, Kansas, by the same team that creates the company's electrostatic models, it should be no surprise that the upper midrange and treble are similarly voiced to ML's ESL models, though with slightly less finesse in the upper frequencies. Vocals are lifelike, engaging, and captivating, whether you're listening to the silky sound of your favorite chanteuse or the gravelly voice of a screaming rock star. An added benefit of the excellent driver and crossover matching is the

realistic lower-midrange/upper-bass performance, further enhanced by the woofers' vertical location in the cabinet. The 60XT produces a broad soundstage that exceeds the width of the loudspeakers' placement, with pinpoint imaging and amazing, three-dimensional depth, even when the source material is of average sonic quality. The twin 8" woofers produce bass extension that will satisfy all but hard-core pipe organ and electric-bass aficionados (or lovers of the *1812 Overture's* artillery fire). If these heavyweight genres of music are your thing, the addition of a subwoofer of your choice (MartinLogan offers several) can easily satisfy you, too.

To enjoy the full performance that these speakers can produce, you have to be patient; the 60XT appears to require every bit of the specified 72-hour break-in period to really sing. Nevertheless, the wait is well worthwhile, rewarding the listener with sonic performance that is nothing short of unbelievably realistic compared with other speakers in this price range, as well as more expensive models.

At the outset, my expectations for a "conventional" loudspeaker designed and produced by a manufacturer whose products have historically been electrostatic designs were undefined. After living with these speakers, however, I no longer have any doubts; the 60XTs are so impressive I could easily adopt them as my reference. Listening to the them was tantamount to a physical addiction for me! They are a "must audition" for anyone interested in natural and realistic sound that will continue to satisfy and impress for a very long time. Highly recommended. *t.as*



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## Equipment Report

# Vandersteen Audio Treo CT

## Uncommon Musicality

Neil Gader

Photography by Dennis Burnett

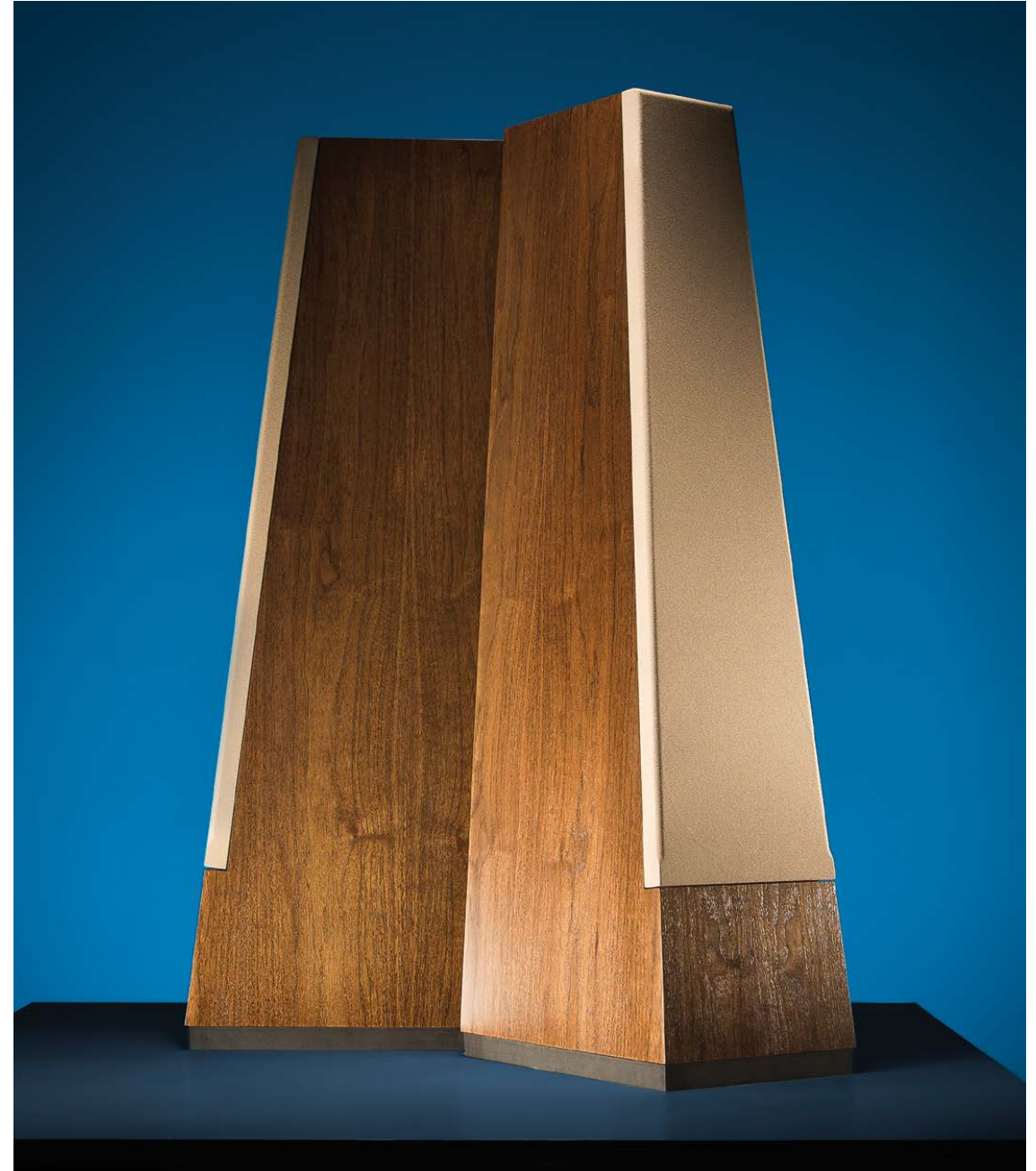
**T**he question is actually a very simple one: Are you an audiophile whose ears are attuned to the sound of live, unamplified acoustic music performed in a natural setting—traditionally defined in these pages as “the absolute sound”? If the answer is yes, Vandersteen Audio would very much like to talk to you. For this is the milieu of its Treo CT, a mid-sized floorstander that, at \$7990, resides midpack in the Vandersteen lineup. It’s a loudspeaker that has an uncommon reverence for the music that poses the greatest challenges to an audio system. Reproducing the context and complexities of performance and venue, harmonics and ambience, the micro and the macro is where the Treo CT shines at its most brilliant.

The Treo CT silhouette will be instantly familiar to longtime audiophiles, and not just to Vandersteen fanciers. Elements of this classic look—the slanted front baffle to time-align the drivers, the cabinet widening and deepening as its non-parallel sidewalls flow into its base—

have appeared in varying degrees from makers as disparate as Thiel, Avalon, Rockport, Wilson Audio, and, more recently, newcomers like Ryan Audio.

The Treo CT is a four-way floorstanding loudspeaker in a bass-reflex enclosure. (The single port fires downward from the speaker’s base.) It shares its general architecture and transducers with the Quatro Wood CT—a hybrid iteration with a powered bass system. CT stands for carbon tweeter—an evolution of the driver type first developed for the Model Seven flagship, later migrated to the Model 5A Carbon, and now an option with the CT (the standard Treo lists for \$6900/pair). For Vandersteen, carbon-driver cones offer the piston-like linearity of metal drivers without their inherently unnatural and amusical sonic colorations (known as ringing in some circles).

True to Vandersteen tradition, the Treo CT is a time-and-phase-correct loudspeaker. The crossovers are first-order, impedance-compensated numbers individually tuned in an anecho-



## Equipment Report Vandersteen Audio Treo CT Loudspeaker

ic chamber. Crossover points are specified at 80Hz, 900Hz, and 6kHz. As a first-order design, much is asked and expected of the drivers in extended operating range and dynamic demands. To these ends, the drivers include a CT tweeter and Vandersteen's "reflection-free" 4.5" mid-range in a proprietary transmission line that breaks up energy from behind the driver rather than directing it back into the cone. The mid/bass driver is a 6.5" tri-woven cone, while the bass is handled by a ported, carbon-loaded, ultra-long-throw 8" woofer.

Vandersteen describes its dense, narrow, rigid enclosures as "minimum baffle" designs that minimize diffraction effects and time-smearing reflections. Construction is in a word, *extreme*. Vandersteen has engineered a unique system that it describes as "cabinet-within-a-cabinet" construction—essentially an inner MDF cabinet within an outer MDF enclosure, separated by a viscous or "gooey" membrane that eliminates resonances. Vandersteen reports that "measurements bear out that this gives us the kind of silent cabinet performance that is typically seen only in very exotic cabinets made with exotic materials...we only exceed this by combining similar techniques with superior and much more expensive materials, like the carbon fiber in our Model Seven Mk II flagship or even the multi-layer head in the Model 5A Carbon." Curiously, the Treo CT still uses a terminal plate rather than multi-way binding posts for speaker-cable hookup (bi-wire or single). This reduces cable termination options to bare wire or spades. However, Vandersteen argues that since "the barrier strip terminals are soldered directly to the board on crossover networks, this makes

the connection 100% impervious to oxidation and other environmental elements that can corrupt connections over time." Vandersteen adds that wiring directly into the crossover board avoids any full-range wiring inside the speaker, which is a big plus sonically.

A word about the Treo CT speaker grilles: Don't touch 'em, as they are meant to be left on. Yes, this runs counter to audiophile gospel, which maintains that grille cloths reduce acoustic transparency, but the Treo's grille is anything but ordinary. Rather than a thin, cheesy frame with a sheer cloth membrane, it is actually a physical extension of the baffle itself—literally completing the front baffle in the way a final piece of a jigsaw puzzle finishes the pattern. Feel free to remove them when you audition the Treo CT, but my bet is that you'll reattach



them pronto. In my observations they were integral to the level of imaging and coherence that the Treo CT was capable of achieving. The set-up manual is very explicit about placement and provides graphs for optimization. The robust and adjustable cone-footers, three to a side, significantly aid in fine-tuning.

Sonically, the Treo CT offered a near-full-range experience with exceptional balance, nuance, and continuousness. Its presence in the room was felt immediately in bass response that extended with authority and finesse into the thirty-cycle range. The Treo's was not a heavy or ponderous balance either; rather there was a lightness to its overall personality that belied the power of a four-driver configuration. Tonally, it perches on the warmer and more relaxed side of neutral, but this trait only manifests itself in contrast with designs that have a drier, more forward, studio-monitor-type sound. The Treo CT has a midrange that calmly draws listeners in rather than forcing them away. There's a civility to the way it steers clear of carving out the last iota of so-called detail or of vying for your attention with a too prominent treble. For example, the top end of the Vandersteen had the air and fluidity that brought the chorus of the Rutter *Requiem* startlingly to life in my listening room. Individual soloists remained cleanly defined and focused amidst the chorus, which led to moments so detailed that each line of vocalists was clearly imaged on the ascending risers of the stage.

There's an implicit sweetness to the carbon tweeter that produces a sibilance range that is well nigh perfect. The Treo captured the leading-edge intensity of singers like Norah Jones

and Holly Cole without turning up the sizzle in this precarious treble region. The CT's stock-in-trade was true treble resolution as distinguished from the false detail of many above-average tweeters that are dogged by material colorations. Thus, piano transients and macro-dynamics were potent and aggressive in the way a grand piano is meant to be aggressive under a heavy hand, yet never veered into hard steely territory. And soundboard harmonics rose into the listening space as if borne aloft on cushions of air. In the CT we have the rare tweeter that places its attention squarely on the music without drawing any attention to itself.

The Treo has such an expressively wide color palette and fine resolution of timbral contrasts that it almost seemed constrained within the musically narrow confines of a typical, studio-sired rock production. In fact, the more musical complexity I threw at the Treo CT, the happier it seemed to be. Whether I was listening to a brass ensemble, or a classical chamber group, or a percussion section, each note was unique in time, fully differentiated in micro-information. The Treo was equally sensitive to the resonances of string instruments, easily distinguishing the unique accents of violin or viola, or the scale of different guitars from auditorium-size dreadnoughts to smaller parlor instruments.

As I listened to Copland's majestic *Fanfare For the Common Man*, I encountered bass response that excelled in pitch definition and tunefulness. Although the raw dynamic energy and extension of the percussion section's timpani and bass drum didn't leave craters in my listening room (see the Quatro Wood CT for that), the Treo CT performed without port noise, chuffing,

## Equipment Report Vandersteen Audio Treo CT Loudspeaker

or the sensation of overhanging notes clinging to the fundamental as if trying to catch up with a performance that had already moved on. During tracks from *Appalachian Journey*, cello and bass viol consistently exhibited a fine body of warmth and detail, though to my ear they did not quite fully ripen with the weight and resonance I know this recording has in abundance. As I've mentioned, the Vandersteen, while touching on the bottom octave, begins to run short of breath in the lower-30Hz range.

Throughout this evaluation there was one trait that, like an addiction, continually fueled my excitement for the Treo CT. It was the speaker's of-a-piece coherence. This is not always a given in the high end. Many multiple-driver loudspeakers—primarily designs with three or more transducers—fail to speak with one voice. Instead, the listener can identify each driver as it jockey for prominence up and down the front baffle. In contrast, the Treo CT was like a top-drawer two-way compact—a segment long celebrated for its ability to reveal three-dimensional space while remaining invisible as a sound source. Similarly, the Treo CT (far better proportioned across the frequency spectrum than a two-way) projected a vast image of the legendary Chicago Symphony Orchestra performing the Beethoven Ninth. Its spread across the soundstage was replete with height cues that reached well above the speaker, and depth cues that drew my eye to the back wall of the hall each time the percussion section lit up and the vast chorus rose in intensity. Much of the credit for this level of spatial precision is certainly owed to Vandersteen's time-and-phase-correct philosophy, but it's also due to the inert cabinet and well-controlled port. You don't

need the classic "knuckle rap" test to determine that the Treo's cabinet doesn't appear to be a source of (mis-)information. You just need to listen to Dick Hyman's "Moonglow" (*From the Age of Swing* on Reference Recordings) to hear how each instrument rings true, utterly free from the common cabinet-borne colorations encountered in lesser designs. Piano, brass, random bass lines, lone ride-cymbal...each instrument seemed physically engraved into the soundspace.

There is a visual analogy that further describes my experience with the Treo CT. It reproduced the panorama of symphonic music with the kind of deep color, dimensional presence, and soundstage continuity of classic widescreen films. It did so with an edge-to-edge, corner-to-corner imaging precision that few loudspeakers at any price have achieved in my room. It cleanly defined and delineated player after player, elbow to elbow within each section of the orchestra, as if they were being photographed through a lens of unparalleled clarity and infinite depth of focus. It balanced the dual imperatives of image and ambience in much the same naturalistic manner that (I think) is still unique to film. Compared with the slightly cooler, harder, edge-enhanced super-reality that often defines digital technology, the Treo CT conveyed a more fluid and realistic representation of the symphonic experience in a real hall. Not softer in resolution, but more *attached* to the air and atmosphere of its surrounding environment.

Even though I think the Treo CT's charms were more fully appreciated in the classical and acoustic arena, the speaker, without question, provided a highly satisfying pop/rock experience. As I listened to the opening bass and drum

groove of Fleetwood Mac's "Dreams," there was a rewarding sense of unalloyed midbass punch, drum fills, and concussive forward-leaning drive that was riveting. As penetrating and electrifying as another personal favorite, the similarly scaled Wilson Sabrina? No, not quite, but competitively close and less costly. Sabrina, of course, has other charms not the least of which is greater low-end extension and dynamic output, but for overall transparency and resolution these rivals share more similarities than differences. The last pop track I played on the Treo CT prior to submitting this review actually turned into a double farewell. That morning I learned of David Bowie's death from cancer at the age of 69. I thought it was fitting that I should see him and the Treos off by playing one of my favorite LP remixes, "Let's Dance" [EMI]. The Vandersteens seemed to rise to the occasion, digging deep into the heavy dance groove, launching wave upon wave of kick-drum pulses, driving Stevie Ray Vaughan's searing guitar solo through the air, handily reproducing the screaming saxophone work and, above all, Bowie's sly, richly resonant vocal, sensually massaging a lyric so very much about being alive and in love.

When all is said and done, there are speakers we've all encountered that, however admirable, are more about quantifying information than reproducing a moving, organic musical event. They might sound lively for a spell, but they lack the heartbeat of musicality. It's a rookie mistake that only years of experience can ameliorate. Vandersteen Audio, however, is an old-guard veteran, and it shows. It takes just one listen to the Treo CT to recognize that you're in the presence of a speaker that superbly balances these twin es-

### SPECS & PRICING

**Type:** Four-way, bass reflex  
**Driver complement:** 1" tweeter, 4.5" mid, 6.5" mid/bass, 8" woofer  
**Frequency response:** 36Hz–30kHz  
**Nominal impedance:** 7 ohms (4 ohms)  
**Sensitivity:** 86dB  
**Dimensions:** 10" x 43" x 15"  
**Weight:** 80 lbs.  
**Price:** \$7990

### VANDERSTEEN AUDIO

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### Associated Equipment

Sota Cosmos Series IV turntable; SME V tonearm; Sumiko Palo Santos cartridge, Ortofon Quintet Black, Ortofon 2M Black; Parasound JC 3+; Esoteric K-03X; Lumin A1/L1 Music Player; Synology NAS; MacBook Pro/Pure Music; Cables: Synergistic Research Atmosphere Level 4, WyWires Platinum, Nordost Frey 2 & Audience Ohno; Power Cords: Audience Au24SE & Kimber Palladian power cords. Accessories: Audience USB, AudioQuest Carbon firewire; VooDoo Cable Iso-Pod

entials, but never loses sight of where its loyalties lie. In my view, you cannot get a more purely musical loudspeaker in this price range than the Treo CT. A true delight. **tas**

## Equipment Report

### ATC SCM19A

#### Heresy

Neil Gader

**T**his review might not sit well with some of my audiophile friends. I'm referring to a large and ardent band of devotees who enjoy the "chase" in the high end—those who make every audio-system component choice with the deliberation of a chess grandmaster contemplating a critical move, weighing each option, mod, or upgrade and scrutinizing the results for the smallest shred of improvement. Indeed, this open-system approach is a big part of the hobby, and I don't begrudge anyone his level of enthusiasm. It's what we do. Truth be told, once upon a time I would have included myself in this group. Back then, the very idea of a semi-closed system that a bi-amplified loudspeaker like the ATC SCM19A represents would have been heretical to my high-end aspirations. But, as they say, that was then.

Here's the backstory: I've owned a couple versions (passives) of the ATC SCM20SL over the years. I recently reviewed its successor, the SCM19 (Issue 245), which proved to be a better overall speaker than my SCM20's in most every way. The idea of an active loudspeaker intrigued me but what really sparked my

interest was an ATC demonstration of active versus passive at CES 2015. It was a shootout between the SCM40 and its active cousin the SCM40A—otherwise identical three-way, acoustic-suspension floorstanders. The latter, however, was equipped with an internal electronic crossover splitting the signal into tri-amplified power. The former was the traditional passive design and received comparable power from ATC amplifiers and traditional speaker cabling. The differences were startling. Improved imaging, a vastly greater sense of dimensionality and immersion, and a level of low-frequency control that said to me in no uncertain terms "there is no going back." When I was informed that ATC had plans for an active version of the SCM19, I told them I was all in. Would the differences I experienced at the CES demo translate into my own listening room with the two-way version?

A brief history: ATC of England began producing custom transducers for the professional sound market in 1974. Active monitors and electronics soon followed. Since then it has developed a worldwide reputation not only for speakers that will play loudly but also for the bulletproof

reliability the pro market counts on. The consumer market has been a tougher reach for ATC in part because it's a company that doesn't engage in smoke and mirrors or eye-catching derring-do. Rather it lets its products do the talking. Thus its look and cosmetics speak to solidity and permanence. Fit and finish are always seamless but not indulgent. However, with the advent of the new Entry Series that comprises three décor-friendly, passive, stand-mount models and a trio of floorstanders (two are active), plus a flurry of excellent reviews and word-of-mouth, ATC seems to be gaining a well-deserved, consumer-based foothold in North America.

The SCM19A is a two-way, acoustic-suspension floorstander but it's probably more accurate to think of it as the standard SCM19 fused atop an extended cabinet designed to house the electronic crossover and bi-amplification. Therefore the actual internal volume that the transducers "see" is identical, although—and this is of no small importance—the passive crossover network components have been removed and thus are no longer subject to vibration from the internal back



## Equipment Report ATC SCM19A

wave of the drivers. To increase floor stability for the slender tower enclosure, ATC provides a wooden plinth "outrigger" stabilizer with threaded floor spikes. The ATC-engineered Class AB MOSFET amplification is installed in the bottom half of the tower. The biamplified system powers the mid/bass drive with 150W, and sends 32W to the tweeter. The second-order crossover slope at 2.5kHz incorporates phase compensation. Keep in mind that because it is an active design, the frequency spectrum is split by the crossover at line-level prior to amplification. Consequently, all this power is available to the drivers without the significant power losses of a passive network. Heavy aluminum heatsinks rise vertically above the power button, balanced input, and IEC plug.

The SCM19A tweeter (model SH25-76 in the ATC catalog) is a 25mm soft dome. It's a short-coil, long-gap, dual-suspension design that mirrors ATC's highly respected 3" soft dome midrange. This design 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 designed to optimize dispersion and allow for the flattest possible on-axis frequency response. Midrange and bass frequencies are handled by ATC's 6.5" Super Linear mid/bass unit—a driver recognizable by its sophisticated diaphragm structure that integrates the profile of a traditional cone with that of a 75mm soft dome. Per ATC tradition, the mid/woof features a short coil in a long gap, a massive ceramic magnet, and a long-throw suspension

for linearity at extreme dynamic levels. The ultra-rigid basket construction appears sturdy enough to support an eighteen-wheeler. Per ATC practice these drivers have been designed and manufactured in-house. They are not off-the-shelf items from a third party.

**Image placement is almost startling in the way musicians inhabit their own space with authority, clarity, and specificity.**

Once plugged in and warmed up for about a half an hour or so, the SCM19A resembles the passive SCM19 in tonal balance and overall sonics, which is to say it is highly neutral through the midrange and presence range. There's a warmer tinge to its overall character thanks to its weighty lower mids and upper bass—major pluses in a compact two-way. There's excellent high-frequency extension and air to keep winds and brass satisfied. For vocal articulation, sibilance is naturalistic but never to the point where it tips over into snippy edginess.

Far and away its biggest asset (and this was also true of the SCM19) remains its fast, dynamic, and transparent midrange—one that anchors images, from vocals to violins, and establishes their palpable presence in the room. Whether it's the gravel and grit of a Tom Waits' vocal or the soothing, silvery soprano of Alison Krauss, the SCM19A is a "voice" speaker that is addictive in its verisimilitude. Its resolution of internal harmonies like the Buckingham/

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## Equipment Report ATC SCM19A

McVie backing vocals to Stevie Nicks' lead during "Gold Dust Woman" is definitive in the way it reproduces each vocal nuance. Particular credit goes to the newly designed tweeter, which integrates perfectly with the midrange and bass rather than sounding like a separate sound source. The result is a near-ideal point-source coherence matched by transducers that seemingly speak with one harmonious voice. This trait can be heard with every piano note, or the draw of a violin bow across an E string.

### SPECS & PRICING

**Type:** Two-way, acousticsuspension floorstanding

**Drivers:** 1" soft-dome tweeter, 6.5" mid/bass

**Frequency response:** 54Hz–22kHz

**Integral amplifier power:** 150W (woofer), 32W (tweeter)

**Dimensions:** 14.4" x 38.6" x 13.5" (includes plinth and amp)

**Weight:** 68 lbs.

**Price:** \$9995

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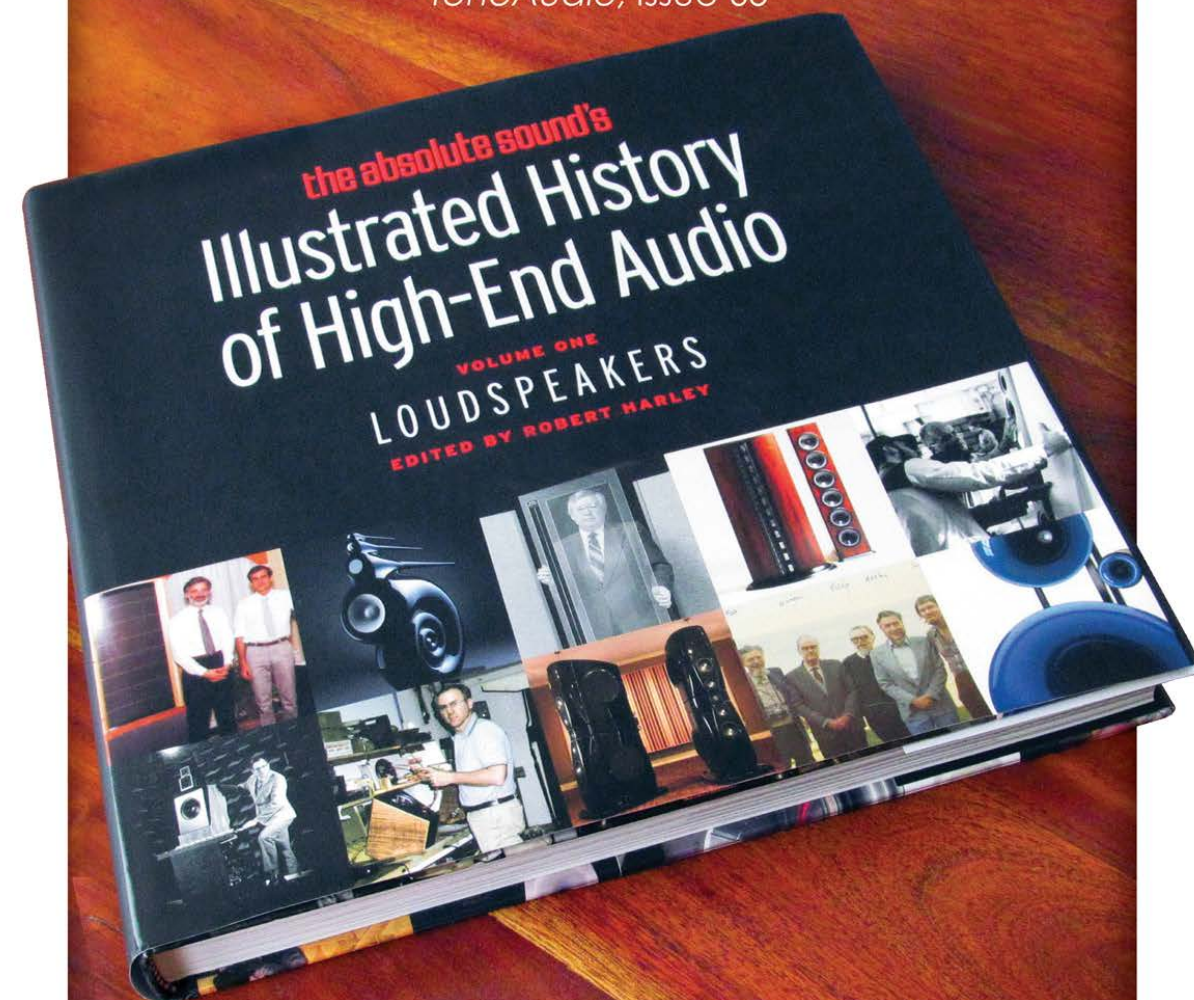
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The key differences, and I do mean differences with a capital D, are the 19A's improved imaging, immersiveness, and tight-fisted low-end control. The active version sounds like a stronger, more muscular version of the passive one—as if the little SCM19 has spent the last few months at the gym. It now resolves more ambient cues, and with a broader and more colorful palette of timbre and texture to draw from. Listening to Arimasa Yuki's "Forest" solo piano from an MQA high-resolution file is a prime example of the way mid- and low-frequency dynamics emerge from the keyboard with captivating and authoritative detail. The touch of the player and the gradations, impact, and surface quality of the piano's hammers striking the strings are hypnotizing.

Image placement is fastidious; at times almost startling in the way musicians inhabit their own space with authority, clarity, and specificity. In the same way an Olympic gymnast "sticks the landing," there is a grounding to the orchestral soundstage that once heard is difficult to forget. This characteristic is on display during Harry Connick, Jr.'s cover of the classic "A Nightingale Sang in Berkeley Square," where he's joined almost note for note in duet with Branford Marsalis on tenor sax. This recording captures the two voices in time and place with almost geo-tracking precision and a level of timbral specificity and intimacy that still leaves this listener breathless. In general, reproduction of low-level details is beyond reproach with the SCM19A but I do not mean to imply that the ATC was behaving like a cool and clinical studio-monitor, either. That is, unless transparency and resolution have somehow

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## Equipment Report ATC SCM19A



become very dirty words. But it also doesn't flatter average recordings. If a vocal is mixed a little hot, the ATC is there to expose it in all its gritty and false hyper-detail. Likewise a stellar recording takes on an otherworldly and soaring luminance that makes it seem as if it couldn't possibly be coming from a loudspeaker in the first place.

Keep in mind the SCM19A does have limitations—both in output and in extension. It is still a two-way after all, so that while midbass into the 40–50Hz range is solid, you'll need one of ATC's larger models, like the SCM40, to catch a glimpse of the bottom octaves. (I know of no two-way compact that authentically reproduces a pipe organ.) Also some may quibble over the qualities of acoustic-suspension bass compared with bass-reflex configurations. They both have a house sound—the former requires more power and leans toward tightness and pitch control, while the latter is more efficient but tends toward a looser, fuller presentation. The bass drum, timpani, or rock 'n' roll kickdrum are good examples. On a ported loudspeaker, bass resonances decay more slowly, as if being released in a deep exhalation. With acoustic-suspension bass like that of the ATC, the decay "exhalation" is more precise. Both can work, and the differences become more superficial in the more expensive segments of the loudspeaker world.

Passive versus active is an argument that is anchored deep in audiophile culture. Though active loudspeakers will likely remain a relative rarity in high-end circles, it is heartening that hybrid designs outfitted with powered woofers (Vandersteen, MartinLogan, Paradigm, for

example) have gained some well-deserved prominence. Ultimately, it comes down to implementation. Whether passive or actively powered, does it do the job of reproducing a musical performance in a way that approaches the authenticity of the live event? Well, some may accuse me of heresy, but I won't be passive in my appraisal of the SCM19A. There is no two-way loudspeaker that I would recommend more highly. **tas**



### Analysis Plus Micro Golden Oval Interconnect

Since active loudspeakers like the ATC SCM19A dispense with speaker cables, I considered the proposition that the last remaining link in the chain—the preamp-to-loudspeaker interconnect—might take on greater significance. I had heard some terrific buzz about the Analysis Plus Micro Golden Oval interconnect and the arrival of the ATCs presented a "golden" opportunity to test this theory. This is AP's top-tier wire and represents the most advanced version of the hollow-oval conductor geometry it has been perfecting over the years. It uses a proprietary combination of three conductors that includes 18AWG copper, plus silver and gold.

It's been said that silence is golden and, as it turned out, this notion was validated by the midnight-black noise floor and sonic calm of the Micro Golden Oval interconnect. It's a high-contrast sound that conveys string sections with a resonant yet unhurried and almost romantic energy, but also expresses swift transient attack and nosebleed dynamics when the material

warrants these. Perhaps the most apt description of the MGO cable is to say it has a frictionless quality, as if music were slipping untouched and unscathed through the system. Tonally, the Analysis Plus interconnect has a neutral balance and soundstage perspective—neither too close to the audience nor too deep behind the hall proscenium. Compared with great references like the Audience Au24 SX and Synergistic Atmosphere Level 4, the AP is a tick quicker in transients and rounder in the sibilance range. At the end of the day, I felt that I was hearing more of the music and less of the system than ever before. In other words, as musically natural and effortless as I've heard from a state-of-the-art contender.

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## Equipment Report

# Monitor Audio Gold 300

## Style Meets Substance

Julie Mullins

**A question for audiophiles: Does the word “lifestyle” give you pause when it comes to hi-fi gear? If a loudspeaker looks a bit too elegant, do you tend to question its sonic bona fides in relation to how much time, attention, and budget went into its design and finish? If so, be forewarned. In the case of Monitor Audio loudspeakers—and the company’s other offerings (such as integrated amps, streaming products, soundbars, and even soundframes!)—equal emphasis is placed on both great sound and visual appeal.**

Although the British-owned-and-managed company has been in business for more than four decades, the brand is still somewhat under the radar in the U.S., but that’s likely about to change. Monitor Audio has increased its presence at U.S.-based hi-fi shows, and this year’s CES saw the debut of its flagship Platinum PL500 II loudspeakers, which delivered remarkably high-end (think Raidho-like) sound and style well beyond its \$29k price. (Even JV was impressed by them! He gave them a shout-out in his show report, calling them the “surprise of CES.” I, too, was impressed by the PL500 II’s and will be reviewing them in an upcoming issue.)

Monitor Audio’s loudspeakers are divided into tiered categories whose precious-metal names are reminiscent of credit-card designations (and in keeping with the lifestyle aspects of the brand’s image): Bronze, Silver, Gold, and Platinum. Which brings us to the loudspeaker under review, the Monitor Audio Gold 300, which is the top model (alongside the Gold C350 for home-theater) in the eight-speaker Gold lineup. Given its build-quality, applied technologies, and high-end finishes, its \$5699 (more for piano ebony finish) pricing seems fair. Far from frivolous, this model delivers style and substance in spades or, er, diamonds. It’s an elegant three-way floorstander featuring a pair of 6.5" bass drivers, one 4" midrange, and a high-frequency ribbon transducer that, according to company specs, has a frequency response extending from below 30Hz to over 60kHz!

Monitor Audio’s Dean Hartley is the principal designer behind both the Platinum PL500 II and the Gold 300 and works closely to develop innovative technologies with the company’s engineering group, including the acoustic team (five people with three electronic engineers, six product designers, and five general project

engineers). Dean is present for every listening session throughout product development as well. *[I had lunch with Dean at the recent CES, and was greatly impressed by Monitor Audio’s driver and enclosure technology, as well as by the company’s dedication to sound quality. —RH]*

A plethora of proprietary technologies has been employed inside the Gold 300, many with trademarked names, most notably the C-CAM (Ceramic-Coated Aluminum/Magnesium) alloy metal-dome drivers. Metal may not be an easy material to work with, but Monitor Audio is among the pioneers of metal-cone driver technology and has been using it for the past 20 years. Here, the complement includes a C-CAM ribbon tweeter and C-CAM (with RST, no less) bass and midrange. Melding impressive sound with cool-looking functional design, the drivers’ shiny metallic surfaces have small, round dimples in a graduated pattern that makes them resemble a kind of space-age honeycomb. Other trademarked elements are Pureflow Silver internal cabling and HiVe II port technology that is said to smooth airflow for improved transient response and tighter bass with improved tonal accuracy. The driver sys-





## Equipment Report Monitor Audio Gold 300

### SPECS & PRICING

**Type:** Four-driver, three-way, ported floorstanding loudspeaker

**Driver complement:** 2 x 6.5" bass, 1 x 4" midrange, 1 x ribbon tweeter

**Frequency response:** 30Hz–60kHz

**Sensitivity:** 90dB

**Recommended amplifier requirements:** 100–200W

**Nominal impedance:** 8 ohms

**Dimensions:** 8 1/4" x 41 3/4" x 13" (210mm x 1060mm x 330mm)

**Weight:** 59 lbs. 14oz. (27.2 kg)

**Price:** \$5699; piano ebony finish, \$6799

### ASSOCIATED EQUIPMENT

**Subwoofer:** JL Audio e110 (pair)

**Sources:** Acoustic Signature Challenger Mk. 3 with AS-1000 tonearm, Air Tight PC-7 cartridge; George Merrill GEM Dandy PolyTable with Jelco

tonearm and Air Tight PC-7 cartridge; MacBook Pro with 2.3GHz Intel Core i7 processor running OS X 10.9.5 with Audirvana Plus Phonostage, preamplifier: Walker Audio Procession, Solutiion 525

**Power conditioner and power cords:** Anszuz

**Cables and interconnects:** AudioQuest Fire, Shunyata Research Venom series, Crystal Cable Absolute Dream

**Equipment racks:** Critical Mass Systems Maxxum

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tems use single-bolt-through construction for decoupling from the baffles and (per company claims) to increase front-to-back cabinet bracing and stability.

The Gold 300's smooth curved enclosure not only looks attractive, but is also said to reduce standing waves. As befits a modern-day high-quality speaker, the MDF cabinet features radial- and cross-bracing for greater rigidity. The speaker is available in four luxe-looking finishes—a dark walnut wood veneer, or high-gloss piano finishes in black, white, or ebony. Generally speaking, I'm a non-grille gal, but the ones here attach discreetly with "invisible" magnets for an unobtrusive and streamlined appearance.

My review samples arrived in piano black lacquer, which nicely accentuated those futuristic-looking embossed metallic drivers. If this speaker had a dress code, it would be black tie. Of all the loudspeakers I've had in my systems at home, none has received more compliments than the ultra-high-gloss Gold 300. Even friends who aren't audiophiles have been wowed by the speaker's fine looks—and in short order, its superb sound impressed them in equal measure. But before I describe the 300's sonics in greater detail, let's talk a bit about setup.

The Gold 300s come with black-metal X-shaped bases with screw-in feet or floor

spikes that connect via locking nuts and washers at each of the bases' four end-points. After attaching those bases—which (luckily for me) was a straightforward assembly process using the bolts and Allen wrench included—I toed the speakers in slightly and positioned them roughly 8 feet from my listening-room sweet-spot and approximately five feet from the rearwall. Generally, this placement delivered immediacy, impact, and excitement, even at tempered volumes. Depending on what I was listening to—or in some cases listening for—I also spent some time sitting and standing farther away from the speakers (between 10 and 12 feet). This additional distance brought

forth a greater overall sense of blended cohesion and coherence among the drivers. (Happily, my listening room is large and deep enough that I can afford to move my sofa back a couple of feet.) In fact, my only real criticism with this transducer was its fairly directly frontal projection at relatively close range. But as noted, some distance took care of this.

After appropriate break-in time, I began critical listening with the NuPrime IDA-8 Class A/D hybrid 100Wpc integrated amp (which I reviewed favorably in Issue 263). Its smooth liquidity and sense of effortlessness suited and balanced out the more or less "bottom-up" character of the Gold 300s. For the bulk of my



## Equipment Report Monitor Audio Gold 300



listening my source was an Acoustic Signature Challenger Mk. 3 turntable with the German maker's AS-1000 tonearm, an Air Tight PC-7 cartridge, and a Walker Procession on phono-stage duty. I did some listening both with and without the addition of a pair of JL Audio e110 subwoofers, crossing over at 50Hz initially, though results proved more favorable when I downshifted to 40Hz, then 35Hz. I didn't uncover an across-the-board preference; some LPs played back more pleasingly without the subs, others benefited from their added extension and fullness. On tracks such as "My Oh My" and "Never Mind" from Leonard Cohen's *Popular Problems* LP, the resolution was remarkable with subs. Every detail of his gravelly diction came nearly as alive as if he were in the room. Fiddle and acoustic guitar, too, were reproduced with noteworthy naturalness.

Broadly speaking, some LPs seemed to fare better *sans* subs for definition, pacing, and vocal clarity, including Buena Vista Social Club's marvelous *Lost & Found* [Nonesuch] collection of "lost" studio and live concert cuts, where guitars—especially the laúd (12-string Cuban guitar)—sounded as warm, heady, and beautiful as the Havana sun. The English Beat's *Special Beat Service* [Mobile Fidelity] showed a lively ambience without subs, with plenty of air and space around vocalists and the plethora of instruments, from horns and saxes to strings and percussion. Soundstaging displayed reasonable depth and dimensionality, while bass lines resonated with respectable definition and without chuffing or noticeable overhang. Overall, I found that the NuPrime combination proved quite well balanced, pretty clean, and

relatively neutral. Midrange proved to be a strong suit as well.

After some weeks with this system, I switched out electronics—the solid-state NuPrime amp and Walker phono-stage for a Soullution 525 full-function preamp and the tube delights of an Air Tight ATM-1S stereo amplifier. (The analog source setup stayed the same.) The general impression here was a fuller and more beautiful sound with plenty of bloom along with slightly darker, richer timbre. Perhaps the most dramatic difference (or improvement) I noticed with these reference-grade electronics driving the Gold 300s was on the sweep and scale of large orchestral works. The gloriously sinister sounds of Khachaturian's "Masquerade Waltz" [Analogue Productions], especially the lower registers of brass and deep woodwinds juxtaposed with the soaring strings, were felt as much as heard. Transient attacks as well as decays were more pronounced, lending a thrilling sense of realism alongside generous helpings of musicality within a deeper and wider soundstage. Broadly speaking, carefully chosen electronics seemed to expand these transducers' repertoire—especially if you're a classical music fan.

I thought it might be worthwhile to include a few comments by way of comparison with a different dynamic floorstanding three-way speaker in a pretty similar price range: the Focal Aria 948 (which I reviewed favorably in Issue 254). Call it the English versus the French (just kidding!). Both deliver plenty of resolution and detail, but like anything else, it depends on what you like. If you tend to go for transparency and true-to-source accuracy, you might prefer the 948. However, the Gold 300 was con-

sistently balanced, rich, and full—and always sounded musical (yet without much in the way of coloration, depending in part on electronics). The Aria 948 has a more "top-down" sound with a fairly neutral-to-slightly brighter overall balance, while the Gold 300 displays a more "bottom-up" flavor with greater heft. Another important sonic consideration here is the Gold 300's ribbon tweeter boasting remarkable range (per the specs) versus the Aria 948's aluminum/magnesium TMF inverted-dome, which can walk a fine line between clean, razor-sharp precision and slightly brighter beaminess in the treble. (Bear in mind these comments are meant to be broad-stroke, at-a-glance comparisons. I recommend doing plenty of listening before buying.) Finally, from an aesthetics angle, they're certainly both luxurious-looking, no matter which finishes you choose. The Aria 948 is more elegantly austere and slightly understated with its classic wood veneer, while the Gold 300 is more streamlined, slick, and shiny—more along the lines of a sexy car.

Beauty may be in the eye of the beholder, but the Monitor Audio Gold 300 represents a special breed of loudspeakers that successfully combines style with substance, as should be apparent from my experience. In addition to its stellar sonic capabilities (particularly throughout the midrange), consider that such a strikingly handsome speaker may be more likely to meet with partner/spousal approval. (I don't want to let my review samples go.) Whether or not style is among your hi-fi priorities, the Monitor Audio Gold 300s are highly recommended for a long look and listen. tas

## Our Top Picks Floorstanding <\$10k



### Elac Debut F5

**\$560**

The floorstanding F5 leverages the strengths of the compact B5—its warm, relaxed, and responsive midrange, surprising bass extension and tunefulness, and strong sense of musical truth—then significantly builds on them. What really distinguishes the F5 is the sheer volume of air that its additional woofers can move. The F5 created nicely weighted orchestral scale and scope, and vocalists of all genres were fully formed and fleshed out, with chest resonance, weight, and bloom. A veritable gift to budget-conscious audiophiles and the younger audience. While not flawless, the F5 is as faultless as a speaker is likely to get at this price. NG, 260



### PSB Imagine X2T

**\$1295**

Simply put, these powerful, fairly compact, four-driver, three-way, quasi-D'Appolito floorstanders live up to Canadian manufacturer PSB's main marketing message: "Real sound for real people." Big bang—and plenty of bass—for the buck is what you can expect. The X2Ts deliver unexpectedly robust low end for their category—something audiophiles tend to drop big coin for. What's more, the X2Ts also offer a strong power range, as well as excellent midband focus and naturalness. If you like a more bottom-up sound with a side of denser tone color, these PSBs are bound to please. It's a rare speaker, says JM, that's this easy on the wallet, and this easy to love. 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 power-and-bass-range speed, low-level resolution, tone color, and extension. Though the .7 benefits on some (chiefly large-scale) music from the addition of a subwoofer, reviewer JM thought that, all by its lonesome, it was shockingly realistic on acoustic instruments (and equally swell on a good deal of rock). JV agreed completely. JM/JV, 250



### GoldenEar Triton Five

**\$1999**

Sandy Gross, the proprietor of GoldenEar, may be the Babe Ruth of reasonably priced loudspeaker designs. With the Triton Five, the gregarious Gross has hit yet another one out of the park. The Triton Five is a remarkably low-distortion design that belts out Led Zeppelin but also has the finesse to reproduce the most finely filigreed musical passages. A high-velocity ribbon driver helps account for the purity of the treble. Four side-mounted sub-bass radiators allow it to plumb the depths of the sonic spectrum. Not least, it's also an elegant and unobtrusive-looking design that should appeal to a wide range of listeners. JHb, 255

## Our Top Picks Floorstanding <\$10k



### MartinLogan Motion 60XT

**\$2999**

The Motion 60XT hybrid electrostatic is not a perfect loudspeaker, but it does many things not only right, but magnificently, provided a suitable amplifier is used to drive it. It should come as no surprise that the upper midrange and treble are voiced similarly to ML's ESL models, though with slightly less finesse in the top frequencies. Voices are lifelike, engaging, and captivating. An added benefit of the excellent driver and crossover matching is the realistic lower-midrange/upper-bass performance. The 60XT produces a broad soundstage that exceeds the width of the loudspeakers' placement, with pinpoint imaging and amazing, three-dimensional depth. DM, 262



### Monitor Audio Gold 300

**\$5695 (depending on finish)**

Monitor Audio is one of the pioneers of metal-driver technology. Melding impressive sound with cool-looking functional design, its Gold 300 tends towards a relatively "bottom-up" presentation that is consistently balanced, rich, and full—and always musical. In addition to its stellar sonic capabilities, particularly throughout the midrange where its realism proved most striking, the Gold 300 is also quite sexy-looking. Its smooth, curved enclosure not only looks attractive, but is also said to reduce standing waves. The Monitor Audio Gold 300 represents a special breed of loudspeakers that successfully combines style with substance. JM, 264



### Vandersteen Treo CT

**\$7990**

A loudspeaker of uncommon musicality and precision. Building upon the R&D that went into the flagship Model Seven, the four-driver, medium-scale Treo CT conveys a single-driver-like coherence that immerses the listener in the very moment the recording was captured. It combines uncanny image specificity, color, and texture with an enveloping sense of air and immersion. At least some credit must go to the Model Seven-derived CT (carbon tweeter), which is as transparent and open as it is extended. Basically a passive version of the Quatro Wood CT, the Treo may not have quite the serious bass slam of that model, but you hardly miss it due to its excellent pitch definition. NG, 262



### ATC SCM19A

**\$9999**

The active, two-way tower version of ATC's compact, passive cousin, the SCM19, the 19A equals or betters the stand-mount in virtually every sonic criteria. It has better bass extension but it's the increase in control and pitch definition that truly engages the listener. Images lock in. Its comforting warmth in the lower mids and upper bass adds to the impression of musical scale and substance. Though it may seem pricey at first glance, considering the amp-packs and precision electronics in each speaker and the studio-grade performance, its true value becomes more evident with every recording. Audiophiles may shrink from active loudspeakers, but the SCM19A makes the case emphatically. NG, 272

# FLOORSTANDING >\$10K

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**OUR TOP PICKS IN FLOORSTANDING >\$10K**

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## Equipment Report

# MartinLogan Neolith Electrostatic-Hybrid

## The Sword in the Stone

Robert Harley Photography by Dennis Burnett

**T**he last MartinLogan speaker I had in my home was the Sequel back in the early 1990s. Despite some laudable attributes, its sound wasn't compelling enough to convert me into an electrostatic devotee. True, the Sequel exhibited some of that magical transparency for which 'stats are famous, but the Sequel's electrostatic panel didn't blend all that well with its dynamic woofer. The cone simply couldn't keep up with the 'stat in timbre and transient fidelity. Consequently, the bass sounded like an appendage being dragged around behind the rest of the music. The bottom-end's character was so different that every time the bass drum went off I instinctively looked down toward the sound's source. In addition, there was no getting around the lack of upper-bass/lower-midrange warmth and body, another consequence of an imperfect transition from panel to cone. Nonetheless, the Sequel and the Sequel II were great commercial successes.

But that was nearly 25 years ago, and to say that in the interim MartinLogan has been working on improving the electrostatic panel and its integration with dynamic woofers would be a co-

lossal understatement. In fact, the company has pursued advancements in its core technologies with a single-minded zeal. In particular, Joe Vojtko, MartinLogan's "Chief Audio Technologist," has for the past 25 years led a team of engineers in pushing forward the state of the art in electrostatic design. Equally important, the team has worked on the seemingly intractable problem of mating an electrostatic panel to cone woofers to create a truly coherent, full-range loudspeaker system that speaks with one voice. Designing an electrostatic speaker is one challenge, but it's an entirely different set of hurdles to create a hybrid electrostatic/dynamic speaker that has the weight, power, body, visceral impact, bass extension, and bottom-end dynamics of the best cone-based speakers. In fact, this challenge is audio's equivalent of the Arthurian legend of the "sword-in-the-stone"—the seemingly impossible task of withdrawing the sword Excalibur from solid rock. But just as in legend, whoever accomplished this feat was ordained to discover the Holy Grail—in this case, the realization of a world-class loudspeaker that seamlessly mates the electrostatic's famous transparency, resolu-



## Equipment Report MartinLogan Neolith Electrostatic-Hybrid

### SPECS & PRICING

**Type:** Three-way electrostatic/dynamic hybrid loudspeaker  
**Frequency response:** 23Hz–22kHz +/-3dB  
**Recommended amplifier power:** 50–1300W<sub>pc</sub> into 4 ohms  
**Sensitivity:** 90dB, 2/83V/m  
**Impedance:** 4 ohms nominal, 0.43 ohms minimum at 20kHz  
**Crossover frequencies:** 60Hz, 250–400Hz (variable)  
**Mid/high-frequency driver:** 48" x 22" CLS XStat electrostatic  
**Woofers:** 12" carbon-fiber sandwich (front-firing); 15" aluminum-cone (rear-firing)  
**Woofers loading:** Sealed (front-firing 12"); ported (rear-firing 15")  
**Bass control:** 0dB, -4dB, -8dB  
**Distance control:** 3m (or less), 4m, 5m (or more)  
**Power consumption:** 1W (standby), 15W (maximum)  
**Dimensions:** 30.3" x 74.8" x 34.2"  
**Weight:** 385 lbs. each (net); 600 lbs. each (crated)  
**Price:** \$80,000/pr.

### ASSOCIATED EQUIPMENT

**Amplification:** Constellation Audio Altair 2 preamplifier and Hercules 2 monoblock power amplifiers; Soudation 725 preamplifier and 701 monoblocks  
**Digital front end:** Aurender W20 music server, Berkeley Alpha Reference DAC, Berkeley Alpha USB converter  
**Analog front end:** Basis Inspiration turntable, Air Tight PC-1 Supreme cartridge, Moon by Simaudio 810LP phonostage  
**Support:** Critical Mass Systems Maxxum equipment racks (x2), Maxxum amplifier stands (x2)  
**Cables:** MIT Oracle MA-X and Oracle SHD, AudioQuest Wild Digital AES/EBU, WireWorld Platinum Starlight USB  
**AC:** Four dedicated 20A AC lines; Shunyata Triton 2, Triton DP, Typhon (x3) conditioners, Shunyata Sigma power cords  
**Acoustics:** ASC 16" Full-Round Tube Traps, ASC Tower Trap, Stillpoints Aperture Panels  
**Accessories:** Klaudio ultrasonic record cleaner; Shunyata cable lifters, Critical Mass Systems Rize isolation

tion, and speed with truly full-range frequency response and dynamics.

MartinLogan's Neolith considered here is the culmination of the company's 33-year quest to perfect the electrostatic speaker. The Neolith's name is a nod to its antecedent, the Monolith, the hybrid speaker that put MartinLogan on the map in 1983. Unlike many high-end companies that have been sold by their founders, Martin-

Logan has benefited from being acquired. The parent company has invested heavily in R&D as well as the specialized equipment and highly skilled labor needed to build large electrostatic transducers. As a result, MartinLogan has continually pushed its technology forward, most notably with its XStat electrostatic panel (see the accompanying interview with Joe Vojtko). This newer panel design represents a significant

improvement over its predecessor, and has been employed with great success in the \$25,495 CLX full-range 'stat, the \$14,999 hybrid Summit X, and the \$995 hybrid Montis. All those speakers have received not just rave reviews in these pages, but have been repeatedly singled out by reviewers as rising above the competition. Jonathan Valin reviewed the CLX in Issue 190's cover story, and was so enamored with them that he bought the review samples. Dick Olsher uses the Summit X as his reference.

The improvements to the electrostatic panel have been significant, but the work ML has done on blending the cone woofer with the electrostatic panel through careful crossover design (as well as the choice of woofer and how that woofer is loaded in the enclosure) has been just as important. Today's Summit X and Montis deliver far better woofer integration than earlier generations of hybrids.

But it's the massive and ambitious Neolith that takes all these technologies to their ultimate realization. This flagship speaker mounts a 48" x 22" CLS XStat panel atop an enclosure that houses a front-firing 12" woofer and a rear-firing 15" driver. Previous MartinLogan hybrids have used smaller panels and 8" or 10" woofers; the Neolith is clearly aiming much higher. The Neolith's 12" woofer is mounted in a sealed enclosure and operates down to 60Hz; the rear-firing fifteen-incher is vented with two large ports, and handles frequencies below 60Hz. This is clearly a statement-level product designed to compete in the top echelon of today's world-class loudspeakers. At first glance, and in theory, it may seem like a fool's errand, or a recipe for disaster, to combine a 15" ported woofer with

a nearly massless panel. But that was the design brief, and MartinLogan worked tirelessly to bring the Neolith to fruition.

Let's look at some of the Neolith's physical features and practical considerations before talking about how it sounds.

First, you should know that this is a big and imposing loudspeaker. Even though most of the Neolith is visually transparent, it nonetheless draws attention to itself by its sheer physical presence. The angular cabinet that houses the two woofers and supports the panel is substantial. MartinLogan offers the Neolith in seven colors, ranging from the same red found on Ferraris to a subtle silver. Two pairs of WBT binding posts are provided for bi-wiring or passive bi-amplification. Keep in mind that you'll need to plug each Neolith into an AC wall outlet. The power draw is nominal—1W in standby and 15W in operation. The speaker automatically turns on when an audio signal is detected, and turns off when no signal is present for a specified time. The Neolith requires AC power to generate the polarizing voltages which create the electrostatic force that, when modulated by the audio signal, pulls and pushes the thin diaphragm back and forth. A recessed area in the woofer enclosure's top panel provides a number of useful adjustments. By inserting jumper bars between pairs of holes, you can attenuate the bass by 4dB or 8dB (in addition to the flat setting) as well as adjust the crossover frequency between the panel and the 12" woofer, from 250Hz to 400Hz, in three steps that correspond to listening distances of 3m or less, 4m, or 5m or more. The greater the listening distance, the higher the crossover frequency should be. In my setup we opted for the lowest

## Equipment Report MartinLogan Neolith Electrostatic-Hybrid

setting, 250Hz.

Sensitivity is fairly high at 90dB, but that figure is measured with a 2.83V input rather than the standard 1W, which, with a four-ohm (nominal) speaker such as the Neolith, increases the sensitivity rating (but not the actual sensitivity) by 3dB. That's because 2.83V across 8 ohms dissipates 1W of power and 2.83V across 4 ohms dissipates 2W of power, thus making the speaker appear to be 3dB more sensitive than it actually is, since it takes twice the power to drive it to the same loudness level compared with a speaker measured with a drive signal specified as 1W. Although 90dB sensitivity is on the highish side, don't think that the Neolith will be easy to drive. Its impedance drops with frequency, reaching a low of 0.46 ohms at 20kHz. Moreover, the load the Neolith presents to an amplifier is highly capacitive. The combination of the 0.43-ohm impedance and a capacitive phase angle will present quite a challenge to most power amplifiers. Don't even think about driving the Neolith with anything but a stout amp that can deliver a lot of current into a low-impedance load. In fact, if you're considering the Neolith you should audition it with the amplifier with which you intend to drive it.

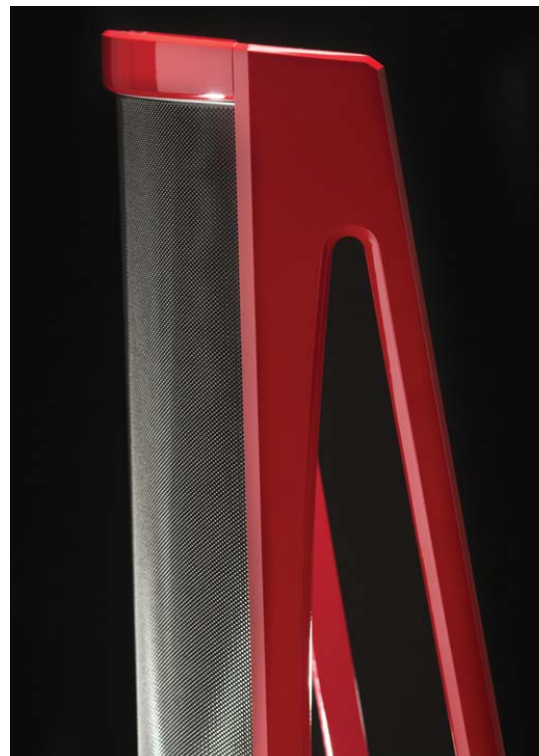
I must commend MartinLogan for producing what is the most useful, informative, and easy-to-understand owner's manual I've seen in a very long time. It's a model of clarity and comprehensiveness.

Before I get to my listening impressions, it's worth considering the manifold virtues of an electrostatic-dynamic hybrid loudspeaker. The first is the fact that nearly the entire frequency range (250Hz–22kHz, in the Neolith's case) is re-

produced by a single transducer, with no crossover within that range. This means there's no discontinuity between disparate drivers, and no crossover in the critical midrange frequencies. Second, the electrostatic panel's diaphragm is extremely light. The diaphragm in the Neolith is just 12.7 microns thick, or about one-sixth the diameter of a human hair. Low mass means low inertia, allowing the diaphragm to respond quickly to transient signals, and to stop equally quickly. Compared with a conventional driver's cone, voice coil, voice-coil former, surround, and the glue holding it all together, the electrostatic speaker's diaphragm is virtually massless. The diaphragm's excellent transient fidelity is not merely the result of its lightness; the diaphragm is driven uniformly over its entire surface area. And that surface area is massive—more than 1000 square inches in each Neolith. A large radiating surface area means the excursion (how far the diaphragm moves back and forth) is proportionately lower for a given sound-pressure level, and presumably, that much more linear. Also, keep in mind that an electrostatic panel is a push-pull device, with one stator pushing the diaphragm while the other is pulling. It all adds up to a recipe for coherence, resolution, transparency, and transient fidelity.

### Listening

The Neoliths settled into my system quite easily, with a minimum of tweaking. After rolling them out of their massive crates and into position, we (two MartinLogan representatives and I) removed the casters and put the Neoliths on furniture sliders to dial-in their final positions. Next, the spiked feet were installed. After a bit



of listening and experimenting with the distance control and the bass-level adjustment, we settled on a flat bass setting. The bottom end was just a little over-full at the flat setting, but I found the sound preferable to the lighter-weight presentation of the -4dB setting. The back of the enclosure was 53" from the wall behind it. Toe-in angle was minimal to moderate.

I drove the Neolith with my usual sources (see Associated Components), and alternated between the Constellation Audio Altair 2 pre-amplifier and Hercules 2 mono power amplifiers on one hand, and the Souldution 725 preamplifier

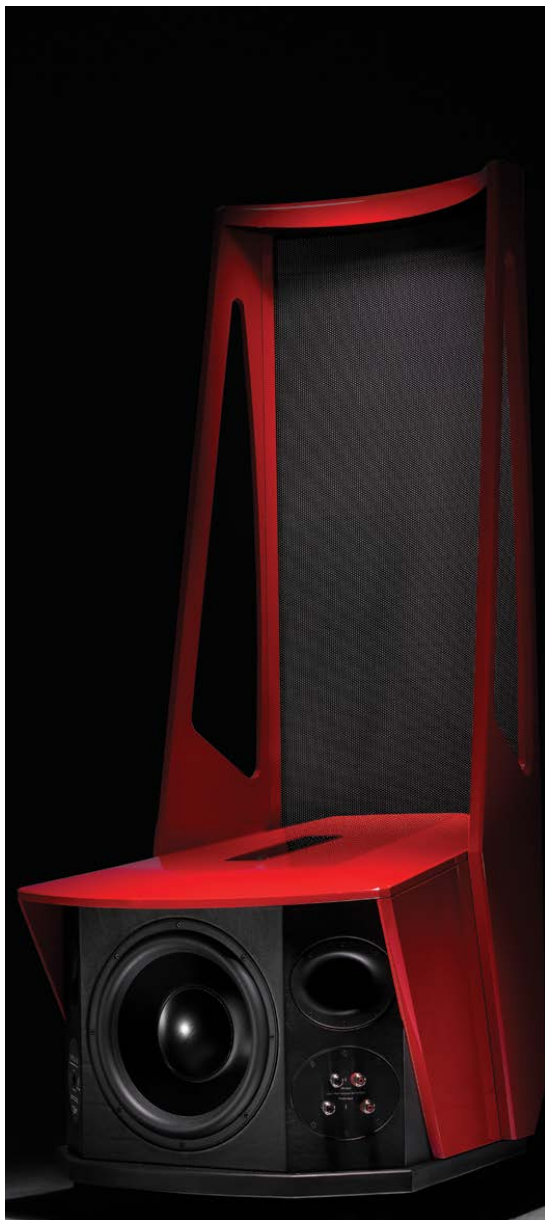
and 701 mono power amplifiers on the other. Both amplifiers are powerhouses (1100W into 8 ohms for the Constellation, 600W into 8 ohms for the Souldution), and neither had a problem with the Neolith's half-ohm impedance at 20kHz.

If the goal of high-end audio is to create in your home the impression of hearing actual instruments, with all their vividness, life, detail, and dimensionality intact, then the Neolith must surely come close to achieving that goal. This loudspeaker reproduces instruments and voices with staggering immediacy and realism. It strips away the mechanical artifice of most other loudspeakers, leaving behind a palpable impression of instruments floating in space. The sense of transparency, of hearing through the playback and recording chains to the original musical event, is revelatory. The Neolith seems to pull off this magic trick effortlessly, as though such legerdemain were simply part and parcel of its nature. Moreover, it doesn't do this on occasion, with specially selected discs; rather it brings music to life over a huge range of recordings, good and bad.

For instance, I love the album *Sunflower* by vibraphonist Milt Jackson, accompanied by Freddie Hubbard, Herbie Hancock, Ron Carter, Billy Cobham, and on some tracks a chamber orchestra playing arrangements by Don Sebesky. Unfortunately, the sonics on this album are poor; the sound is closed down and "hooded," particularly on the piano. Although the Neolith laid bare this recording's flaws, it also laid bare the extraordinary musicianship that makes this disc such a standout. The speakers truly disappeared in every sense of that word, providing



## Equipment Report MartinLogan Neolith Electrostatic-Hybrid



an intimate window on Hancock's funky Rhodes work that underpins the track "People Make the World Go Round," the gorgeous juxtaposition of the chamber group's woodwinds, reeds, and strings with Hubbard's trumpet lines on the title track, and the way Jackson explores a melody from all angles in his brilliant solos. Sitting in front of the Neolith made me feel like an eavesdropper on spontaneous musical creation.

The Neolith was simply sensational with well-recorded voices. One of my references is Jennifer Warnes' *The Hunter* [Impex LP] and the track "Somewhere, Somebody." Her voice wasn't being reproduced by two electromechanical contrivances; she was standing directly between the speakers. Forget about box coloration, driver discontinuity, and cone breakup—this is as pure and unadulterated as music reproduction gets through the midrange. Not only was Warnes' voice unencumbered tonally and dynamically, the sense of vivid presence and palpability was astonishing. This tangibility was magnified by the tendency of the Neolith to sound a little forward and assertive in the mid-band, with a fully fleshed-out brilliance range. This is not a laid-back, reticent-sounding loudspeaker. The Neolith doesn't, however, sound "skeletal" in the way that some electrostatics can; neither is it overly warm and saturated.

As focused and intimate as the Neolith was reproducing an unaccompanied voice, it was just as expansive on big music. Those two huge panels present certain instruments and ensembles with a magnificent grandeur and scale that small loudspeakers, no matter how good, simply fail to convey. The amazingly recorded piano on Bruce Katz's New-Orleans-inflected *Crescent*

*Crawl* [AudioQuest LP] had a power, weight, authority, and sense of size you just don't get from most box speakers. The sheer physicality of left-hand piano lines and crashing chords brought to life the piano's size and majestic power. Large ensembles and full-sized orchestras were well served by the Neolith's "bigness." This sense of size wasn't just conveyed in conventional terms by width and depth (although the Neolith has those qualities in spades), but also by the size and power of instruments and ensembles. The Neolith's 6'-plus height contributed to a soundstage that extended higher than that of most speakers.

Not surprisingly, the Neolith was stunningly fast, reproducing transient information with life-like speed. It wasn't just transient leading edges that were faithfully portrayed, but also trailing edges. That is, sounds started and stopped with equal precision. As a result, the music had a sense of life and verve, with no smearing of dynamic inflections. Little things, like the edge of a drumstick gently tapping on a cymbal, were so vivid and alive they stood out from the mix. Percussion was simply sensational—the timbales on the outstanding *Mobile Fidelity* reissue of Santana's *Abraxis*, for example, sounded like they were in the room with me. The snare drum that drives the martial rhythm of "Mars" from *The Planets* (Mehta, LA Philharmonic, LP reissue) was astonishingly crisp and precise, cutting through from the back of the soundstage. Hearing the Neolith's reproduction of this piece gave me a greater appreciation for the orchestra's rhythmic precision. Acoustic guitar was particularly well served, with notes seemingly jumping out of thin air, without inducing the fatigue of

box speakers that achieve apparent transient speed by way of an unnatural emphasis on transient leading edges. The way that the guitar's string caused the air inside the instrument's body to resonate and then decay was revealed with crystalline transparency.

The treble was exquisitely detailed, filigreed with an ethereal delicacy. The Neolith resolved the fine micro-dynamic structure of cymbals, a violin's upper harmonics, tambourine, and saxophone with no trace of the grain, etch, or metallic flavor often heard from box speakers. Listen to the cymbals on the 45rpm Analogue Productions reissue of Dave Brubeck's classic *Time Out* and you'll hear a full measure of treble energy and vitality without the sense of tension that most dome tweeters produce.

One of the knocks against planar loudspeakers (including electrostatics, planar-magnetic drivers, and true ribbons) is that, while fast and detailed, they don't deliver the same dynamic force and impact behind transients. Drum sticks hitting drum heads, for example, don't have quite the transient pop they have with full-range dynamic speakers. This shortcoming can be exacerbated in hybrid systems in which bottom-end dynamics, reproduced by cone woofers, call attention to the planar's dynamic shortcomings by juxtaposition. The Neolith goes a long way toward dispelling the notion that planar transducers lack force. The Neolith supplied plenty of impact and weight behind transients, perhaps by virtue of the panel's size; nonetheless, it didn't pack the punch of the best cone speakers. That said, I never felt something was missing on any type of music.

As impressive as all the characteristics I've de-

## Equipment Report MartinLogan Neolith Electrostatic-Hybrid

scribed are, and as important as they are to musical communication, what really sets the Neolith apart is its resolution. By resolution I mean the Neolith's ability to convey everything that's going on in a recording, from instrumental timbre, to the separation of individual instrumental lines, to micro-dynamic shadings, to the puff of air around image outlines, to transient information, to the space in which the recording was made. All is laid out in ravishing detail. The Neolith was particularly adept at clearly resolving every instrumental line, even within the most complex passages. I was continually amazed to hear previously buried instrumental parts in familiar music with such vivid clarity. The intricate horn arrangements of Gordon Goodwin in his modern interpretation of big band music, for example, were suddenly much more intelligible. The Neolith "de-homogenizes" the music and, in doing so, allows much more of the musicians' intentions to be revealed.

Because the Neolith is so high in resolution, it will reveal every single aspect of the signal feeding it. It's a microscope on your front end, amplification, AC power, cables, and vibration isolation. No sources or amplifiers are "too good" for the Neolith; an investment in top-quality sources and electronics won't go to waste. With the Constellation electronics driving the Neolith, I heard the most highly resolved musical presentation I've ever experienced. The Constellation electronics are unbelievably transparent and detailed, qualities that combined synergistically with the Neolith to reveal even the finest bit of musical information. You may think that this combination may be too much of a good thing—at some point resolution degenerates into mere

clinical analysis. But that wasn't the case. Every increase in transparency in my system resulted in hearing more musical expressiveness, creating greater engagement with and immersion in the music. There was no trace of etch or coldness, and no longing for a less detailed, more "musical" rendering.

None of this would matter if the Neolith's cone-woofer bass had ruined coherence by calling attention to the discontinuity between it and the electrostatic panel. But it didn't. Rather, the front-firing 12" woofer, which handles the transition from the panel to the 15" rear-firing driver over two octaves from 60Hz to 250Hz, smoothly integrates with the panel and produces a sound that is truly consistent from top to bottom. Even the low bass sounds "of a piece" with the mid-woofer and the panel.

You look at the massive rear-firing 15" driver, along with those two huge ports, and think that there's no way that it will blend seamlessly with an electrostat. But it does. The Neolith's low bass isn't as hard-hitting, taut, and defined as that of some of the best box speakers, but the glorious mids and treble more than make up for this. Plus, the combination of the two woofers and the massive panel allows the Neolith to play any type of music, at any listening level, with utter ease.

As you can see, I greatly enjoyed my time with the Neolith. They delivered hour after hour of sheer musical delight, across a wide range of music and styles. But perhaps the most memorable experience I had with them, and one that speaks volumes about the Neolith's fundamental attributes, was when I called up a rip of a straight-ahead jazz CD I had engineered (*Confir-*

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## Equipment Report MartinLogan Neolith Electrostatic-Hybrid

mation by the Chiz Harris Quartet) live to two-track. The Neolith brought out specific aspects of the sound, including the golden burnished timbre of Conti Candoli's flugelhorn, the woody body of the doublebass, and the rich detail of the cymbals. Listening to this recording through the Neolith was revelatory; I was clearly hearing things that I had never heard from any other playback system. But beyond these specific improvements, what really struck me was how the Neolith conveyed the live feel and energy of spontaneous music-making, as it actually happened at the session. Seconds into the first track I experienced a frisson of excitement as the memory of the session was suddenly brought back to vivid life by the Neolith. The recording was supposed to be the Chiz Harris Quartet, but Chiz invited his friend, the great trumpet player Conti Candoli (of the Woody Herman, Stan Kenton, Dizzy Gillespie, Benny Goodman, and *Tonight Show* bands), to drop by the studio to listen in, if he had some spare time. Candoli not only showed up, he brought his horn. Without rehearsal with Candoli, the group (which included Supersax member Jay Migliori on tenor) launched into ten-minute-plus free-flowing renditions of be-bop classics such as Charlie Parker's "Confirmation." The impromptu contribution of Candoli, the improvisational nature of the music, the talent of these veteran musicians, and the live-to-two-track technique contributed to the feeling of raw musical energy captured on tape. I've used this recording for years in evaluating equipment, but I've never before felt as vividly transported back to the original musical performance as I did when listening to it through the Neolith.

### Conclusion

MartinLogan's Neolith is a world-class product, taking its place in the upper echelon of today's best loudspeakers. The Neolith's transparency to sources, resolution, coherence, transient fidelity, and lifelike sense of presence and immediacy are as good as they get. In short, the Neolith is as colorless a loudspeaker as I've heard.

The blend between the electrostatic panel and dynamic woofer is masterfully executed, be-lying its hybrid nature. The bass integrates with the panel to an extent I did not think possible. The low bass may not have quite the tautness and impact of some cost-no-object cone loudspeakers, but that deficiency pales beside the Neolith's state-of-the-art midrange and treble.

The build-quality and finish are superb, and the product is backed by a solid company with a 33-year track record. Those are important considerations when making an investment of this magnitude.

The Neolith is an unqualified technical and musical triumph. It's also more than fairly priced at \$80,000. Although that's a huge amount of money by any standard, I can name off the top of my head about ten speakers (more if I thought about it) that cost far more and that I wouldn't choose over the Neolith. MartinLogan has successfully blended its electrostatic panel technology with dynamic woofers to create a truly full-range, coherent loudspeaker—finally succeeding in the audio equivalent of pulling the sword from the stone.

## Divine Madness



Aristotle wrote that the creative act was a natural event, and as such, conformed to natural law. Plato held a contrasting view. He believed that artistic inspiration arose from singular moments of "divine madness." At Wilson Audio, we understand that both philosophers had it right.

All cutting-edge products are impelled by the careful balancing of two motivating sources: science and passion. They are the physical manifestations of the idealist philosophy that it is possible for a specific assemblage of inductors, resistors, capacitors, tweeters and woofers to possess the ability to not only recreate a realistic simulacrum of the musical event, but to convey an ineffable sense of the emotional intent of the performing artist. To do this, a designer must develop both a near polymathic understanding of the natural laws of physics and possess the passionate heart of an artist.

The new Yvette draws from this rich cultural philosophy. It is, at the same time, the most technically advanced and emotionally evocative single-enclosure loudspeaker in Wilson's history.

Watch the story unfold in a new video at [wilsonaudio.com](http://wilsonaudio.com). Click on the YouTube icon.

## Equipment Report **MartinLogan Neolith Electrostatic-Hybrid**

# MartinLogan's "Chief Audio Technologist" Joe Vojtko Talks with Robert Harley about the Neolith's Design

### How long have you been at MartinLogan, and what is your role?

I've been here over 25 years. I started doing electronics assembly before moving into engineering. I've been doing electronic and acoustic design since then.

### You've apparently made a big contribution, because the crossovers in the Summit X, Montis, and Neolith are called the "Vojtko Crossovers."

The marketing people thought that would be a good name to put on the crossover. It's not a particular technique, but rather the culmination of everything we've learned over the past 25 years in achieving a blend between the electrostatic panel and the woofer.

### How long has the Neolith been in development?

We've been working on it for about three years. We've had two mechanical engineers, and I have a counterpart in acoustics who worked on the woofer development. I was working on the electronics and the voicing. We also have a technician, a couple of managers, and our cabinet guy who built the various prototypes. It's taken a lot of people, all working together.

### Tell me about the advances in the XStat transducer. What makes it better than the previous generations of panels?

We've had the XStat for over ten years now. The previous generation had the bigger holes [*in the stators*], and it was manufactured a little differently. The XStat gets vacuum-pressed after it's made, which allows us to control the tolerances in the gap between the diaphragm and the stators. We have much better left-right matching. The XStat panels also have higher sensitivity. We also started using clear spars [*the intermittent spacers between the diaphragm and the stators*], which makes the panels look more transparent.

### Let's talk about the challenge of mating an electrostatic panel with dynamic woofers, and what techniques you used to address that challenge.

We used the same technique we've been using for years. It boils down to having a crossover that matches the phase correctly and gives a good overall response in a room.

### But the Neolith is the first time you've attempted to do it on this scale.

I was involved in the Statement E2 project back in the 90s. That was also very ambitious. [*The MartinLogan Statement was a massive four-piece hybrid system with woofers in separate column enclosures.*]

### True, but the blend between the dynamic woofer and the ESL panel is so much better in the Neolith than in the Statement or, particularly, in the Sequel. What's different today?

Well, we've learned a lot since the days of the Sequel. That was 25 years ago. Today's comput-

er-driven measurement equipment is so much better. Back then we were using a TEF 12, which ran on a five-inch floppy drive. We now have a custom program that provides an analysis of the speaker's performance in a room and in echo-free half-space.

There's really nothing different about how you handle the woofer other than tailoring the low-pass filter so that it mates to the ESL panel. We also spent a lot of time researching the highest-quality woofers we could for the Neolith. They are quite advanced, with carbon-fiber cones. The front woofer has an edge-wound voice coil, and has very high efficiency. All the woofers in the hybrid systems are custom-spec'd for the particular product for the particular 'stat panel.

### Could you talk about the decision to put the 12" woofer in the sealed enclosure and the 15" in a reflex enclosure?

Making a speaker that plays down to the 20Hz range passively [*without integral amplification and equalization*] in the size enclosure we had specified dictated that we use a ported enclosure. So we used a front woofer in a sealed enclosure that mates well with the panel, and crossed that over to the rear 15" woofer that can play deeply and cleanly.

### Could you explain the Neolith's adjustable crossover frequency between the panel and the front-firing 12" woofer?

At greater listening distances in larger rooms, we'd see the lower frequency range of the panel roll off. My cal-

culations showed that it was because of the floor bounce. The panel's lower frequency range is not as directional as it is at higher frequency, so we still get some floor reflection. The difference between the primary signal and the reflection decreases with distance, and therefore the first null increases in frequency. We fixed that by developing a system of user-adjustable jumpers that raises the crossover frequency so that the woofer fills in the frequencies where the panel's not able to play. The Statement E2 also has similar compensation, because we had similar problems when it got into really big rooms. **tas**



## Equipment Report

# Monitor Audio Platinum Series PL500 II

## Big Time

Julie Mullins

**I**f you entered my living room (aka my listening room) right now, you might think, “What’s a nice gal like Julie doing with these enormous speakers?” Yes, up to now I’ve been charged with reviewing, shall we say, relatively small-scale equipment. Oh, it’s still serious hi-fi gear, but we’re talking mid-sized transducers along with a couple of components some might even call “cute,” female-friendly stuff. But for now, every time I enter that room and see the PL500 II towers—that tower over me by at least a foot—I get excited about this hobby all over again. (I even feel a little giddy!)

It’s been said that big loudspeakers mean big problems—and bigger bucks. Happily, neither claim rings true about Monitor Audio’s state-of-the-art flagship, the Platinum Series PL500 II. Tall, dark, and handsome, these boys impressed me from the very first time I heard them—at this year’s CES. (They also caught the attention of JV, who commented on them favorably in his Vegas show report.) The reason why I was impressed was simple: The PL500 IIs didn’t sound like any other Monitor Audio speaker I’d heard. In fact, in some ways—in their warm, rich musicality and overall driving energy—they reminded me of classic Raidho Acoustics speakers (minus the

diamond drivers and nearly another zero on the price tag).

Happily, what wowed me (and JV) at the CES show proved equally wow-worthy in my home. With their layers of depth and detail, delightful musicality, and overall coherence the PL500 IIs have been immensely enjoyable companions. They are not only high-energy, high-resolution transducers that boast beautiful sound; they also offer superb build-quality, advanced technologies, and value far exceeding their price.

### Tech Talk

UK-based Monitor Audio is a 40-plus-year-old company that’s well respected overseas for many pioneering acoustical advances; yet the marque has flown largely under the consumer radar in the U.S. But the times are a-changin’. The brand has increased its market presence in the States, while continuing its longtime tradition of technological development. To this very end, the manufacturer brought designer Dean Hartley (see my sidebar interview with Mr. Hartley) on board a handful of years ago—the brains behind the newly evolved flagship Platinum Series, where the PL500 II holds the top spot.

(Seven other models round out the line, ranging from the PL100 II stand-mounted two-way and two more floorstanders to two center-channel speakers, an in-wall design, and the PLW215 II subwoofer.)

In keeping with Monitor tradition, the PL500 II contains a wealth of innovative technologies—specifically in its drivers and crossovers. According to the manufacturer’s white paper on the Platinum II line, these new tech developments are the fruit of extensive FEA modeling and measurement (prior to extensive listening testing, naturally). In addition, Monitor Audio builds all of its drivers and crossovers in-house.

The PL500 II is a three-way, seven-driver floorstander in a D’Appolito configuration. The tweeter, a micro-pleated diaphragm (MPD), was created by Monitor Audio as an improved version of Dr. Oskar Heil’s Air Motion Transformer (AMT). Typical AMTs have a null in frequency response at around 40kHz, but with the help of FEA modeling Monitor engineers figured a way around this issue. As explained in the white paper, the larger rolls (or pleats) in the AMT diaphragm were causing phase cancellations at progressively higher frequencies. The resulting null, which reached a –3dB point at roughly



## Equipment Report **Monitor Audio Platinum Series PL500 II**



28kHz, could be eliminated by reducing pleat height and increasing the number of pleats. Incorporated for the very first time in a Monitor speaker, this new MPD driver reportedly functions with uniform output to over 100kHz. (In my listening, the treble did, indeed, prove to be quite silky-smooth and sweet-sounding, with desirable detail and no etch or beaminess.)

Another advantage of this advanced transducer is its low mass, lower inertia, and larger radiating surface area (eight times the area of a typical dome tweeter), which together produce transient response that's more similar to an electrostatic driver than to a dynamic design. Indeed, I found the speaker possessed a satisfying sense of speed of attack as well as snappy overall energy and pacing (traits which of course are also linked to the electronics in the chain powering the speaker, more on which later). The MPD has a pair of neodymium/iron/boron magnets front and rear to reduce distortion, provide greater uniformity of response, and increase efficiency; the micro-pleated diaphragm only needs to move one-eighth of the distance of your average dome tweeter to produce the same output. These factors contribute to the PL500 II's power handling and high sensitivity of 91dB @ 1W. (This surprising sensitivity allowed me to drive the PL500s with a relatively low-powered Air Tight tube amp—to very ear-pleasing effect.)

Monitor's newly upgraded Platinum II technologies have also resolved the coherence issues that plague large-scale multiways. For starters, the crossover networks have been redesigned using air core inductors for the tweeter and midrange, and laminated steel cores for

the woofer. All cone drivers in the Platinum II line also use underhung voice coils for lower distortion. For more efficient driver and voice-coil coupling, the speaker's drivers feature Monitor's new patented Dynamic Coupling Filter (or DCF) mechanism, which is a pliable nylon ring that is calibrated to stay rigid up to the crossover frequency, but above that wavelength to act like a spring to dampen excess HF energy.

### First Impressions

Aesthetically, the PL500 II looks stately and statuesque. And with a speaker this size, you will want to like the way it looks. Even if you're a go-big-or-go-home audiophile, you don't want to feel like there's a proverbial elephant in the room, and obtaining partner acceptance goes without saying here, as does having a listening room of adequate size. While there's no getting around its grand dimensions (short of opting for another model in the line), the PL500 II boasts a blend of nice lines and strategic curves—all the better for minimizing diffraction. The hand-upholstered front baffles sport fine Inglewood leather from Andrew Muirwood, a supplier to many British luxury brands. Finishes follow suit in natural wood veneers (Santos Rosewood, as in my review samples, or Natural Ebony) that are pair-matched and hand-coated with 11 layers of clear gloss piano lacquer. If it's a truly standout statement you're after (and if you're in the market for a speaker of this scale, it's hard *not* to make a statement), piano black gloss lacquer is another option. Each speaker is hand-built with painstaking precision and takes as many as 144 hours to complete.

### Critical Listening: A Tale of Two Amps (and a Sub)

As the loudspeaker represents the final outcome in the system chain, amplification choices (not to mention source components) have a powerful influence over how a speaker sounds. So let me say here that you'd want to consider carefully which electronics you choose based on your musical and sonic preferences. I listened extensively to the PL500 IIs with two amps from rather opposite ends of the amplification spectrum: the Air Tight ATM-1S stereo tube amp and a pair of Pass Labs XA100.8 monoblocks.

When the PL500 IIs arrived, like a kid on Christmas morning, I wanted to get them plugged in and powered up right away. So I connected them to the amp I'd had in my system, the Air Tight ATM-1S. Even right out of their huge crates, these speakers delivered the sonic goods with a firm sense of image solidity, impressive detail, and an easy laid-back (in a good way) listenability. After adequate break-in time, eventually I began my critical listening with this superb tube amp hand-built in Japan. It might seem an odd coupling (and yes, I'll admit, the ATM-1S falls below Monitor's officially recommended power specs) but the sound proved so compelling, highly musical, and utterly beautiful that I kept the Air Tight in the system for some time. Everything I chose from my eclectic vinyl collection was reproduced with a high degree of resolution and a natural ease that prevented the speakers from ever being fatiguing.

Just for fun (*not* due to any dissatisfaction with the bass), I connected a Crystal Cable Deep Bass Subissimo subwoofer crossed over at 40Hz. The outcomes of this experiment were some-

## Equipment Report Monitor Audio Platinum Series PL500 II

thing of a mixed bag. Broadly speaking, as the bass drivers were relieved of some of their duties, the results were increased low-end clarity, resolution, and separation—but this came at a price: The sub acted as a sort of tone control, and at times it also had a paradoxical effect on timbre. For instance, Dusty Springfield's and Ella Fitzgerald's lovely, distinctive voices didn't sound as true-to-life and utterly recognizable as they should have with the subwoofer in the system; the former skewed deeper and the latter went unnaturally higher—even after some crossover adjustments were made. Due to phase cancellation in the bass, some sense of energy was lost in the upper midrange with the subs, but the tradeoff was an opening up of the midrange in other areas. I also found the sound sweeter without the sub; sonics turned slightly drier with it in the chain. However, the sub did seem to deepen the soundstage just a bit and add some extra air and dimension on certain large-scale orchestral pieces, such as Analogue Productions' RCA reissue of the Khachaturian *Masquerade Waltz*. But too much separation can be double-edged sword if cohesion—a PL500 II strength—is lost. All told, I proceeded *sans* sub.

Then the *other* big boys arrived: A pair of Pass Labs XA100.8 monoblocks. These pure Class A solid-state amps certainly brought more power to the party as well as some other dramatic sonic changes (not surprisingly). Broadly speaking, the switch to the XA100.8s entailed a slight sacrifice in textures and instrumental detail and differentiation in exchange for more muscle, speed, and attack. The Passes also delivered sharper resolution and increased the "wow" factor with their full, robust sound, particularly on rock and blues.

This heavyweight setup begged for some brawn so I spun Dire Straits' *Brothers in Arms* [Mobile Fidelity 45rpm reissue]. There was pleasing separation of Fender bass and kickdrum on "Money for Nothing" while Sting's plaintive tenor backing vocals shone through the mix with the astonishing clarity of a ray of light.

A listen to some tracks from Muddy Waters' *Folk Singer* [Analogue Productions 45rpm reissue] conveyed all the intimacy and immediacy of this spare classic recording. Closing my eyes, I felt transported back in time to the 1963 sessions at Chicago's Tel Arc Studios (aka Chess Records). "My Captain" was reproduced with a startling sense of ambience, presence, and realism as Muddy's shouts echoed in the recording booth while the sharp transient attacks of his and Buddy Guy's guitar strings resonated and lingered through clean decays. The spacious soundstaging and specific placement and imaging of snare and bass (both cleanly articulated) were especially striking on "My Home Is in the Delta". "Long Distance" brought long guitar- and bass-string sustains and decays that uh, went the distance. This was captivating, even highly addictive listening!

Wanting to return to some classical cuts, I spun the Bernstein performance of the Shostakovich Piano Concerto No. 2, Opus 101 [Columbia, reissued by Impex]. Once again the PL500 IIs (still powered by Pass amps) threw quite a large soundstage commensurate with the full orchestra's scale. Turning things up, I was thrilled by the highly resolved presentation, full of dynamic excitement, from pianissimo to forte and beyond. The speakers/system conveyed the intensity of Bernstein's fingers

striking away at the keys, slamming the hammers onto the strings. In the upper midrange I detected just the faintest hint of glare on a few notes but the degree of detail and overall image stability were maintained. (I should also mention that my ears are particularly sensitive to treble anomalies.) I also picked up on some subtle rustling of sheet music early in the second movement. However, on this record—and classical selections generally—it seemed that the Air Tight amp proved more nimble and offered more bloom than the Pass Labs monoblocks, while the Pass's added sense of weight and stability—its gravitas, you might say—was better suited to rock, blues, or hard-hitting pop. But both were consistently enjoyable.

As for any downsides with these transducers, the only shortcomings in some listeners' eyes—or ears, I should say—were that on certain recordings I noticed a slight degree of forward or frontal projection, though I never really found this bothersome. The farther I sat from the speakers—say, 12–15 feet away as opposed to 6–10—the less noticeable this became. On the other hand, the PL500 IIs seemed to do very well off-axis, making them a good choice for company. (IMHO, this is a hobby we should be sharing with others.)

A few more up-tempo and extremely layered selections, Buena Vista Social Club's *Lost and Found* for one, seemed a shade more dynamically laid-back than on some other reference systems. I missed some of the high-octane energy charge those musicians bring to the party—as if they'd traded drinking Cafe Cubano for double Cuba Libres that day. But this was a rare occurrence and a rather specific nitpicky short-

### SPECS & PRICING

**Type:** Three-way, seven-driver floorstander  
**Driver complement:** 4x 8" bass, 2x 4" midrange, 1x MPD tweeter (D'Appolito configuration)  
**Frequency response:** 22Hz–100kHz  
**Impedance:** 4 ohms  
**Sensitivity:** 91dB  
**Dimensions:** 504mm x 1848mm x 626mm  
**Weight:** 218 lbs. (99.1 kg)  
**Price:** \$29,000

### Associated Equipment

**Amplifiers:** Air Tight ATM-1S stereo amplifier, a pair of Pass Labs XA100.8 monoblock amplifiers  
**Subwoofers:** Crystal Cable Deep Bass Subissimo, JL Audio e110 (pair)  
**Source:** Acoustic Signature Challenger 3 with TA-1000 tonearm, Air Tight PC-7 cartridge  
**Phonostage preamplifier:** Soudation 525  
**Power conditioner and power cords:** Ansuz  
**Cables and interconnects:** Shunyata Research Venom series, AudioQuest Fire, Crystal Cable Absolute Dream  
**Equipment racks and amplifier stands:** Critical Mass Systems Maxxum  
**Acoustic treatment:** Stein Music

## Equipment Report Monitor Audio Platinum Series PL500 II

Also, if you're someone who goes in for transparency to sources above all else, these might not be the ideal speakers for you. The Monitors had a rich, mostly bottom-up, and occasionally kind of dark balance with the electronics I paired, though that balance never kept instruments from sounding highly coherent, musical, and pleasing.

### Conclusion

There are many variables that help or hinder great sound: crossover, cabinet, resonances, sensitivity, hunger for power. Happily, Monitor Audio's myriad technical innovations have allowed the PL500 IIs to pretty well nail every criterion. The PL500 IIs proved endlessly enjoyable in their layers of depth and detail, delightful musicality, and overall coherence. They can also rock out and supply slam with the best of them. In sum, whatever your sonic and electronic preferences are, you really can't go wrong with these towering transducers, however you power or configure them. This is a whole lot of speaker for the money—and a whole lot of speaker by any measure—and it took a whole lot of passion and painstaking research to get so many things right. Above all else, no matter what music you like to listen to, these big guns are a whole lot of fun to have around. It's going to break my heart to see these guys go. (I even briefly considered chaining myself to them.) If you have a hankering for big, bold, immersive sound and have the room space (and partner approval) and the desire for a mighty flagship-level speaker that delivers almost all of the qualities of much higher-priced multiways for far fewer dollars, go for the Platinum—audition the PL500 II.

## Questions for Dean Hartley, Technical Director, Monitor Audio Ltd.

### When did you begin working for Monitor Audio?

I joined Monitor Audio Ltd as Technical Director in 1997. I was involved in the purchase of the company from its previous owner, who retired after successfully running the business since its founding in 1972. I was the only technical/loudspeaker person as part of a new investment team at that time. My UK team now comprises six acoustic engineers, six product/mechanical designers, three electronic/software engineers, and a project manager.



I also have a project manager and four project engineers based off-site.

### What kind of sound do you personally like?

I personally prefer a sound character that is engaging and dynamic, yet neutral in balance. This is very difficult to achieve, unless the drivers and parts used are capable of achieving this fine balance. The Platinum Series exhibits the type of sound character I have been trying to achieve for many years in that it presents a high degree of dynamic contrast and is exciting, yet still remains non-fatiguing on the ear.

### What do you strive for sonically when designing a speaker? Do you have any particular influences?

I guess my influences go back many years to the professional studio environment and designing monitors for that application. The key elements would be to create a faithful reproduction by ensuring fundamental design principles are adhered to. Some of these techniques are restricted to higher-end speakers as they involve the use of expensive materials. Reducing distortion is an example. Elements we have introduced into Platinum drivers to reduce distortion are quite elaborate, more difficult to manufacture, and also expensive.

### How long was the PL500 II speaker in development? Was it the first speaker in the line to come to fruition?

The Platinum Series development is now in its second generation; the first series was launched in 2007 and took around three years to develop. The new series concept ideas started in February 2014, and we launched the product range at CES in January of 2016.

### What would you consider the most significant tech development in the PL500?

The PL500 II uses many of the same components and bases of the drivers from the rest of the Platinum range. However, it is the only one to use the dual-mid (M-T-M) arrangement (aka D'Appolito). This gives the new PL500 an incredible amount of focus and precise imaging, compared to the PL300, for example. This is related to the PL500's different dispersion pattern and also its significantly lower distortion profile.

### A fun question: Tell me about your first exposure to hi-fi. What was the experience like for you?

My first exposure to hi-fi was when my father bought a Quad hi-fi system with ESL speakers; I guess I was age 8 or so. I thought the sound was incredible and made a wish to be involved in music and sound at some stage in my life. Despite the fact that the source was 8-track tape, as the turntable was broken for as long as I can remember. I built my first speaker kit when I was 14 using old Leak/Wharfedale drivers. **tas**



## Equipment Report

# Von Schweikert Audio VR-55 Aktive

## Excellence Redefined

Greg Weaver

**D**eveloped to update and replace the aging VR-5 Series of products first introduced in 2004, the new Von Schweikert Audio four-driver, three-way VR-55 is available in either a Passive or Aktive version. The Aktive is identical to the Passive, save for the addition of an on-board 525-watt mono amp to drive the twin custom woofers.

The VR-55's enclosure generally follows the form factor initially seen in the original VR-5 head units, though that model's two-piece stacking bass-module and mid/tweeter-module are now a single cabinet, like that of the VR-44 (the replacement for the longstanding and diverse VR-4 lineup). Standing 42" tall, 14" wide at the base, and 28" deep, tipping the scales at an impressive 190 pounds, the VR-55 Aktive employs a very narrow, chamfered front baffle around both the custom 6.5" ceramic midrange and the doped beryllium tweeter. The baffle shape is designed to promote wide dispersion. The front baffle slopes slightly backward, tapering from 14" wide at the base to just 9" wide at the top, to facilitate driver time alignment and accommodate the twin custom 8" woofers

housed in the bottom of the baffle and the large Class D amplifier in the back.

Fabricated using VSA's patent-pending Triple-Wall Laminate Construction, my review pair's enclosures were finished in an impeccable piano-black lacquer. The outermost layer of this composite is a sheet of resin-based MDF (medium density fiberboard). The middle layer is a sheet of synthetic stone—made from crushed gravel, various other minerals, and a resin binder—that's bonded to the inner surface of the MDF outer shell. The innermost layer is hard felt.

Each of these three incongruent layers is bonded to the next with a thick (roughly 1/5<sup>th</sup> of an inch), industrial, anti-vibrational, rubber-based adhesive designed to add yet an additional obstacle to vibration. The resultant triple-layered wall is roughly three inches thick. This construction exploits the natural effects of using three disparate layers, all with inherently different and effectively opposing native "Q's," working together as a resonance-cancellation system that effectively turns any unwanted energy into heat.



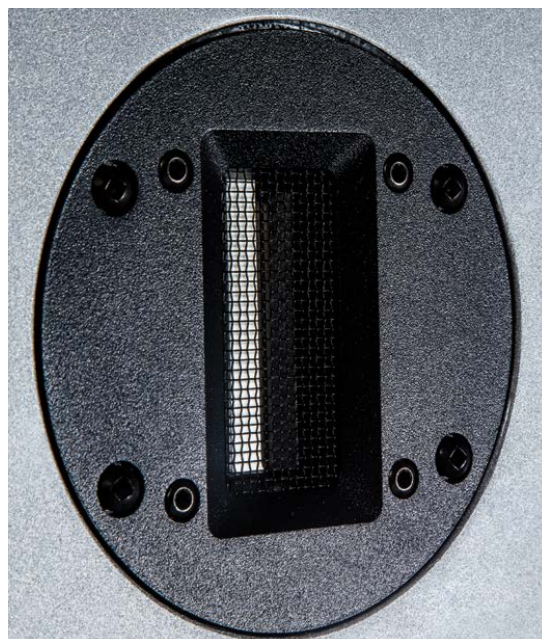
## Equipment Report **Von Schweikert Audio VR-55 Aktive**

The finishing enclosure touch is what VSA calls Gradient Density Damping. This proprietary technique includes three different thicknesses of bonded Dacron batting. Packed extremely tightly closest to the cabinet walls, its density gradually decreases (i.e., it is less densely packed) as it nears the rear of the driver on its baffle. This innovative construction helps to provide exceptional absorption while greatly reducing reflections back into the cone.

First pioneered in the VSA UniField Model 3 speaker system in 2007, Gradient Density Damping is the result of extensive research using Cal Tech's Laser Interferometer Lab to measure speaker cabinet-wall vibration and the internal mechanical processes of stored-and-released energy. According to Von Schweikert, cabinets constructed with this method offer measurably superior results to those using solid aluminum enclosures—and do so at a drastically lower cabinet-production cost. This approach has proven so successful that it is utilized in all VSA models in production today, from the Vortex VR-22, to the VR-11SE Mk2, and the one-off, statement, four-tower VR-11XS.

The rear panel is busier than most, and its contents contribute significantly to the VR-55 Aktive's unique ability to seamlessly integrate with any room. Situated centrally on its nine-inch width—two inches down from the top—is the four-inch round housing for the 3" Rear Ambiance Retrieval ribbon tweeter, intended to match the transient response and tonal quality of the superb front tweeter and to help effectively replicate the concert hall (or recording studio's) acoustic space. An all-new ambience-retrieval circuit with a level control is

also included. This control allows owners to tailor the rear tweeter's dipolar dispersion pattern and intensity to the environment—be it a hard and reflective surface or a softer, more absorptive one such as a curtain.



Behind a ten-inch-square silver plate near the bottom of speaker is a 525-watt mono Class D amplifier—engineered by and sourced from Channel Islands Audio, and using Hypex transistor modules and a linear power supply. This housing also contains the IEC socket and its amber-lit rocker-switch, two sets of five-way binding posts for bi-wiring, and two small, round control knobs for fine-tuning both the woofers and the rear tweeter. (More on this later.)

Both sets of binding posts are WBT-0710Cu

Nextgen, fabricated from 99.996% pure, oxygen-free copper plated with a single layer of 24k gold and fully insulated with Makrolon. This copper/gold combination was chosen over similar posts fabricated from silver or platinum purely for its "sweeter" sonics.

About four inches above the amplifier plate, centered horizontally, is the six-inch mouth of the fluted woofer port. The woofer system employs a four-chamber hybrid transmission line and is user-adjustable via the rear-loaded port, with a factory preset "Q" of 0.6.

Moving to the front baffle, we find a unique driver set, the result of a four-year collaboration between Albert Von Schweikert and both Thiel and Partner (Accuton) and Scan-Speak. Albert's desire to eliminate what he felt was an unnatural resonance that spot-lit certain frequencies and prevented an overall natural timbre eventually led to the development of the VR-55's 8.5" and 6.5" Accuton ceramic-on-Nomex honeycomb drivers. Both employ what can only be described as massive, vanishingly low-distortion motors. (Yet none of this would be apparent from a casual glance at them through the perforated, concave curvature of their protective black grilles.)

The proprietary doping compound applied to the Scan-Speak beryllium 1" dome and its large rubber surround is also the result of a long-term collaboration between Albert and Scan-Speak, in an effort to prevent even the slightest perception of harshness.

The 3" aluminum-foil ribbon used for the Rear Ambiance Tweeter was designed by European speaker-maker RAAL, and boasts an upper frequency extension of 60kHz.

### SPECS & PRICING

**Driver complement:** Two 8" woofers, one 6.5" midrange, one 1" tweeter

**Frequency response:** 16Hz–40kHz (–6dB); 21Hz–40kHz (–2dB)

**Sensitivity:** 90dB @ 1w/1m

**Total system distortion:** 0.5 percent at 90dB

**Impedance:** 8 ohms Aktive/4 ohms Passive

**Recommended power:** 20–200 watts (Aktive), 100–500 watts (Passive)

**Subwoofer amplifier power rating:** 525 Watts

**Dimensions:** 14" x 42" x 28"

**Weight:** 186 lbs.

**Price:** \$60,000

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The crossover is constructed from the finest parts available, with all final components selected by ear. This particular crossover circuit, unique to Von Schweikert Audio, is a time-and-phase-aligned design that represents the latest iteration of its ever-evolving Global Axis Integration Network. With a goal of sonic "invisibility," the crossover leverages the advantages of servo-control and the use of very few parts in series with the drive units. Most of the constituent components are in parallel ground shunts to control phase and impedance. The crossover parts are hyper-expensive—including premium devices from Duelund, as well as Jensen copper

## Equipment Report Von Schweikert Audio VR-55 Aktive

foil and Teflon/beeswax bypass caps. The main capacitors are Mundorf Supreme Gold/Silver/Oil. All inductors are copper foil, resistors are Mundorf metal film, and all internal wiring is Delphi's MasterBuilt Single Crystal Copper.

### Into the Fray

Fortunately for me, the driver who delivered the large crates containing the VR-55 Aktive loudspeakers was willing to help me get them down my stairs and into my listening room—for a small gratuity. Extricating these speakers from their wooden shipping crates and getting them positioned in my room was relatively

straightforward, but would have been a bit of a challenge to accomplish singlehandedly. The assistance of at least one other person should be considered mandatory for installation and setup.

Initially, the pair I was going to review was to have shipped to me directly from its official introduction at RMAF 2014, but there was a slight change of plans. During that initial exhibit, Albert heard some minor issues he felt he could successfully address. As a result, when the VR-55s arrived at my home in late January, they were not only improved, but also very well broken-in.

I began by placing them in the same locations as my longtime reference VR-5 Anniversaries, and over the next few hours of nudging them this way and back, toeing them in and out, I finally honed in on a location that offered the best compromise of timbre, coherence, and spatial information.

When it came time to install the floor spikes, I noticed that each speaker had two slightly differently sized pairs, with about a half-inch height discrepancy between them. After a quick call to VSA, I learned that there was a reason for this: The additional upward canting of this set of unequal footers was designed to offer just a bit more focus and tonal accuracy than using four footers of identical height. VSA suggested that the taller pair go under the front baffle and the shorter set under the amplifier at the speaker's rear.

Once I had the speakers suitably positioned and spiked, the real magic began. Normally, settling on that final placement would be the end of the room integration process, but with the

VR-55 Aktive it proved to be just the beginning. Over the next few days, by taking advantage of the remarkable fine-tuning abilities offered by both the woofer and rear ambient tweeter controls, I was able to achieve a bass coherence, depth, and impact, overall tonal balance, and degree of spatial re-creation considerably more refined and accurate than I'd been able to realize with the VR-5 Anniversary (which had nonetheless been remarkable), or with any other loudspeaker that has graced my listening room.

At the time of their arrival, I had four very different sets of monoblocks on hand, each exceptional in its own right, and seemingly perfect to test the versatility of these new speakers.

Given that VSA recommends a power range of only 20 watts on the low end to 200 watts or more for the VR-55 Aktive, I was curious to see how the exquisite Channel Islands Audio VMB-1 40W monoblocks (no longer in production) would fair. They employ an exceedingly simple circuit built around the National Semiconductor LM3886, feature a robust power supply, and are capable of creating some of the most organic midrange I've ever heard from a non-tube amplifier. The results were surprisingly satisfying for such incredibly affordable amps (their original retail was \$999/pr.). Their tube-like midrange tone and bloom dominated, while their slightly forward presentation was still apparent.

My only real complaint about the VMB-1 had been its inability to handle large dynamic swings at a decent, even small-room-filling volume. This was no longer a problem. They now exhibited an abundance of dynamics that, without the VR-55 Aktive's on-board mono amps, would have been unachievable.

Next up were my longtime reference Class D mono's, the Channel Islands Audio D-500 MKII. With those hitched to the speakers, I was treated to all their seductive qualities. The D-500 MKII has always offered some of the most liquid midrange combined with outstanding pitch definition, extension, and slam in the lowest registers of any Class D entrant I've heard. (Keep in mind that VSA chose CIA to build the 525-watt mono amplifiers for the Aktive VR-55, and for good reason.) The D-500 MKII's primary weakness is how they handle the spectrum above roughly 4kHz. They just don't have all of the grace and poise offered in that region by the very best Class A or AB tube or solid-state entrants.

Next into the fray were the late John Ulrick's last iteration of the Spectron Musician III Mk2 SE, with all the upgrades, V-Caps, Super-Effect Bybee Purifiers, and premium fuses. In their mono configuration, these behemoths deliver an absurd 2000 watts into 8 ohms! These signature editions of the Musician III Mk2 SE's showed why many consider the Spectron to be in a class of its own—utterly quiet, superb microdynamic resolution, jolt-you-out-of-your-chair dynamics, and midrange bloom that is a cut above, especially for Class D. Honestly, I still find a bit to quibble about when it comes to how they handle the top three registers, but they are exquisite amps, nonetheless.

Last up were the Pass Labs XA160.8s. These seductive 160-watt, pure Class A monos are the latest creation from the brilliant mind of Nelson Pass, and they reconstruct music in a manner that satisfies both heart and intellect so completely that, once they were in place, they never again came out of the system. All further



## Equipment Report Von Schweikert Audio VR-55 Aktive

notes for this evaluation were taken with the XA160.8s.

### Constituent

It is no secret that I was not completely enamored of the earliest iterations of the Accuton ceramic woofers. Though their transient speed could be intoxicating, they often exhibited a ragged, edgy, resonance that could make them overly aggressive sounding. Rest assured, these aren't your father's Accutons.

Custom fabricated and highly modified, the VR-55's twin 8.5" Accuton woofers use a unique ceramic honeycomb lattice to which the ceramic cone material is bonded. The standard Accuton drivers do not use this honeycomb support matrix, and as a result are considerably less robust. In fact, they can be easily cracked or punctured with only the pressure of your finger. These custom-built drivers are astonishingly fast, with rise and settle times rivaling—possibly surpassing—the best I've heard from any driver of equivalent size. In addition to possessing this astonishing transient prowess, they tender a remarkably natural and accurate timbre, completely free of audible ringing or resonance to my ears, and very high in fine detail, pitch definition, and harmonically rich and accurate tonal color and texture.

As well as having the ability to accurately execute blisteringly fast and precise transients, the woofers play very deep. VSA's claim that they are only 2dB down at 21Hz in this alignment seems completely realistic from both my rudimentary measurements and from extended listening. I've only heard a handful of speakers, all over \$100,000, that approach the bass-range

power, weight, accuracy, and transient responsiveness the VR-55 Aktive.

There is a remarkably similar familial openness and transparency to the 6.5" midrange driver, fabricated of the same honeycombed, ceramic-coated materials as the woofers. Here again, the transient response of this driver is unnerving, and the degree to which it preserves timbral correctness throughout its wide bandwidth is remarkably hard to fault. Unrelentingly revealing and hard-hitting, it does not tend toward any of the usual congestive artifacts or ringing common in lesser ceramic (or non-ceramic) designs.

Midrange with the VR-55 Aktive is laden with texture and dimension, rich in detail, and replete in harmonic bloom. Instrument fundamentals from piano, violin, guitar, and especially the human voice, are rendered so realistically that they seem to conjure a living, breathing quality. The VR-55s offer some of the most beautiful, smooth, and expressive midrange I have had the pleasure of hearing—they are so engaging and articulate, so completely expressive and fluent, they almost burst with life.

While beryllium dome tweeters have been favored for their comparatively lower mass and the resultant speed that affords, in many applications, they could become overly assertive, affecting the overall system coherence and integration and making the system sound a bit discontinuous and bright.

The collaboration between VSA and Scan-Speak has resulted in an extraordinary tweeter. While the off-the-shelf version is unquestionably very good, after all the iterative electrical and mechanical modeling—all verified by lis-

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## Equipment Report Von Schweikert Audio VR-55 Aktive

tening tests—this final modified model was the first to fully satisfy VSA's sonic design goals. In an effort to eliminate a bothersome resonance that was intractable in the stock model, a film of an undisclosed damping material (co-developed with VSA) is applied to both the dome and the large rubber surround of this 1" dome tweeter. VSA and Scan-Speak have also significantly enhanced the flux density of the ring of neodymium magnets around the circumference of the voice coil.

The result is a very open, articulate top end that seems capable of adeptly and masterfully handling just about any high-frequency signal at any reasonable volume. Over my listening period, the tweeter never lost its overall effortlessness and articulation, and not once did it draw attention to itself; it simply revealed the music. If there is a more natural-sounding, more resolute 1" beryllium dome tweeter in production as of this writing, I've not heard it.

Treble with this modified Scan-Speak tweeter is focused while delivering an unbelievably open and spectacularly airy top end. Uppermost registers are articulate with no sign of sterility or glare, and are rendered with an inescapable sense that there is nothing left unrevealed. The listener is treated to pure and uncongested detail, with vivid attack and seemingly endless ambient decay (recording permitting, obviously). The sheer totality of their reproduction of the sound of cymbals and triangles is exceptional, with the kind of shimmering warmth that you would hear live.

The VR-55 Aktive's sophisticated GAIN crossover delivers only high-frequency reverberant information from the recording to the rear leaf

tweeter. When the rear tweeter's transparent contribution is combined with the overall front wave launch, the VR-55 creates a spaciousness and depth of field that very few speakers can approach, let alone equal. The result is a loudspeaker that speaks with one voice; driver and crossover coherence is among the smoothest I've heard.

### Aggregate

My initial reaction to this extraordinary loudspeaker's voice was identical to the one I had at the introduction of the Magico Q7 at the 45<sup>th</sup> annual CES in Las Vegas, January 2012. I'm not saying that the VR-55 sounds *exactly* like the Magico Q7; rather, its level of performance so closely mimicked that haunting experience—the creation of an unqualified suspension of disbelief, the sense that I was in the presence of a live performance and not a loudspeaker—that I was beside myself with astonishment. When you recall that the VR-55 sells for one-third the price of the Q7 (in 2012), that makes the experience all the more remarkable!

Right from the crate (as noted, they were well broken-in), the VR-55s offered uncanny broadband pitch definition; lucid, airy, and detailed high-frequency performance; a vibrant, engaging, and tonally pure midrange; deep, articulate, impactful bass—and an unnerving level of transparency and transient speed.

Their ability to recreate a wide, deep, and *realistically sized* stage is second to none, thanks to both the physical baffle and crossover designs. Images within the stage are not only precise and rock-solid in placement, but also exhibit an unmistakable accuracy of size and shape. In this

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## Equipment Report Von Schweikert Audio VR-55 Aktive

regard, the VR-55 Aktive is masterful, and handily bests many speakers I've heard at even three times their price.

Sound waves radiate in spherical patterns, so speakers that use narrow, contoured baffling (to minimize surface area around the drivers) and time-aligned crossovers—such as the VR-55 Aktive—will necessarily offer more accurate imaging and more articulate staging than speakers using otherwise equivalent drivers mounted to a wide, flat, constant-width baffle with no time-alignment.

With complex passages like the opening from Prokofiev's *Scythian Suite*, or in the re-creation of the delicacies of massed strings, the speaker's ability to unravel dense and often complex layers of sounds is exceptional. It presents those layers without the slightest hint of congestion or indistinctness and with an ease bordering on effortlessness, all the while rendering such passages with indisputable tonal accuracy and texture.

If my descriptions of the drivers and of their performance give you the impression that this speaker is exceptionally transparent and wildly dynamic, you'd be correct. From the subtlest microdynamic expression to the most startling macrodynamic explosions, the VR-55 Aktive is astonishing at reconstructing the speed and scale of big musical moments. While I hesitate to compare their transient speed and dynamic prowess to that of a horn speaker, the reference seems fitting if only to convey the degree to which the VR-55 Aktive excels at the things that horns excel at. They consistently express dynamic events with a sense of immediacy and control—both under acceleration and decelera-

tion—that is unnervingly lifelike, and virtually unparalleled at anywhere near this price point in my experience.

Taken in combination, the midrange and treble performance of the VR-55 Aktive is more open and more transparent than I can recall hearing from virtually any dynamic loudspeaker. In fact, in this area it rivals the best I've heard from any planar or electrostatic design. In addition, its bass performance—in somewhat varying degrees due to the remarkable pair of custom Accuton drivers and the dedicated 525-watt, fully adjustable mono amp—simply needs to be experienced to be fully appreciated. Taut, deep, and lightning-fast, it differentiates pitches and timbres with an ease and accuracy that are nearly unmatched. Try as I might (and believe me, I really tried), I could not detect the faintest hint of ringing, resonance, or driver distress during any of my auditions.

VSA has published the total system distortion for the VR-55 Aktive as being just 0.5 percent at 90dB. Given this, it's not surprising that one of the speaker's strongest suits is its transparency and resolution. The experience of listening to doubled (or any multiple) voices or instruments such as in duets and chorales, or with strings *en masse*, is nothing short of revelatory. The individual voices in such passages are more readily and effortlessly delineated and identifiable as discrete voices. Yet that very individualism also allows them to emerge as more musically connected, more relevantly woven together. This heightened resolution affords a more musically expressive context and a degree of realism I'm not used to being treated to from other speakers in this class.

Inconsequential and inadvertently captured concert-hall noises such as a creaking chair, an air-handler blower, a cough from the audience, or the closing of a door somewhere off-stage are all revealed to be *exactly* what they are, rather than being presented as some indiscriminated noise. This attribute has the positive psychoacoustic effect of allowing the mind to follow more readily the flow of the music in its full context, rather than creating an unnecessary distraction while the brain tries to puzzle out what caused some indefinable, unrecognizable noise. In other words, because the VR-55 Aktive so clearly presents the distinguishable from the indistinguishable, the mind is not distracted by trying to identify the sound. This ability is, in my experience, something that only a small number of loudspeakers today can do exceptionally well.

Piano works are presented with uncanny vitality. The musings of Ivan Moravec playing Beethoven's Piano Concerto No. 4 from *Ivan Moravec Plays Beethoven* [Via] or Vladimir Horowitz playing Chopin's *Fantaisie-Impromptu, Op. 66* from *The Last Recording* [Sony], are presented on a heightened emotive level, granting the listener a more intimate experience. The challenging voice of the piano—whether vigorously erupting from the explosive attack of the hammers on strings, or their delicate brushing in a mere whisper—is actualized with a haunting degree of realism, leaving no question that the piano is, after all, a percussion instrument. This remarkable presentation serves to further enhance the rendering of the expressiveness of the music.

The human voice is presented in a most vital manner. Listen to the self-effacement of Tori Amos on *Little Earthquakes* [Atlantic], the mis-



## Equipment Report Von Schweikert Audio VR-55 Aktive

chievous wife of Rickie Lee Jones on her eponymous debut [Warner Brothers], or the visceral passion of Sarah McLachlan from *Fumbling Towards Ecstasy* [Arista], and you will find they are all equally realistic and powerful. Neil Young's ire or irony from his early works is laid bare. Thomas Dolby's acerbity and satire on *Aliens Ate My Buick* [EMI] have never been more obvious. Stevie Ray Vaughan's constrained angst on Absolute Analogue's wonderful 180-gram remastering of *Couldn't Stand The Weather* [Epic 25940] becomes a sheer visceral assault on the senses.

Given the heightened detail the VR-55 Aktive is capable of revealing, I was more than just a bit concerned about listening to older, less judiciously recorded works. I'm a product of the AOR radio era, so one of the real decisive tests for me was my first pass at David Bowie's 1972 Glam Rock classic, *The Rise and Fall of Ziggy Stardust*. While it is true that the VR-55 Aktive exposes a recording's blemishes and faults more clearly because of its extraordinarily low distortion and extreme transparency, it also serves to reconstruct the music's message more abundantly.

My first listen to Bowie resulted in the most emotional and engaging connection I have ever felt to that recording, and I assure you that I've likely heard the album 1000 times since its first release. For example, the backing vocals, which had always been an integral part of the underlying musical composition, were now rendered with a newfound clarity and authenticity. This invigorating contribution drove the musical expressiveness of the work, enhancing the narrative in a new and visceral manner by revealing a

host of previously undiscovered sonic and musical details.

Do not take this to mean that the VR-55 can magically make a poor recording sound like an audiophile treasure; it will not. Yet all varieties



of music were recreated with a naturalness, coherence, dimensionality, presence, texture, pace, drive, and immediacy so evocative of the live event that I felt as if that event had been transported into my room.

The VR-55 Aktive renders such an inherent sense of "live"—a symbiotic combination of its exceptionally low distortion, spectacular transient speed, sheer transparency, and resolving ability, and of an overall composure unlike anything I have ever experienced from a loudspeaker at this price—that I was completely enthralled.

### End Game

Component pairing is crucial to really discover what this speaker has to say, so be prepared to match it with only the best electronics and sources. Do that, and these speakers will speak truthfully. Yet as candidly as they reveal weaknesses or strengths of all associated components, they can still deliver the lion's share of their magic with merely competent electronics—such as they displayed when paired with the overachieving Channel Islands Audio VMB-1's. Driving them with the Pass Labs XA160.8's was a magical union; I'm sure there are many others.

Further, I cannot name another speaker, at any price, that is more capable of playing the chameleon and disappearing more seamlessly into a room. The adjustability of the powered woofers and rear tweeter allow the speaker to be successfully adapted to just about any amplifier (save for the flea-powered, 7-watt SET variety), and any room of any size or finish. Other speakers have self-powered bass drivers, and some

boast a reasonable degree of versatility in gain, but nothing I've seen offers the engaging spatial and tonal fine-tuning ability of the VR-55's excellent 3" leaf tweeter.

What makes this speaker so alluring, and such a value, is the way it is able to synergize its innovative, inert cabinet technology, class-leading resolution, crystalline transparency, tonal accuracy, top-to-bottom coherence, and complete room integration ability into a vibrant and indisputable musical soul. Make no mistake; while it is expensive, its accomplishments make it a bona fide value.

The VR-55 Aktives have more than just the ability to vanish from the listening room, leaving only the musical experience. They deliver music in the most resolute yet wholly organic manner I have yet heard in a loudspeaker below the \$100,000 mark. The VR-55 is a new landmark—the most significant transducer Albert Von Schweikert has debuted since the introduction of the VR-11 in 2004. In fact, I would argue that it is even more significant.

What Von Schweikert Audio has created with the VR-55 Aktives is a compellingly accurate, resolute, coherent, and extraordinarily musical loudspeaker. So expressively do they communicate with such a remarkably faithful and engaging voice that I simply cannot allow them to leave my listening room. I had neither the intention nor the desire to spend this kind of money, but because they are so utterly captivating, I have worked with Von Schweikert Audio to trade in my VR-5 Anniversaries and keep the VR-55 Aktives. They are my new references. **tas**

## Equipment Report

### Magico S1 Mk II

#### Strong Family Resemblance

Andrew Quint

**M**agico loudspeakers have impressed a good number of TAS equipment reviewers. No fewer than seven Magico models are endorsed in the 2017 Buyer's Guide and the most ambitious designs have served as references for Robert Harley (the Q7 Mk II) and Jonathan Valin (the M Project). Alan Taffel and Anthony Cordesman were not stinting in their praise for two models in the less elaborately, but no less uniquely engineered S Series, the S5 and S7. At \$38,000 per pair, the S5 is the lowest price of the products just mentioned. All these speakers represent a substantial investment, a reflection of the materials and technology that go into their manufacture.

At \$16,500 (in its M-Cast finish) the new Magico S1 Mk II is the least costly product that the California company makes, other than one subwoofer. The term *entry-level* definitely catches in my throat, as this is significantly more money than the "flagship" offerings from several manufacturers I've positively reviewed recently—the PSB Imagine T3 or the Ryan Tempus III, for examples. Surely, this smallest Magico floorstander must blend into the throng of high-performance full-range loudspeakers that

sell for under \$20k. Well, sorry, that's not the narrative here. The Magico S1 Mk II is very much a Magico and, as such, at this price point represents a smoking value.

There's been plenty of ire expressed toward Magico on our website regarding the application of the "Mk II" suffix, specifically to the speaker at the very top of the regular production line, the Q7. Alon Wolf argues cogently for why this anger and cynicism is misplaced. In Wolf's view, there are two aspects to the design of his loudspeakers, the "platform" and, well, everything else. The "platform" is the enclosure, the extruded aluminum monocoque design of the S Series, or the more complex and labor-intensive construction of the Q and M Series. "I don't really care for the Mk II designation," Wolf told me. "I encourage people to talk about it as 'the new S1' or 'the new S5.' The platform for the S Series is a fundamental achievement in terms of construction, and we are not going to change it anytime soon. It's too good to mess with. There is no better way to build a loudspeaker in my mind for this kind of cost." The extruded metal pieces are made for Magico at the only factory in the United States with the capacity to produce pieces this large. The process is "mind-bog-





## Equipment Report **Magico S1 Mk II**

gling,” says Wolf. “You take a 21” billet of aluminum—one solid piece—and push it through a cookie-cutter profile. It’s an incredible thing to watch.” There actually is one difference in the fabrication of the S1 enclosure in its Mk II iteration. The original S1 used “pressure bracing”—a piece of machined aluminum was pushed tightly against the inside skin of the speaker. Now, Magico bolts the four internal braces from the outside: “The tension points are much more powerful,” says Wolf. This, of course, results in holes in the enclosure that must be welded and sanded to restore a smooth exterior surface and, one assumes, ensure mechanical integrity.

What gets the speaker its “Mk II” appellation are the new drivers it uses and the necessarily reengineered crossover that unites them. The two new drivers are designs that have trickled down from pricier models in the Magico line, a 1” diamond-coated beryllium tweeter and a 7” graphene Nano-Tec mid/bass cone. (Magico’s use of graphene—a material that is so exceptionally stiff and light it has engineers and scientists in many fields pretty pumped—is still among the few commercial applications of the stuff.) The crossover is a fourth-order Linkwitz-Riley configuration that employs Magico’s “elliptical” topology. As with other speakers in the S and Q lines, the S1 Mk II is available in both an M-Coat finish or, for about \$4000 more, a glossy M-Coat version—both in various colors. I actually prefer the M-Coat option, as the speakers are less visually obtrusive and easier to keep looking pristine. (Wolf doesn’t hear or measure any difference between the two finish choices.) A metal grille that covers both drivers, held in place magnetically, is easily removed for

critical listening.

The review pair of S1 Mk II’s, sporting a black M-Cast finish, came carefully packed in two sturdy cardboard boxes. (The M-Coat version is shipped with the two speakers sharing a single wooden crate.) The user’s guide is quite thorough regarding unpacking, which is a two-person job. Clear guidelines for placing the loudspeakers are provided as well. I set up the S1 Mk IIs in a position that had worked previously for speakers of similar size. Peter Mackay, Magico’s VP for Global Sales and Marketing, visited for a morning and—using two tape measures, a laser distance measurer, a bubble level, a calibrated microphone plugged into his laptop, and pieces of blue painter’s tape on the floor—ended up moving the speakers forward about 4 inches. I don’t mean to sound snarky, as the S1s sounded much better when Peter was finished. Some of that was, undoubtedly, Peter’s careful leveling of the speakers and spiking them through the carpet and underlying acoustic treatment to the concrete slab beneath. The point is that you shouldn’t hesitate to enlist the aid of your Magico dealer to set the S1 Mk IIs up: He’s likely done it before and may have been trained by Mackay himself. In my 15’ x 15’ room (a hallway off one of the sidewalls obviates any standing-wave problems; the ceiling height varies from 10’ to 12’) the S1s ended up 25” to 29” from the front wall—they were canted in toward the listening position—and 8’ apart, center-to-center. The distance from each speaker to the sweet spot was 9’ 6”. Mostly, the Magicos were driven by Pass XA 60.8 monoblocks, with some service from a 200Wpc Parasound HCA-2200II stereo amplifier. The preamp/processor was my trusty

Anthem D2v. Digital sources included an Oppo BDP-93 (used as a transport) and a Baetis Reference music computer feeding the Anthem’s DACs; for analog, a VPI Scoutmaster fitted with a JMW Memorial tonearm and Sumiko Bluepoint Special EVO III cartridge. Cabling was mostly Transparent, the notable exception being a Shunyata Anaconda AES/EBU wire from Baetis to Anthem.

My first impression of the Magico S1 Mk IIs was that the sound was *lean* in comparison to my beloved Wilsons (Duette 2s with and without WATCH Dog subwoofer)—in the sense that any extraneous sonic detritus was gone and only the meaningful electroacoustic representation of the original musical event remained. With orchestral scores, colorful music was colorful, not colored. Devotees of Romantic and early twentieth century repertoire know that certain composers have a difficult-to-describe yet characteristic density, a center-of-gravity to their symphonic sonority that makes the identification of the author of even an unfamiliar work possible. Tchaikovsky, Brahms, Bruckner, Richard Strauss, Stravinsky—the tonal palette of each of these masters was utterly idiomatic through the Magicos.

To examine this sonic parameter more closely, I pulled out a recording I’ve used before to evaluate tonal accuracy, one I plan to refer to in future reviews as “The Old Italian Violin Test.” To recapitulate: In 1998, the esteemed Chicago violin dealer Bein & Fushi published a handsome coffee table book, *The Miracle Makers*, that explored the history, craftsmanship, and, of course, the aural magic of the violins built by the two most famous makers of string instruments,

Antonio Stradivari and Giuseppe Guarneri del Gesù [see TAS Issue 125]. A few years earlier, 30 such instruments—the estimated total value at the time was around \$100 million, which would be considerably higher now—were brought to a recital hall in Purchase, New York, to be photographed and then played by one violinist, the American virtuoso Elmar Oliveira. Oliveira was recorded by Mark Levinson, using Cello gear, in three CDs worth of music ranging from Bach to Ysaÿe. The third disc is a singular undertaking—Oliveira plays the first 30 bars of the Sibelius Violin Concerto on all the violins in succession, alternating between a Stradivarius and a del Gesù. Through good equipment, even a listener lacking any experience with 300-year-old Cremonese violins can quickly distinguish the

### SPECS & PRICING

**Type:** Two-way, sealed box enclosure

**Driver complement:** One 1” diamond-coated beryllium dome tweeter, one 7” graphene Nano-Tec mid/bass cone

**Frequency response:** 32Hz–50kHz

**Impedance:** 4 ohms

**Sensitivity:** 86dB

**Dimensions:** 8.5” x 43” x 9.75”

**Weight:** 120 lbs.

**Price:** \$16,500 (M-Cast finish), \$20,295 (M-Coat finish)

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## Equipment Report Magico S1 Mk II

more focused and brilliant sound of a Stradivarius from the darker, warmer, earthier tone of a Guarneri instrument. The S1 Mk IIs did this more effectively than any other loudspeaker I've had in my listening room. In fact, I could readily distinguish among different Strads and different Guarneris with the Magicos, such was their degree of tonal and textural resolution.

The sound—or lack thereof—of the diamond-coated dome tweeter is alluring, with a lack of hardness and harshness at the top of the audible frequency range that surely indicates good mechanical behavior of the driver well beyond that point. The Act I Prelude to Richard Wagner's *Lohengrin* begins with a high-flying harmonized theme for violins divided into eight parts. It's rare to hear that ethereal sonority realistically recreated on disc. Through the Magicos, I did, with the Esoteric SACD reissue of Herbert von Karajan's EMI program of *Wagner Overtures and Preludes*. Not only did the strings register as individual players joining to produce an ensemble sound, but it was possible to hear that other high-pitched instruments—flute and oboe—were in the mix as well. Cymbals on good jazz recordings (Patricia Barber's *Café Blue*, the M & K RealTime Records direct-to-disc LP *For Duke*) weren't splashy, and it wasn't hard to distinguish among cymbals of different sizes. It's not just the extended, linear output of the tweeter that makes the top end of this loudspeaker so beguiling; it's the seamlessness with which it hands off to the graphene mid/bass cone—a device that clearly can keep up with the high-frequency driver it's paired with in the S1 Mk II.

Bass performance from this sealed-box system was tight, tuneful, and punchy on recordings having an abundance of such information, say, "Brite Nightgown" from Donald Fagen's *Morph the Cat*. In an attempt to embarrass the modest-sized Magicos, I assembled an electronica playlist on the streaming service Tidal—tracks like "Strobe" (Deadmau5), "Spannered in Pilton" (OTT), and "Heartbeats" (The Knife)—and turned the volume up to an un-neighborly level. The Magicos held their own, with more than a suggestion of gut-wrenching bottom-end im-

**It's not just the extended, linear output of the tweeter that makes the treble so beguiling; it's the seamlessness with which it hands off to the graphene mid/bass cone.**

pact. You can't open a dance club with S1s. But I do expect to hear from the condo association.

Because all Magico speakers are sealed-box designs, they are capable of producing deep bass—but at the price of decreased sensitivity. Accordingly, I tried the S1 Mk IIs with a well regarded, moderately priced 200-watt stereo amplifier of yore, the Parasound HCA-2200II and, yes, with program material having lots of low-frequency information, the beefier amp provided better bass control (and a sense of greater dynamic headroom). But the S1's owner's manual recommends a minimum of 50 watts per channel and I think that's fair, if those 50 watts are good ones. The Pass XA 60.8s

didn't sound *underpowered*; it's just that one won't regret having a big amplifier to drive any Magico loudspeaker.

Spatially, the speed and continuousness of the two drivers serves well those who relish dimensionality in the listening experience. SACDs and Pure Audio Blu-rays from the Norwegian 2L label often provide seating diagrams for the musical forces as they were recorded, including a program of wind ensemble pieces performed by the Royal Norwegian Navy Band (*Symphonies of Wind Instruments*). For works by Hindemith, Schoenberg, and Rolf Wallin, there are two semi-circles of woodwinds closest to the conductor, a ring of horns, percussion and tubas behind them and, across the back, a straight row of trumpets, cornets, flugelhorn, and trombones. Morten Lindberg's recording is simply miked and the Magicos recreate the disposition of the players just as depicted in the liner notes. Soundstaging is similarly impressive, whether the recording is out to represent a real space (Kingsway Hall for Decca's *La Fille mal gardée*) or an intoxicatingly expansive artificial one ("Why Worry" from Dire Straits' *Brothers in Arms*).

Needless to say, Magico's S1 Mk II isn't a perfect loudspeaker. While the S1 Mk II is undeniably a full-range speaker, it's still a relatively small one, and if your room is big, and your taste runs to large-scale music, and you like to listen to that music at life-like levels, you're going to be disappointed. More existentially, we all know that there *is* no such thing as a "perfect loudspeaker." That transducer would have to produce sound that, objectively and subjectively, was indistinguishable from the real

thing—and that ain't happening, at least in my lifetime. Because of this inescapable fact, we audiophiles find ourselves having discussions about the merits of speakers voiced according to "taste" as opposed to those designed strictly by the numbers. All the finest loudspeakers, of course, employ both approaches. But more successfully than most, Magico begins with theoretical constructs and then undertakes a lengthy and methodical course from computer to test bench to factory to listening room. They create products that both measure well *and* excite the brain's pleasure centers as effectively as loudspeakers of the "as you like it" school, to use JV's terminology.

Magico has steadily moved its family of products forward in its entirety. Remember, there was a time when Magico's enclosures were made primarily of wood; now they're all-aluminum, save for the M Series (which uses carbon fiber and aluminum). For the S Series and Q Series, Alon Wolf has his "platform" established and continues to advance the performance of the drivers and other components he puts into these optimized enclosures; significant engineering accomplishments achieved in the most exalted Magico models will ultimately inform the design of all the speakers produced in the Hayward, California, factory. The Magico S1 Mk II is, indeed, as much of a Magico as the S7 or the Q7, and must be a top consideration for anyone in the market for a loudspeaker up to \$20k. As the saying goes, it "comes from a good family." *tas*

## Equipment Report

# Paradigm Persona 9H

Sleek, Sophisticated, Stylish

Anthony H. Cordesman

Photos by Dennis Burnett

**L**et me begin with the conclusion. The Paradigm Persona 9H is a new assault on the state of the art in speaker design by one of Canada's leading companies. It may cost some \$35,000 a pair, but it's one of the best speaker systems I have ever had the opportunity to listen to or review.

The Paradigm 9H has superb upper-octave and midrange response, and it can deliver flat, detailed, and room-corrected bass that normally requires a massive separate subwoofer. Soundstaging and imaging are equally excellent. As is the case with every top speaker, the nuances of its voicing and physical style are matters of taste, but this is a truly exceptional product that merits high praise.

Why begin with the ending? Because it is all too tempting to focus on the Paradigm 9H's exceptional bass and room-correction features, and this would be distinctly unfair to the speaker. The Paradigm 9H joins the Legacy V and Legacy Aeries in showing that room correction can really work and provide truly accurate deep bass, even in a speaker that is relatively small by reference-quality standards.

In recent years I have been steadily more impressed with the fact that today's speakers have

improved to the point where the average real-world listening room is more of a problem than flaws in the transducer. Really demanding experimentation with speaker placement, room treatment, and the use of separate subwoofers can get around this, but often at the cost of letting the audio system dominate the décor, making a dedicated listening room a necessity, and still living with significant problems in the mid-low to low end.

### Features and Technology

Paradigm describes the 9H as a "6-driver, 3-1/2-way hybrid floorstanding system with active-bass acoustic suspension. Its room correction only applies below 500Hz, and there is no room correction or active circuitry that plays any role in affecting the sound of your system in a range from some 40kHz to 500Hz."

On the face of it, the Paradigm 9H's frequency specifications seem almost too good to believe:  $\pm 2\text{dB}$  from 19Hz–45kHz on axis, and  $\pm 2\text{dB}$  from 19Hz–20kHz off axis. My limited home test gear isn't close to the level of confirming whether such specifications are accurate, but the 9H does have better in-home RTA, pink noise, and warble tone measurements, once it is room corrected, than any



## Equipment Report **Paradigm Persona 9H**

other speaker I have reviewed. Paradigm also has very advanced test facilities, and a good reputation for making honest claims.

More importantly, listening tests also show that the 9H is a superbly integrated speaker without any audible peaks or colorations at any point in its frequency range—and not simply at low or moderate listening levels. It easily deals with complex dynamics up to listening levels that go far beyond my taste and tolerance.

While it may or may not matter in your system, the 9H is also exceptionally efficient. Its sensitivity is rated at 96dB in-room—which is high enough to allow you to use certain low-powered triode tube amps for the treble and midrange (and let the 9H's active electronics handle the bass). The room correction in each of two pairs of woofers is used in conjunction with separate DSP-controlled 700W amplifiers—providing a total of 1400W RMS (2800W dynamic peak).

In the mids and treble, the Paradigm 9H is rated for use with amps from 15 to 500 watts, and could take all the power my ears could stand from a pair of PS Audio BHK Signature 300s without coloring the peak passages from music like Saint-Saëns Third Symphony. As for rock, this is a speaker where you would have to push even bass synthesizer and guitar sound to ear-damaging levels to hear coloration in anything approaching a normal listening room. Its combination of power and efficiency helps give the Paradigm 9H outstanding life and dynamic realism even in very loud, complex passages.

The treble and midrange drivers are also exceptional and as important to the 9H's success as its bass drivers, power, and room correction. The speaker has a 1" beryllium tweeter and a 7" beryllium



midrange driver, crossed over with third-order slopes at 2.4kHz and 400Hz. It is the first speaker I've heard with a beryllium midrange, and while I've come to be extremely cautious about singling out any given driver material or technology as uniquely better, these particular beryllium drivers do provide remarkably clean and detailed sound over an unusually wide, stable listening area. They are as good at keeping solo instruments and "small music" natural in imaging and depth as they are at resolving the soundstage details of complex operas and choral music.

Once again, I've found that enclosure design tends to be like driver design; individual design-

ers may favor one choice over another, but the execution of a given approach tends to be more important than the particulars. In the case of the Paradigm Persona 9H, the manufacturer states that "completely inert enclosures begin with seven layers of wood composite material and viscoelastic adhesive placed in a custom press. The enclosures are treated with radio-frequency energy to accelerate the curing process, which takes almost a week to complete. The result is a strong, constrained-layer-damped enclosure that's the perfect acoustical foundation to build upon."

It is well worth looking at the Persona 9H brochure on the Paradigm website to get an idea of just how complex the enclosure bracing and subwoofer layout is. This is critical in a speaker that utilizes four ultra-high-excursion 8.5" woofers and relies on a balanced vibration-canceling configuration (two front-firing, two rear-firing) to go so low in the bass, uses full room correction, and delivers even the lowest bass at high levels when the musical dynamics require it.

I got better and smoother bass out of the Paradigm Persona 9H in a variety of room locations than I have with any other system that did not have room correction. Moreover, it outperformed any other pair of speakers—or pair with separate subwoofers—that did have room correction. It measured better; it did a better job with a wide range of bass warble tones; and, most importantly, it sounded better with organ, jazz, rock, and the kind of sonic spectacles you may hate as music but can't resist using to test your system.

Its size is also remarkably easy to live with. The 9H isn't small, and each enclosure does weigh 190 pounds. Its measurements of 11.875" x 51.75" x 20.5" are also scarcely petite. At the same time,

this is still a size that is compatible with most real-world listening rooms, most decors, and most partners and roommates. Its form factor is particularly critical when so much bass power has to be delivered in a relatively small package.

Talking about a speaker's wife acceptance factor (WAF) is now deservedly "DWM" and politically incorrect. At the same time, most of us are going to appreciate having a speaker that does not dominate the room but does have the ability to use its room correction to equal or outperform far larger integrated speakers and systems with separate woofer towers or pairs of properly located subwoofers, *and* avoid highly visible room treatment. Unless you like being a hermit (hermitess?) in your sound room or audio cave, there is real merit in being able to listen casually to music, and demonstrate your system to non-audiophiles as if the music were what matters, and you hadn't turned the system into an object of pagan worship.

About the only caveat I can think of in this respect is that the Paradigm 9H has good techno styling, but it also has exposed drivers with mildly psychedelic grilles over its tweeter and midrange driver. Exposed drivers are scarcely uncommon in high-end speakers, but some of us work, live, and play with non-audiophiles. Many visitors liked or ignored the 9H's physical design, but were more than mildly amused by the tweeter and midrange's unique driver grilles. These grilles' unusual design and appearance, however, serve an important technical function, as explained in the accompanying interview.

### The Music

Let me again stress that the Paradigm 9Hs have far more going for them than superb bass perfor-

## Equipment Report Paradigm Persona 9H

mance. I used them as well as my own reference speakers—the Magico S7 and Legacy Aeris—in trying the new PS Audio Directstream Memory Player. I had some initial doubts about the ability

### SPECS & PRICING

**Type:** 6-driver, 3-1/2-way hybrid floorstander with active-bass acoustic suspension

**Crossover:** Third-order electro-acoustic at 2.4kHz (tweeter/mid), third-order at 400Hz (mid/front bass), second-order at 200Hz (rear bass)

**Amplifier:** Each woofer pair is powered by a separate DSP-controlled 700W RMS amplifier

**Room correction:** Anthem Room Correction, with included calibrated microphone

**Frequency response:** On-axis, ±2dB from 19Hz–45kHz; 30° off-axis, ±2dB from 19Hz–20kHz

**Drivers:** 1" beryllium dome tweeter; 7" beryllium mid/bass; four 8-1/2" woofers

**Sensitivity:** Room/Anechoic, 96dB/93dB

**Impedance:** Compatible with 8 ohms

**Suitable amplifier power range:** 15–500 watts

**Maximum input power:** 400 watts

**Dimensions:** 11.875" x 51.75" x 20.5"

**Weight:** 190 lbs.

**Price:** \$35,000/pr.

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of any new disc player to reveal more of the music on CDs, SACDs, and high-resolution discs like the Reference Recordings HRx series of 176.4kHz/24-bit discs—as well as some high-resolution discs made by my friends.

The tweeter and midrange in the Paradigm 9Hs did a superb job of revealing fine transient details in the midrange and highs, and making it immediately apparent that the PS Audio Directstream Memory Player did make real—if subtle—improvements in the sound of virtually every type of disc, in a direct comparison with transports like the Oppo BDP-105D and the earlier PS Audio. The improvement in life, detail, and upper-octave clarity was most striking with CDs, but it was also apparent with SACDs and even with the 24-bit/176.2kHz versions of number of Keith Johnson's (and other Reference Recordings) discs that will be familiar to many audiophiles—*Exotic Dances from the Opera* [Reference Recordings HR-71], *Rachmaninoff Symphonic Dances* [Reference Recordings HR-96], *Arnold Overtures* [Reference Recordings HR-48], and *Crown Imperial* [HR-112].

I'm not sure that rediscovering the sonic improvements made by today's most advanced digital transports will lead to a rebirth of optical and digital discs in the way that better hardware and software have led to the rebirth of the LP. Nevertheless, it did make me think hard about shifting fully from disc to digital storage. More importantly, the ability to make these nuances audible showed just how good the Paradigm 9Hs could be in resolving depth (when the recording has such data), preserving soundstage integrity and image size, and handling the full range of instruments—strings, brass, woodwinds, percussion, and organ. There is no way to adequately describe the

differences in nuance and voicing between three great speakers like the Paradigm 9H, the Magico S7, and the Legacy Aeris without writing a whole new review, but even if one ignores the bass, the 9Hs are clearly competitive. And no audiophile can ever really ignore the importance of bass or the impact of a listening room. The Magico S7 has truly excellent and deep bass, but it does not have room correction. I have to use them with a pair of carefully calibrated Golden Ear XXL subwoofers so I can place them where they provide the best soundstage and midrange and treble performance. The Legacy Aeris has a separate DAC/pre-amp/room correction system called the Wavelet that provides both bass and full-range correction and equalization features. It does provide a wider range of correction that includes room reflections, but the speaker does not go as deep with as much power as the Magico or the Paradigm. Life is filled with trade-offs.

The Paradigm Persona 9Hs not only provided the best overall bass response I've had in my listening room, it did so when playing back deep bass at subwoofer frequencies and loudness levels. It virtually eliminated the mountain-sized bass resonance peaks that are inevitable in most real-world listening rooms, and it filled in much of the equally deep valleys in bass response. I've been listening to room correction systems since the days when loudspeaker manufacturer Snell began to experiment with the technology and when Tact introduced full room correction. The 9Hs is the first speaker I've heard aside from the Legacy Vs that can really provide full correction of the bass and do so with extraordinary detail at almost any rational listening level.

I do have some cautions about the result. If you

are not familiar with flat full-range bass, you may initially feel that room correction slightly reduces the apparent bass performance of a speaker. We are accustomed to hearing the impact of the resonant peaks in our speakers, and their sudden absence takes some getting used to. It is only when you listen to the entire range of bass music over time that you realize how much more lower-octave detail is available, and that bass peaks are no longer adding at least a slight one-note character to the low end and no longer partly masking the midrange and treble. It is also only when the bass truly extends to frequencies you sense more than hear—below about 35Hz—that you realize how much the deep bass can contribute to musical life and realism. It is only when low-end response is truly smooth that you realize how many minor room resonances and vibrations are no longer being excited by the bass. Put simply, there is far more to the low end than 1812 cannons, bass drum whacks, excessive synthesizer and bass guitar bass lines, and organ notes that vibrate the walls and the couch.

### The Realities of Bass Room Correction

There also are several points about the realities of bass room correction you should be aware of. First, it in no way affects the need to place your speakers in the best spot to provide a realistic soundstage and the best overall mix of bass, midrange, and treble. If anything, the more revealing the overall response, the more placement details matter and the better the bass response will be after room correction. Good placement without correction means less correction is required, and better results when it is applied in the bass. (The room correction software does provide a quick mea-

## Equipment Report **Paradigm Persona 9H**

surement setting to allow you to measure different speaker placements and minimize the amount of room correction.)

Second, the lack of bass peaks does affect the apparent level of midrange and treble energy, and the 9Hs have relatively flat upper midrange and treble response. This can give the impression of a slight hardness or of excessive energy in the upper midrange with violin, harpsichord, soprano voice, woodwinds, and brass—particularly with many recent recordings where the miking is too close and the production values apparent detail over natural musical warmth.

Engineering purity is all very well, but I want to listen to the music and not the equipment. This is why I like the full-range correction features of the Legacy Wavelet, although the Bohmer room correction in the Wavelet DAC/preamp/room correction electronics emphasizes different aspects of sound quality than the bass-oriented ARC-2 system used in the 9H. The Paradigm 9H does not have such options, but you can accomplish a great deal by experimenting with different placement of the mic when you set up the room correction, by finding just the right toe-in and spacing for the 9Hs, and by experimenting with minor adjustments in the distance of the speakers to side and rear walls to minimize any excessive upper-midrange energy.

A number of reviewers question whether speaker midrange and treble energy should measure flat or be rolled slightly downwards. As a classical music and jazz fan I have mixed feelings about older recordings, and many more modern recordings that emphasize natural musical warmth. Speaker voicing of any kind will favor one set of recordings, cartridge, DAC, preamp, amp, and set of wires

over another.

I don't believe that this is a problem that should be solved at the speaker. Loudspeaker crossovers are complex enough as it is, and a speaker designer can really only voice the non-active circuits inside in one way. It is a problem that needs to be solved by making more musically realistic recordings and/or by providing some form of equalization in the preamp or some outboard unit, rather than in the speaker. As far as I'm concerned, high-end electronics designers really need to rethink their design goals. They need to get away from the "less-is-more" approach to front ends and DACs and/or digital preamps.

I'd like to see high-end electronics designers provide the ability to "tilt" the overall frequency response up or down over the entire frequency range—or at some point from the upper bass to the highest frequencies—by at least several dBs from "flat." I'd also like to see the option of being able to slightly dip the upper midrange. Apparent musical realism, not specsmanship and simplicity, should be the real goal of high-end sound.

Third, for all these reasons, be careful if you visit a dealer to hear the 9Hs. Listen with and without room correction. Make sure the speakers are properly placed in the showroom, and—if you decide to buy—make sure the dealer has the skill and willingness to help you with an initial setup that really suits your ear and taste. Bring your own favorite bass spectaculars, but also bring at least a couple of your best recordings of music you really love. This is a remarkably coherent, detailed, full-range speaker, and you should judge it accordingly.

Fourth, if you plan on doing your own setup of the ARC-2 room correction system used in the Paradigm 9H, be aware that it requires the use of a

PC—devices that approach the work of the Devil and/or embracing the dark side of the Force to a Mac user like me. The instructions in the manual also are only "acceptable," and I'd check for updates to both the instructions and the software at the Paradigm website before running the program. At the same time, downloading the software is easy, setup is quick once you get the hang of it, and the display shows you the before and after measurements. As for Mac users, many online software and black magic stores do sell an application that allows you to run Windows on your Mac.

Finally, I'm not sure that a detailed explanation of the technology behind the ARC-2 system is really needed, and many audiophiles will rely on dealer setup. But, people and speakers do get moved, and high-enders love to tweak and fiddle. Accordingly be aware that you can readily find out the technical details and get some good high-tech reviews by putting "ARC-2 room correction" into your computer search routine. (Be aware that the ARC-2 system in the 9H is designed and used in very different ways than the ARC-2 in Anthem receivers, and for home theater.)

At the same time, you should also be aware that Paradigm speakers and the manufacturers of the Anthem ARC-2 room correction system are one company, and the Paradigm is designed around its proprietary room correction system. This allows it to correct for dips of up to 6dB and peaks of up to at least 30dB.

I'd dearly love to see the Anthem aside of Anthem-Paradigm make an outboard ARC-2 unit that could be adjusted to suit any given speaker. In the interim, however, I've found that past attempts to provide universal room correction that cannot be tailored to an individual speaker's design often fall

seriously short of providing the best performance in dynamics, power handling, and distortion. Both Paradigm and Legacy avoid this by ensuring the speaker's capabilities match the room correction and vice versa—although they take very different approaches. The results really pay off in superior sound quality.

### Summary

One of the best around. Highly recommended.



## Equipment Report **Paradigm Persona 9H**

### A Conversation with Paradigm's Oleg Bogdanov By Robert Harley

■ The Persona line is in some ways a radical departure for Paradigm; in other ways it is a logical progression for the Canadian manufacturer. The company is best known for its affordable speakers that combine high-end design with economy-of-scale manufacturing. In the past, creating flagship products with cutting-edge technologies just wasn't in Paradigm's wheelhouse. But Persona is also a natural step forward because it represents the culmination of everything Paradigm has learned about making



speakers over the past 35 years. One could argue that the discipline of three-and-a-half decades of building speakers to strict price points is the ideal foundation for creating a much more ambitious and expensive line such as Persona.

For some background on the Persona's genesis and technology, I spoke with Oleg Bogdanov, Director of Product Development.

**Tell me how the Persona project came about.**

**What were the inspiration and the goal?**

It's been about five years in the making. We wanted to create a speaker that would really make a statement, that would cover the full range of human hearing, playing at 120dB over the widest range of frequencies from below 20Hz to beyond 20kHz.

**Was there a concern about a company known for making affordable, high-value speakers producing a \$35,000 product?**

We have never offered a speaker in this price range, but we're known for providing performance and value. We're not a brand that just makes it cheap. Our approach is to provide performance and features that would cost way, way more from other companies. We can do it efficiently and provide good value.

Consumers will definitely see and appreciate the value in the Persona even though the price is higher than we ever had before at Paradigm. But at the same time, it's pushing features and technologies that are not available at this



price—and maybe not available at all from other companies, such as the 7" beryllium midrange driver. Beryllium is very light, very rigid, and has very good damping. There may be one or two other companies with that technology, but we're talking a six-digit price range. Beryllium diaphragms are just one of the technologies we use.

**Did you develop the beryllium cone technology in-house?**

We partnered with a company called Materion, which mines beryllium in Utah and processes it into 99.9%-pure beryllium foil. Based on our design, they made a tool that creates the cone's

shape and thickness. We then assemble the drivers here in Canada.

**Let's talk about some of the other technologies in the Persona, starting with the differential-drive woofers.**

We originally developed differential-drive for subwoofers. It improves the motor design and makes the driver much more linear. We take a very long voice-coil bobbin and put two voice-coil windings on it, wound in opposite directions. Each coil is sitting in its own magnetic gap. The magnetic fields of each coil are in opposite polarity, but the force that each coil generates

## Equipment Report Paradigm Persona 9H

### A Conversation with Paradigm's Oleg Bogdanov Cont'd

■ adds together. This has many advantages, including lower distortion, higher power handling, and better heat dissipation, and thus less thermal dynamic compression. The long voice-coil former and dual spiders create a very stable mechanical structure that will not rock from side to side or add any extraneous noise when pushed to high excursions, as conventional drivers do. The differential-drive and woofer-suspension structures allow greater excursion, which is related to how loudly the system can play at low distortion levels. The differential-drive woofer contributes to the Persona's sense of ease and effortlessness.

#### Why did you make the Persona a hybrid system, combining a passive midrange and tweeter with internally amplified woofers and DSP room correction below 500Hz?

We quickly realized that achieving our lofty goals would be impossible with a passive speaker. For example, to extend the frequency response to 20Hz in a passive speaker would require a much larger cabinet. The result would have been a large box that was difficult to place in a room. We wouldn't have been able to incorporate room correction if it were passive. Without room correction the frequency response will be very different in different rooms, and with different placements in the same room. Room correction and active woofers give us the ability to have flat response in the bass down to 14Hz and consistent performance from room to room.

Also, the combination of powered woofers and a high-efficiency midrange and tweeter means that even very low power amplifiers, including tube amplifiers, can drive the Persona to sound-pressure levels that are unheard of in a less-sensitive speaker. *[The 9H has a rated sensitivity of a whopping 96dB.—RH]*

#### Tell me about the enclosure.

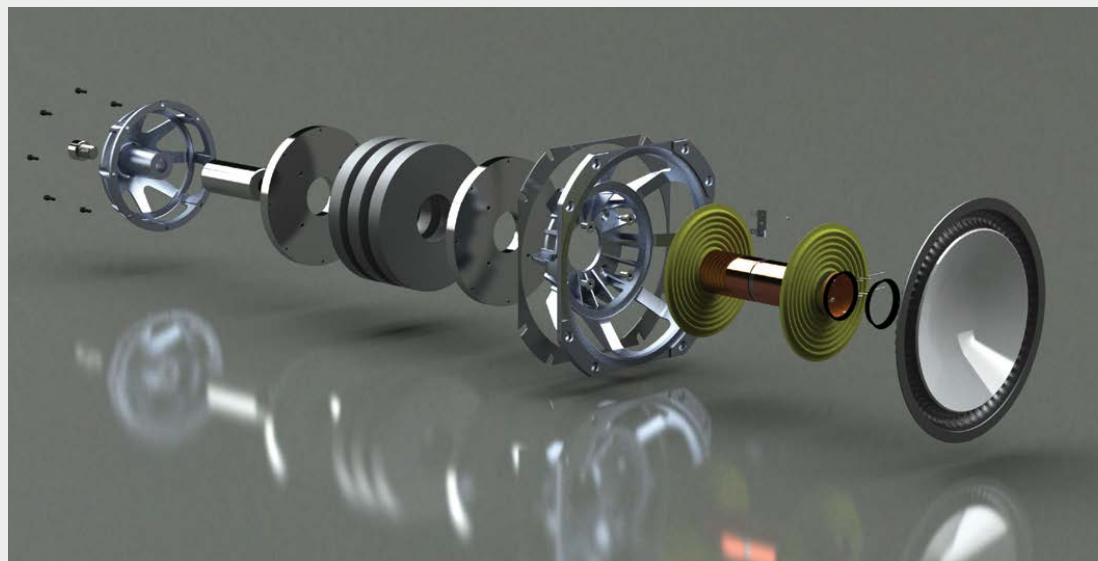
One of the challenges was combining all those elements into a relatively compact enclosure that was attractive. The industrial designers did a great job in creating the shape, but the next challenge was how to manufacture the enclosure. The enclosure is made from seven layers of wood

composite, with layers of vibration-damping adhesive between them. It's bent into shape in a press *[see photo above]*, and the adhesive is cured with a burst of microwave energy. The back of the speaker is curved, and that curve meets the top and bottom surfaces at an angle, which creates challenges. The solution was to use five-axis CNC machines at a level of sophistication we'd never tried before. The CNC machines do all the cutting and carving to create the complex curvatures and angles. *[See Paradigm's website video showing how the cabinets are made.—RH]*

One important element we haven't talked about is the Perforated Phase Alignment (PPA) lenses in front of the midrange and tweeter.

These are non-removable because they are an important part of the acoustic design. The PPA lenses over the midrange and tweeter solve a fundamental problem with cone and dome drivers. As the frequency of the sound increases, at some point the sound's wavelength becomes comparable in size to, or even smaller than, the cone in the case of the midrange driver or the dome in the case of the tweeter. When that happens different portions of the dome or cone become their own point sources. This causes phase difference cancellation due to the different distances from the ear to different portions of the cone or dome. The sound from one part of the cone or dome travels a shorter distance to the ear than the sound produced by a different part of the cone or dome. The two waves combine constructively to increase the sound's amplitude at certain frequencies, or combine destructively to decrease the sound's amplitude at other frequencies. You get a series of small peaks and dips in frequency response.

The PPA lenses block the out-of-phase sound so that it can't combine with the in-phase sound. We get flatter response, particularly off axis. Even at 30-degrees off axis the Persona response goes out to 20kHz. That means there's no limited sweet spot. There's a very wide area where you can listen and still have it sound good. The image doesn't collapse as you move off-center. Two people can sit side-by-side and still hear a good soundstage and flat frequency response. The patent-pending PPAs are a striking feature of the Persona 9H. **t85**





## Equipment Report

# Legacy Aeris with Wavelet Processor

## Wishes Granted

Anthony H. Cordesman

**I**n my initial review of the Legacy Aeris (Issue 235) I found that it was an excellent speaker for its price. The addition of the new Wavelet processor, however, makes a great speaker even better.

The Wavelet is a stand-alone electronic processing component that combines a DAC, a digital and analog preamp, electronic crossover, and far better room-correction features than were provided by Legacy's original Wavelaunch processor for the Aeris. The end result is a combination that integrates electronics and speaker design in ways that not only do more to solve room-interaction problems, but produce cleaner and more musical sound at every dynamic level.

The Wavelet also provides the kind of defeatable adjustments in the bass and the lower midrange that should be in the electronics and not the speaker, and which can help make many recordings sound more musical and realistic. Moreover, the Wavelet is the answer to my one major wish for an improvement in the original Aeris design: It provides automatic set-up and room-correction adjustment features. In fact, they are a snap to operate.

The combination of the Aeris and the Wave-

let are also relatively affordable by the steadily escalating pricing of the high end. The Legacy V that I reviewed in Issue 258 is the best speaker I've encountered with room compensation, but it costs \$49,500—daunting even to most dedicated high-end audiophiles. Legacy has adapted the same Wavelet unit it developed for the Legacy V for use in the Aeris at a much more affordable \$24,475. Moreover, users who already have the Aeris can buy the Wavelet for \$4950, and the price for a consumer who wants to trade-in his original Wavelaunch processor supplied with the Aeris will be \$3450.

### Key Features of the Aeris

I'm not going to repeat most of the content in my initial review, but even a brief look at the photos of the Aeris in the Legacy website will show you that it is one of the most attractive pieces of sculptured woodwork in audio.

To provide a short refresher course, its features include:

- A cardioid-shaped radiation pattern to decrease boundary coloration from sidewalls while decreasing modal sensitivity at low frequencies.



- Increased dynamic range and waveform tracing accuracy by employing drivers with higher sensitivity and greater acceleration. The high-flux magnetic motors of the midrange drivers are larger than on most bass drivers.
- The Legacy dual AMT (Heil) design employs a 4" folded ribbon that hands off to a similar 1" unit at the shorter wavelengths. The AMTs integrate with a high-efficiency 8" midrange that together cover over seven octaves at a sensitivity of 98dB, and that I found helped produce something close to point source sound, in spite of the Aeris' overall size, and to be smoother and more natural in the midrange and treble than any similar driver I've yet encountered.
- A titanium-encrusted 8" midrange with an enormous motor structure imported from Italy.
- A 10" mid/bass and dual 12" subwoofers with a linear volume displacement of nearly 200 cubic inches. The bass section is powered by a cumulative 1000 watts of included ICEpower Class D amplification and offers exceptional extension to 18Hz. (Separate 500-watt

- full-bandwidth ICEpower amplifier modules are used for each of the 12" woofers to reduce intermodulation distortion and prevent the user's main amplifier from encountering up to 40 volts of back EMF generated by the Aura motor system used in the woofers.)
- Reverberation is minimized by reducing side-wall 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. Listening panels in controlled trials have determined that imaging precision and soundstage width is consistently improved over the Legacy Focus system, for example, which exhibits an otherwise-similar monopolar driver layout.

### The Wavelet's Key Features

The new Wavelet provides a far more flexible and capable package of electronics than the combination of the Aeris and the Wavelaunch electronics that I reviewed in Issue 235. The Wavelet is a full-featured outboard analog and

## Equipment Report Legacy Aeris with Wavelet Processor

### SPECS & PRICING

**Type:** Frequency- and time-domain-optimized 4.5-way loudspeaker with directivity controlled array

**Tweeter:** 1" AMT neodymium ribbon

**Upper midrange:** 4" AMT neodymium ribbon

**Midrange:** 8" cast-frame, titanium-encrusted diaphragm, dipolar configuration (open baffle)

**Midbass:** 10" cast-frame, carbon-fiber/pulp diaphragm, dipolar configuration (open baffle)

**Bass:** Dual 12" aluminum diaphragm, Aura neodymium motor, sealed enclosure

**Frequency response:** 18Hz-30kHz +/-2dB

**Impedance:** 4 ohms

**Sensitivity:** 95.4 dB @ 2.83 volts/1m in-room

**Recommended amplification:** Bass section is powered internally with dual 500-watt

ICEpower amplifiers; 30 watts or greater required for upper section

**Crossover:** 80Hz, 2.8kHz, 8kHz

**Inputs:** 1 pair of external binding posts, 1 XLR balanced inputs

**Dimensions:**

14.5" x 58" x 16"

**Weight:** 171 lbs.

**Price:** \$22,975

### LEGACY AUDIO

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digital preamp. It also provides automatic setup, including adjustment of the levels for its electronic crossover and channel balance, and far better room compensation than the earlier Wavelaunch—compensation that helps eliminate the coloration from unwanted room reflections.

The Wavelet includes two pairs of XLR and two pairs of RCA stereo inputs, and USB, RCA, and optical digital inputs for connection to an excellent 24-bit/96kHz DAC with switchable apodizing filtering. There is also an Ethernet port to keep the unit's software and firmware up-to-date. Wi-Fi operated remote-control software can be loaded into a iPad or smartphone, and provides precise volume and balance settings as well as a number of other features most

modern preamps lack.

Features also include easy switching between room-controlled and uncompensated sound, and settings for normal and reverse-stereo or mono operation. The unit also has four different settings for dynamic expansion, and one of the most practical equalization settings I've encountered. You can adjust playback as required to suit your taste or individual recordings. There are now four faders for bass-frequency contours centered at 50Hz, 100Hz, 150Hz, and 300Hz, a spectral tilt control hinging at 1kHz, and a brilliance control at 13kHz. The faders are visible on-screen at your remote and their effect is audible in real time. These controls are far more practical in compensating for the real-world differences in recordings than all but

the most advanced parametric equalizers. The latest software update allows the user to store/recall up to eight different contour settings.

### The Wavelet's New Approach to Room Correction Software

The Wavelet does retain several important software features that were in the Wavelaunch.

Built-in software uses an algorithm to divide 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 for you or your installer to make adjustments in your room.

Software includes an empirically derived algorithm that is integrated into the speaker design to compensate for the losses in low-frequency separation in most listening rooms by increasing the ratio of difference information in bass frequencies to more closely approximate half space (free space with ground plane).

What is radically different about the Wavelet, however, is that it debuts Bohmer acoustic processing. This is a system that can optimize the loudspeaker/room acoustic-transfer function in both the frequency and time domains. It uses a new set of algorithms, and starts with a psycho-acoustically based measurement method with the provided calibrated microphone.

Alignments are then individually optimized within an unprecedented 40ms window by way of a setup using a calibrated microphone and

wireless iPad, smartphone, or computer. The result is audibly improved transient response that allows the Aeris to operate accurately and consistently in any listening environment.

And here, let me stress a set-up feature that I failed to give proper emphasis in my review of the Legacy V. You do not put the mike at the listening position and try to average out what can often be serious variations in response in the bass with minor differences in microphone height, or if you rely on one seating position for setup, or try to create average settings over a wider area of listening positions. Instead you set the mike on axis with the Aeris' tweeter at a distance of 48" and then move it twice per channel—once to check phase and set the crossover and balance and once for room correction. I found the end result worked well with a wide range of speaker and listening positions, and produced consistently accurate measured results, where other units I've tested that place the mike in or around the listening position sometimes produce strange settings because the mike just happens to be in the wrong position. Moreover, no amount of tweaking the settings on the Wavelet to their extremes presented digital processing problems—something that can happen with room-correction devices that have more features than processing power.

The only limits I find to the Wavelet's features that will have an impact on most audiophiles are first—like virtually every preamp now on the market—it does not include a built-in phono section. Second, it uses Wi-Fi for remote operation, and while it works well with a decent Wi-Fi system, I prefer to use a computer with a wired connection.

## Equipment Report Legacy Aeris with Wavelet Processor

I should also note that the Wavelet does not attempt to get into the hi-res equivalent of the horsepower race at 384kHz and 32 bits. Legacy notes that “higher resolution files such as PCM and DSD can be readily played back through the Wavelet using software such as JRiver.”

In practice, however, I don’t find a limit of 192kHz/24-bits to be real-world limitation to sound quality. The room correction and other DSP processing in the Wavelet are very advanced. It uses an Analog Devices processor with an internal processing sampling rate of 96kHz and bit depth of 56 bits—a bit-rate that Legacy states is “56 bits of depth in a domain more than one trilliontimes finer in resolution than that of a standard CD.”

When it comes to actual recordings, I have not yet heard any reason to even go as high as 192kHz. Some of my colleagues disagree, but I have so far found rates above 96kHz/24 bits to be a waste of money. I do buy the 96kHz/24-bit version of the music I download or stream for safety’s sake, but most of the time, a good 16-bit/44.1kHz version of the same mastering of a recordings will sound exactly the same. One has to be very careful in paying what usually is nearly twice as much for the 96kHz/24-bit when there is no way to hear whether there is any difference, particularly with a modern DAC with really good filtering. Oddly enough, the better your DAC, the less likely you are to hear any difference.

As for streaming DSD, most DSD recordings have already gone through some form of PCM mastering before they are issued in DSD form. Moreover, I have yet to hear any comparison test that indicates high-rate DSD recording sound

better than 96kHz/24-bit recordings. I do keep my SACD player, but largely because I love classical music, and the SACD versions on disc are usually a bit more detailed and have more musical upper octaves than the CD version on the same disc. However, to the limited extent that I have heard direct comparisons of DSD and PCM files that some of my friends have made of the same performance on high resolution systems, I have heard no more superiority from DSD over 88kHz–96kHz/24-bit than I have heard from 192kHz/24-bit over 88kHz–96kHz/24-bit.

As for the rest of the Wavelet features, it does come with a small basic remote volume control, but what counts is the Wavelet app you can download for both setting up and operating the system. It provides exact volume and balance control, dynamic expansion and equalization settings, switchable room correction, and all the sophisticated control options I touch upon later. Just set up the wavelet for the form of remote control, leave it on continuously, and forget about the small remote entirely.

### The Sound

I should stress from the outset that the Legacy Aeris with the Wavelet is a very good speaker even without the room correction switched on. To repeat some key points from my first review, the treble and upper midrange are realistic without any softening or, contrarily, any touches of hardness. The treble from the dual Air-Motion Transformer (Heil) folded ribbon tweeter is extended and provides all the air I could want. Equally important, its transition to the mid frequencies of the “titanium-encrusted” 8” midrange is virtually inaudible. Many of the designs

I’ve heard that mix driver technologies have at least minor sonic anomalies in the transition areas between them and you can sometimes hear the difference.

Even without the room correction switched on, the Aeris will reproduce the midrange of my best piano and violin recordings with the kind of accuracy that is sometime missing in even the most expensive competition. It does equally well with flute and clarinet and soprano voice, reproducing the difficult passages in voice in ways that still shows the strain a given singer was under but that add nothing in terms of hardness or coloration. It does an unusually good job reproducing the most difficult instruments in the sonic repertoire, like the harpsichord, and it is as natural with cymbals as my recordings allow.

As for the bass, the Aeris will reproduce most of the bass detail that is actually on even the most demanding bass spectaculars. Saint-Saëns’ Third, the deepest organ music, Kodo drums, Telarc bass spectaculars, bass guitar, synthesizer, take your pick.

Switching on the Bohmer room correction makes improvements that are a matter of nuance, not a revolution in sound, and it can take a few minutes to realize that less room resonance is a good thing and excessive, lingering, peaky bass is not. But, there is no question that the new room correction option makes a critical difference.

The Wavelet’s room correction is subject to well-chosen limits and will not produce perfectly flat response at the cost of excessive correction. It can still compensate to a great degree, however, for really bad speaker placement in

areas where there is too little bass or too much. It provides a capability that will make a vital improvement if you have a truly bad room, or you have to use a setup that is less than optimal because of the décor or other reasons. It does enough to get rid of the worst peaks—peaks which not only give the sound something of “one note bass character” but also excite room resonances and mask the midrange, the highs, and the details of the rest of the bass.

What is even more important to me, however, is that it also produces major sonic benefits even in a good room and a good location. The bass is much tighter, and transients are far better defined. You can hear the full range of bass without dominant peaks and fewer apparent suck-outs. Higher-level dynamics are cleaner, particularly in the bass. The Aeris does not have all of the power and bass detail of the Legacy V, but it can overdrive my room at every bass frequency that is musically relevant. Adding the Bohmer room correction means that the overall sound is much cleaner at higher volumes. There are fewer room-boundary problems, where higher bass levels mask the rest of the music to some degree or are too sustained to sound realistic. Room correction not only provides great bass detail, it does so more evenly.

The critical transition from the deep bass to the midbass is cleaner and more musically natural, as is the transition from upper bass to the lower midrange. This allows the Aeris to do a better job of cleanly reproducing the natural warmth of music that is present in good recordings and doing so more accurately. The middle and upper midrange and the treble become clearer when the hills and valleys in the

## Equipment Report Legacy Aeris with Wavelet Processor

bass response, and excess room resonances, are reduced. This is something I've also noted in really good speakers without room correction and that measure exceptionally smoothly in the bass in a given listening room. Getting the bass right is critical to getting the best in midrange and treble sound.

Soundstage detail and depth become cleaner and more detailed, and imaging becomes notably more precise and natural in many recordings. The Aeris' soundstage is very good even without room correction, but the speaker seems to act more like a point source with room correction engaged.

### Summing Up

The combination of the Aeris and Wavelet provide some of the most musically realistic sound I've ever encountered. They take digital processing and room correction a vital step forward, and show they can reach levels that are competitive with even the best purist speakers.

The ability to make firmware upgrades, as the interview attached to this review with Bill Dudleston (the chief designer of the Aeris) indicates, will lead Legacy and Bohmer to make steady improvements in processing, operating, and set-up features, and don't forget, as you look at the price, the Wavelet is also a really good analog and digital preamp and DAC as well.

If I now have a new wish, it's to hear what the Bohmer level of correction can do when applied to other brands of speakers. As the interview indicates, this is another wish that may end up being granted.



## AHC Talks with Legacy's Bill Dudleston

**Let's talk about the future of both your efforts in room correction and plans for the Wavelet. Any plans for a universal version of the Wavelet that could handle any speaker, including ones with a single input?**

Yes. An example is already in the works. We are introducing a 750-watt flex-powered version of our Focus speaker, which can be driven three different ways; mono-amplified internally with a single input, bi-amplified with internal crossover, and bi-amplified with the Wavelet crossover. In all three variations the Focus XD can employ the room correction. To correct a generic speaker with a single input, we will offer a basic menu of target function choices, including excursion limit protection at low frequencies, and request the user input the best fit of the speaker's radiation pattern (e.g., omni full-range, omni bass with cardioid upper range, and dipolar). Another parameter to be input will involve the number of subwoofers in use if any.

**If we can switch back to the Legacy Aeriis and Wavelet, what adaptations from the room correction for the Legacy V did you have to make to suit the Aeriis?**

The room correction process remains the same with a very similar target function as the V. However, building the V system from the ground up using the Wavelet revealed several areas where we could get more performance

from the Aeriis in the crossover region and in driver correction. Aeriis is more coherent with the Wavelet in place before the room correction is even applied.

**How is your approach to room compensation evolving? Have there been changes since the Legacy V review and what changes are you exploring? Will they all be possible through software changes?**

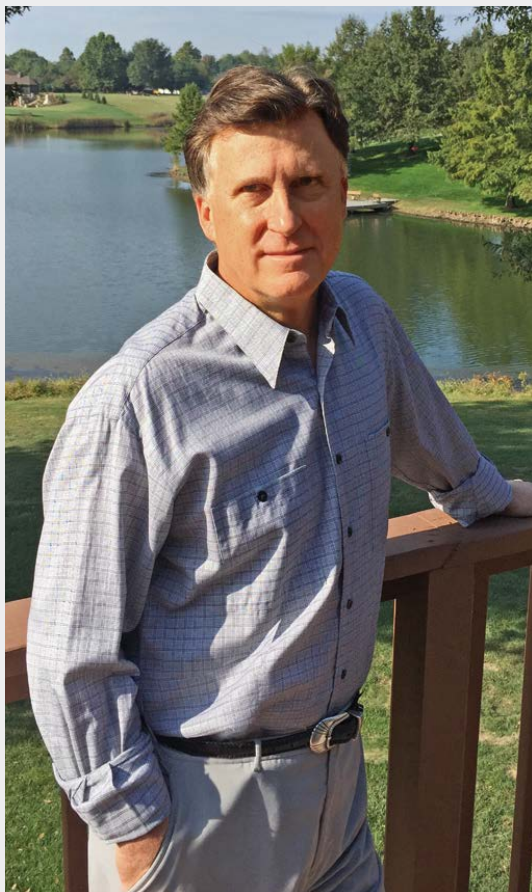
Most of the recent improvements to the software have been made to improve setup and user control, such as the polarity check and level adjustments. We are now looking at the upper range of the reverberant field more closely. Here the density of reflection, spectral balance, and relevant temporal information are being studied along with the psychoacoustic weighting of this information. All improvements will be available through software updates downloaded to the USB stick and inserting in the Wavelet port.

**The remote control features and software download commands are now accessed via Wi-Fi. Do you have plans for a wired network connection to realize software updates?**

The prototype Wavelet originally hosted its own network, but this prevented the continual improvement to the remote interface and functions. The current method provides many advantages include control of multiple units

## Equipment Report Legacy Aeris with Wavelet Processor

### AHC Talks with Legacy's Bill Dudleston Cont'd



simultaneously. Software updates will eventually be offered from the Legacy website, regardless of what port is used. Users will be allowed to subscribe to updates for a modest fee to keep the programming current.

#### Any potential for Wavelet to adopt MQA or higher sampling rates?

That really is a DSP question. The Wavelet will presently accept PCM files rates at high as 352.8kHz and higher. But remember Wavelet is not just converting a single sample of data per unit time, but correcting a 40msec window. This is equivalent to 14,080 samples to applying complex computations upon in real time.

A sampling rate of 96kHz is more efficient, consuming less processing power and sonically equivalent in the end. Think of a digital photo. A sharply focused image at 150 dpi will provide more real detail than a slightly out of focus image at 300 or 600 dpi. That is why it is the role of the Wavelet to sharpen focus in the time domain at 56 bits and then use apodizing to remove digital artifacts.

**As you know I am a strong believer in the workings of Bob Stuart's MQA. I think if audiophiles experienced it, even if they didn't comprehend the genius of the solution it offers, they would realize that sonic improvements are not to be had by merely increasing sample rates. I hope the press gives MQA the attention it deserves. The consumer must demand it for the format to gain acceptance.**

We would then most certainly consider a license. While I will personally always record live in WAV, MQA is the best solution yet proposed to deliver music to the audiophile. No

compromise in dynamics, noise floor, or audible bandwidth, yet file size is similar to a 16-bit WAV file. It is certainly a great replacement for FLAC, DXD, DSD, SACD. Today, music should not even be distributed in MP3, AAC, WMA. These formats should be used in talking appliances.

#### Your literature describes the way the Wavelet reduces room reflections, but does not describe frequency correction. How does the Wavelet do this?

First the loaded algorithm corrects the loudspeaker frequency anomalies in each channel of output, independent of the room. Let's say we have a shallow dip at 1800Hz, for example, but next to it is a sharper rise in response at 2200Hz. Previous methods would apply a broad boost at 1800Hz, and a sharp cut at 2200Hz using filters that introduce phase shift. While this can make the frequency response appear smoother at a single mike position, the ear is aware something is still wrong in the time domain and the power response. Time domain measurements substantiate this.

The Wavelet applies a totally different approach. First of all, it will not force the frequency response flat at the expense of transient behavior. It will address the cause of the problem and make a psychoacoustic correction weighing the time domain heavily. The Wavelet's software will identify domain errors introduced by stored energy in the diaphragms, which are ultimately the actual

cause of the peaks and dips. It will undergo iterative calculations to determine the most optimal solution with regard to phase to preserve transient response. It may apply a gentle lift if energy is lacking, or remove a resonance in the diaphragm material but the time domain will always be improved in the process.

The room correction continues in the same manner, with emphasis on treating errors introduced by boundary interaction. It does not merely notch response due to room resonances. It instead works to prevent these resonances from forming by looking for late arrival of redundant information in the measurement process. Resonances take quite a while to build up. Even a simple floor to ceiling axial resonances requires at least 16msec to form. The problematic buildup from the wall behind the speaker usually requires less than 8msec in comparison.

This old information is predicatively and literally fed forward in time, canceling its own presence. It is not accomplished relative to a position or multiple averaged positions in the room but relative to the launch from the speaker itself. It is unique in this manner. The process really should be described as automated loudspeaker adaptation instead of room correction. We didn't change the room a bit! **tas**

## Equipment Report

# Muraudio PX1 Omnidirectional Electrostatic Hybrid

And Now for Something Completely New

Robert E. Greene

“I had not realized that music could be so beautiful.” Thus spoke Bruno Walter after conducting in the Vienna Grosser Musikvereinsaal for the first time. His words came to mind listening to the Muraudio PX1 omnidirectional electrostatic speakers for the first time. I had perhaps not realized that music reproduced in the home could be quite like this: the purity, the smoothness, the roundness, the filling of the room, the effortlessness, the deep bass extension, the sense of speakers vanishing as sources, and the stability of the sound with respect to listener position, all combined to disarm my critical self and switch me over to the state of a listener hearing live music in a great concert hall, immersed in an ambient soundfield, albeit with the locations of instruments still clearly perceived. The experience is so different from ordinary stereo listening that it calls for some careful thought about what one wants from a stereo system. By intention, the PX1s present a unique experience—entrancing but different.

And the mechanism of this is truly something new. The PX1s are not just a slightly different

version of something else, not just another variation on themes already stated and varied by others. Most of the speakers in our world would not really surprise Rice, Kellogg, Olson, Villchur, Walker, Hughes, and the other giants of the past. They would be impressed by the refinement of execution (and the prices!) but not startled by the designs, which would seem to them the natural extensions of their own work, using improved materials technology. The big floorstanding towers of today are the speakers Rice and Kellogg would have built if they could have. But I think it is safe to say that none of the masters of the past really envisioned as a practical possibility an electrostatic speaker with panels that curved in both directions with three of them fitting together to form not a pulsating sphere, but rather a sort of pulsating kiwi fruit with a radiation pattern that is horizontally omni. One can imagine Peter Walker saying, “Jolly clever work there.”

Reviewer comments from audio shows suggest that everyone had much the same experience as my own—of being swept away on first exposure to the PX1s. But it is, of course, part of

review work to take such unified, more or less ecstatic experience and analyze it, slice it, and dice it to figure out how the speaker does what it does, and whether what it does is what one wants a speaker to do.

These sentences are not a preamble to finding fatal flaws in the PX1s later on. This won't be like the Cheater: “He's gonna build you up just to let you down.” But it will be necessary to describe the distinctive nature of the PX1s—not so much in terms of what the “right” transducer is (a question with no objective answer), but rather in terms of the differences among speaker types. Omnidirectional radiators are distinctive, without doubt, and this one is particularly so.

As it happens, I liked the PX1s just as much on the last note I heard from them (just a few minutes before they went back into their crates) as I did on first exposure. Maybe I even liked them better. But as with any speaker, the PX1 chooses a path, and one needs to understand what its path is and what its virtues and inevitable restrictions are. As I mentioned, it's different from other speakers—not a little different, with this,



## Equipment Report **Muraudio PX1 Omnidirectional Electrostatic Hybrid**

that, or the other small variation of frequency response or whatever, but a lot different. And a potential purchaser has to decide whether the difference is what he wants.

### How the PX1s Work

The frequencies below 450Hz are handled by a sealed-enclosure bass unit with three dynamic drivers, separated by 120 degrees, which have a total effective radiating area of 100 square inches. The enclosure is cast aluminum. On top of the bass enclosure is the electrostatic mid/tweeter unit made of three curved electrostatic pieces, each subtending 120 degrees, which fit together to give a continuous round unit. But the unit is not a cylinder—rather it is tapered at either end with maximum diameter in the middle and small diameters at either extreme. The effect is that the combined electrostatic units radiate in an omni pattern horizontally but, unlike what a cylinder would do, they spread their radiation vertically both up and down. The radiation is effectively uniform over a +/-8 degree window and thereby eliminates any sense of vertical beaming. The transition from woofer to mid/tweeter unit is effectively seamless, with the narrowing down of the vertical radiation to +/- 8 degrees happening much further up than the crossover frequency. However, at close-up positions there can be a hint of highs-up, bass-down.

In order to accomplish all this, it is clear that the electrostatic panels have to be curved in both horizontal and vertical directions. They have to have what mathematicians call “positive Gauss curvature”—curvature in all directions. This presents a challenge for metal-forming

because thin metal parts are usually made by rolling flat sheets with the results curving only in one direction at each point. Here, the stators of the electrostatic elements are made by hydraulic pressure-forming with heat annealing at an intermediate point in the process to prevent excessive internal stress accumulation from resulting in fracture. This is not the typical electrostatic panel we are used to, not even of the curved sort; those curve only in one direction.

The whole speaker thus has a horizontally omni pattern. Vertically, it goes from omni in the bass (as usual for enclosed woofers) to a narrowed pattern in the top end as the vertical pattern gradually narrows with increasing frequency into the +/- 8 degree directionality mentioned.

### The Sound in Tonal Terms

Let me start with the bass. This is the least distinctive part of the speaker, but it is in fact extremely good. “Gnomus” from Mussorgsky’s *Pictures at an Exhibition* arranged for pipe organ and played by Jean Guillou [Dorian] had not only the required power but also excellent definition. Pedal tones that often are undifferentiated rumbles became precise musical (and mechanical) items. These speakers supply full-range bass with superlative precision on their own and so do not need subwoofers. (The nominal -3dB point is 30Hz, but given room gain and the slow roll-off of sealed enclosures, these speakers are full-range.)

What’s needed here is power. The nominal sensitivity of the PX1s is 82dB—quite low! The otherwise excellent Benchmark AHD2 amplifier, with 100 watts into 8 ohms, 190 into 4 ohms, did

not enable the PX1s to give their best; there was clipping on orchestral climaxes at even moderate levels. So I brought over my big Bryston 14 ST, which can pretty much drive anything, and it drove the PX1s without any fuss or bother. (The PX1s are rated to accept 1000W peak power so you are not likely to over-drive them, but, say, 250 watts on bass transients won’t be as loud as one might think.) Both the Benchmark and the Bryston have clipping indicators, so it was clear what was happening in metered as well as listening terms. The Sanders Magtech would have been another obvious choice, but I was using it back at my place. (The Muraudio review samples were in fact in Paul Seydor’s home, as I did not have the space for them at that moment and as PS was partnering in the review in any case. I am very familiar with PS’s listening room and system—we live not far apart and often listen together at his place—so this was not an issue. And PS was out of town during part of the review period, so I could indulge myself in listening without being a nuisance.)

One just has to face the fact that the PX1s are not terribly sensitive speakers, and you must give them the kind of amplification they need. In this price range, this does not seem a major issue since suitable amplifiers—suitable and then some!—are available at prices far lower than the speakers themselves.

The speakers’ maximum SPL output is rated at 105dB at 2 meters (this would be around a 200-watt input for a sensitivity of 82dB, if one takes these things at face value). This is loud, especially with an omni speaker. In practice, I never felt any need at all to play them louder than where they seemed happy playing. Due to

### SPECS & PRICING

**Type:** Omnidirectional hybrid electrostatic speaker with dynamic-driver woofers in sealed enclosure plus electrostatic unit with three double-curved panels to form continuous 360-degree horizontal coverage at all frequencies, +/-8 degrees vertical pattern in higher frequencies

**Total electrostatic membrane area:** 5000 square centimeters (775 sq. in.), ultra-thin Mylar film

**Maximum SPL:** 105dB at 2 meters, on-axis

**Low-frequency unit:** Total driver area (three drivers together) 640 square centimeters (99 square inches, 33 per driver, equivalent to 11-inch driver)

**Crossover:** 450Hz, fourth-order Linkwitz-Riley

**Frequency response:** Anechoic, 30Hz–20kHz; typical room, 20Hz–22kHz (-3dB points)

**Sensitivity:** 82dB/w/M

**Impedance:** 8 ohm nominal, 2 ohm minimum at 20kHz

**Input power:** 500W (1000W, program peak)

**Dimensions:** 56" x 18"

**Weight:** 145 lbs.

**Price:** \$63,000 (active model is \$69,500)

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the speakers' omni pattern and resultant "direct arrival" loudness, this SPL is actually louder than its number suggests. In any case, 105 dB is plenty loud! Still, you do need a powerful amplifier to get out of them what they can offer. (Big bass notes can amount to a surprising lot of power for short times.)

Beyond the bass, two things were immediately striking. One was that the sound was extraordinarily smooth in both in-room and perceived response. In-room measurements were also much smoother than one usually finds. Every speaker is pushed around a little bit below around 300Hz by room effects (though the PX1s looked good from there down, as such things go), but from there on up the PX1s' RTA measurement (1/6th-octave smoothing) was uncanny in its smoothness. It matched within 1dB a very gently sloping target curve, say a 2dB droop by 10kHz. There was a very subtle broadband lift at 1kHz and a small dip at 2kHz but effectively the speakers were in-room flat up to the usual (and desirable) roll-off of the very high treble. This is as good an in-room performance as I can recall ever seeing without DSP, and far, far better than most. Moreover, it was very stable over a variety of listener positions. Usually such super-smooth curves (e.g., [regonaudio.com/Harbeth%20Monitor%2040.html](http://regonaudio.com/Harbeth%20Monitor%2040.html)) are obtainable only at a particular sweet spot, but the PX1s did the trick over a variety of listening positions. Large displacements vertically from the center of the electrostatic unit caused some irregularities and extra treble roll-off. But otherwise stability was the rule.

The slight tendency to relax a bit around 2kHz brings up another point: Above 1kHz the

PX1s generate more diffuse than direct sound compared to most speakers, and the ear's response to a diffuse field is quite different than the response to frontal arrival. This means that a speaker with more diffuse field will in fact sound different, other things being equal, than one with relatively more direct arrival and a less diffuse field. The nature of this difference is known, with the main distinction being is that around 3kHz there is a dip of about 5dB in the ear/brain's diffuse-field response compared to frontal-arrival response. Physically both responses rise, but the diffuse field rises considerably less. So diffuse sound will have in effect an audible suck-out around 3kHz. This works the other way, too—when the response of a microphone that is picking up a diffuse field is played back frontally, it will have an apparent peak of about 5dB at 3kHz. This is the reason many speaker designers have found that a dip at 3kHz makes things "sound better" (cf. Siegfried Linkwitz's website).

The effect of all this is that the PX1s, which are quite close to truly flat in in-room RTA measurement, sound pleasantly non-aggressive and natural in the 3kHz range compared to flat speakers with primarily frontal radiation. This is, in the case of recordings where a lot of diffuse field was recorded, a kind of higher truth—the playback resembles the sound the microphone picked up and hence sounds more natural.

This is not to say that the PX1s lack top-end sparkle. Sibilance in speech, for instance, is not lost. Nor is high percussion dulled. If anything, the speakers are a bit extroverted on top though not in any displeasing way. Note also that many speakers roll the RTA response off considerably

earlier than the PX1s, as a result of their tweeters becoming beamy. Played at natural levels the PX1s give front-row-center sound in that sense.

### The Spatial Character of Things and the Impressions of Instruments

The uniformity of tonal character with respect to changes of listener position is a key part of a second aspect of the speaker. One really feels *immersed* in a soundfield rather than listening into a soundfield in front of one. Now to some extent one can get this feeling from ordinary speakers if one sits very close to them. But here one gets the "nearfield" experience in tonal terms as well as in immersion terms over the whole room. One could move almost anywhere, and the tonal character of the sound would remain effectively constant. This is, of course, what happens at a concert—most of the sound there is diffuse field (cf., [regonaudio.com/Records%20and%20Reality.html](http://regonaudio.com/Records%20and%20Reality.html)), so there is little of the variation one typically gets with even relatively small changes in listener position.

The immersion in the soundfield is, however, more than a matter of tonal stability and accuracy. The imaging of the PX1s is also very distinctive. First of all, the images are rounded and not quite as tightly focused as with directional speakers. But at the same time, they are very stable. One gets a rounded image, which one might think of as more natural than a tightly focused image (whatever stereo theory might say); moreover, this image does not shift nearly as much with respect to sideways movement of the listener as it would with more directional speakers. And large ensembles sound large, too. This is all very impressive, though one

cannot help thinking for a moment that much of the scope and immersion of the experience here (and the uniformity with listener position, too) is offered in a somewhat different but effective way by the Carver ALS at a much lower price (Issue 256).

Not surprisingly, the imaging is a lot different than that provided by speakers that emphasize direct arrival. Stereo reproduced anechoically tends to make the speakers more audible as sources unless the recordings are done exactly right, and the image, while very tightly focused in anechoic stereo, is unstable with respect to head position. Here the opposite happens. The image is built in good part out of room sound and it acquires stability while losing somewhat the sense of exact focus.

This effect can be quite startling and very convincing. The Chopin Nocturne Opus 9, No. 1 in B-flat minor played by Janne Mertanen [Gradient] sounded to me considerably more like a real piano than one usually hears from a stereo system. The tonal character was exceptionally realistic, and so was the size and presence of the instrument.

By comparison, most speakers—even really good speakers—sound too small, too specific, not extended in the bass, and artificially focused in position. Grand pianos are large. A real concert piano in Paul's room would stretch almost from wall to wall (along the shorter direction). And the sound would have enormous depth and power. The PX1s were creating this impression to a surprising extent.

Similarly, Harnoy and Dussek's recording of the Schubert *Arpeggione* Sonata [RCA] had a size that matched the reality of cello and piano



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at relatively close range.

On orchestral music, the PX1's anti-miniaturization effect, if I may call it that, came into its own in a big way, as it were. My Rachmaninoff favorite, *Symphonic Dances* [ProArte], sounded enormous not just in the "soundstage" sense—which never really happens without trick signal processing (orchestras never sound 60 feet wide reproduced in a living room of moderate size)—but in the sense that one felt immersed in a large acoustic space with instruments of power and substance before one.

All this was, of course, hugely gratifying, almost hypnotically so. One had a wonderful time listening and experienced a remarkable suspension of disbelief. One could sink into the music and forget all about audio and its categories.

At the same time, smaller-scale music that was precisely recorded—*Tiden Bar Gaar*, Blumlein-recorded on Opus 3 for instance—sounded sufficiently focused to be natural, albeit without the "X marks the spot" imaging of highly directional speakers. It was different, but it was still convincing.

Also convincing were recordings of nonmusical material. The Sherlock Holmes "Boscombe Valley Mystery" recorded as a radio play by the BBC had natural speech timbres and very realistic sound effects, which could make one really jump from being startled.

If one thought about the matter in terms of, say, reverberant versus non-reverberant halls, one might suspect that more sound coming off the walls would somehow reduce resolution, would tend to obscure details. But this turned out not to be true. Pieces like the often subtle harpsichord *continuo* part in the Bach/Sitk-

ovetsky recording of the *Goldberg Variations* arranged for string orchestra were easily audible, unmasked, and very well resolved. The main effects of the extra sound off the walls turned out to be in keeping with the previously discussed tonal and imaging matters.

### And the Differences: Who is Right?

From the early days of *The Absolute Sound*, and even earlier elsewhere, controversy has raged—sometimes almost literally raged—about how stereo recordings should be reproduced. If you go back into the early years of TAS, you will find arguments made vigorously on both sides of the question of whether speakers should be directional and generate as much direct sound as possible, or whether speakers should spread sound around the room, so as to use its characteristics to help recreate an acoustic environment.

This controversy ultimately it is not a matter of right or wrong, but of what sounds most natural and convincing to you, the listener.

I am in the position of admiring good speakers of both types. When I first encountered the PX1s at the 2014 Newport show, I picked them as having the best sound—but tied with Sanders speakers, which are highly directional and about as far from the omni sound as possible. For me, either approach can work wonderfully if it is done right. And the quite-directional Janszen ZA1.1s that I was reviewing at the same time as the PX1s also offer some wonderful qualities, but quite different ones from the PX1s.

Each approach has its virtues and its drawbacks—I would not call them failings in either case—compared to the other. The omni approach with its room-filling sound has a kind

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of scale and an independence of listener position that gives some truly compelling naturalness. At the same time, one could have a certain sense that all that sound bouncing around the room was not exactly on the recording and that the space generated is in part generated by the room, and thus tends to be somewhat similar from recording to recording. And the imaging is less tightly focused and more impressionistic, albeit convincing in its stability. The choice is a personal one, since of course one cannot have both things at once.

### Overall

The PX1s are one of the all-time triumphs of speaker design. The goals that were envisioned are so nearly perfectly accomplished that one is stunned with admiration and, for me, musical pleasure. The in-room smoothness is all but incomparable, the bass is superb, the midrange and treble are not only neutral but pure and clear in true electrostatic style, and the desired radiation pattern is realized to perfection. This is really a landmark in speakers, a huge step in a new direction that previously hardly figured in anyone else's imagination, much less in reality.

And musically, I was enchanted. But the question remains: "Is this the form of enchantment you want?" If it is, if the omni sound is your audio goal, this is a speaker almost without competition. On the other hand, the controlled-radiation-pattern speakers have their own enchantments. I think of the closing lines of "St. James Infirmary": "She can search this whole wide world over, she won't find another man like me"—or a speaker like this one. A *non-pareil* if ever there was one.

### Paul Seydor comments:

With his customary thoroughness, REG has covered all the important bases in his review of the Muraudio PX1, and I concur with his enthusiastic evaluation. If, like me, you get a little tired of the way audio reviewers seem to discover fresh masterpieces each month, to say nothing of so-called breakthroughs and innovations that are in reality little else than reworkings of long-established technology, it may be difficult to appreciate a truly unique and unprecedented design such as this omnidirectional electrostatic. It represents the most original thinking in loudspeaker design since Jorma Salmi found a way to suppress the backwave in his aptly named Gradient Revolution loudspeakers. The observations that follow will involve some criticisms, but I should like them to be understood in the context of my conviction that the PX1 belongs right up there with a small handful of the finest loudspeakers ever made, and it is superior to most of them and all in all, inferior to none. My enthusiasm should also be understood in another context: I have never been a great fan of omnidirectional loudspeakers, or for that matter even wide dispersion. I prefer the greater precision and accuracy of restricted dispersion that's found in speakers such as Quad ESLs and several classic designs from the BBC school, designs that attempt to excite the acoustic characteristics of the listening space as *little* as possible.

As REG has explained, perhaps the paramount reason for the PX1's success is its exceptionally smooth, extended, and uniform frequency response. This is one really *neutral*-sounding transducer. It's truly uncanny to be able to walk

around a loudspeaker and perceive virtually no alteration in tonal balance from front to side to back to the other side. Allied to this neutrality is a dynamic range that approaches lifelike (though you do need *gobs* of power). Robert's observations about how it reproduces a piano are well worth paying attention to, since the room adjoining my listening room houses a gorgeous Bluthner grand piano. Yes, the speaker does have a slight forgiving character in the presence region, but while audible, it really *is* slight and in no way, at least to my ears, detracts from any sense of lifelikeness, vitality, or excitement. In any case, this is something I tend to prefer inasmuch as the vast majority of recordings are so closely miked and thus peaked in that very region.

Most omnidirectional loudspeakers and most other loudspeakers that reflect a lot of sound from room surfaces image terribly. Not so the PX1. No, it doesn't have the absolute pinpoint accuracy that, source permitting, something like my Quads or Harbeths do, but neither is there any sense of image wander, instability, nine-foot violins or vocalists, or other such anomalies. On the contrary, all the staged-for-the-microphone sources I regularly use for evaluating imaging and soundstaging—*The Christmas Revels*, the Bernstein *Carmen*, the Water Lily Mahler *Fifth*, the Solti *Ring*—are beautifully reproduced in an enveloping acoustic space that recreates a very convincing realism, one that frees the presentation from the impression it's restricted to one end of the listening space. Furthermore, owing to the omnidirectional radiation, I can sit well out of the so-called sweet spot—in fact, practically across from one or the other speak-

er—and with judicious application of the balance control (one of the reasons I detest control units without one) hear an essentially perfect soundstage that does not collapse into one or the other speaker or compromise the tonal balance. In this specific sense, the PX1 is a rare and absolute triumph.

Of course, as REG points out, because an omnidirectional radiates in all directions and invariably reflects off all surfaces, the acoustic character of your room is going to be more mixed into the presentation than would be the case with conventional loudspeakers—and far more than with loudspeakers that deliberately restrict the dispersion of the mids and highs (bass frequencies are always omnidirectional and always heavily influenced by one's listening space). Acoustically speaking, my listening room happens to be an exceptionally pleasant space, so the PX1 was able to do its thing to best advantage. I'm uncertain how it would do in a less accommodating setting, say, one with lots of hard, flat surfaces. My guess is that it would perform much better than speakers of considerably less neutrality, but perhaps at some further sacrifice to imaging precision—because highly reflective rooms generally don't allow for very good imaging under any circumstances unless you sit very close to the speakers, and the speakers are fairly restricted in their dispersion.

The only aspects the PX1 that Robert and I react to differently concern bass response and bass integration. It is certainly true that the PX1s are at the state of the art when it comes to bass articulation, definition, detail, and resolution, and they will certainly plumb the depths with considerable reach and power. However,

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play a recording like Volume 2 of Kei Koito's Bach recital [Claves Records]—which *The Diapason* magazine judges a benchmark recording for organ music—on the PX1 and then play it on a system which uses, say, an REL subwoofer, and you would hear that the PX1s don't quite have all the bottom-end reach some recordings have. On the vast majority of sources this won't matter, though I would add that precisely because the PX1 is so good so far down, a top REL would make a splendid partner for that last half octave inasmuch as it is a true *sub-bass* woofer, principally intended to extend already superb bass response.

Then there is the obstreperous matter of integration. I want to hit this one as lightly as possible. When I heard the PX1 the year before last in a large room at the Newport show, I heard no discernible issues as regards cone bass to electrostatic mid and high integration. But in my much smaller room, from time to time I felt I did. It was nothing very serious, nothing that distracted from the listening experience, and it was infrequent and vague enough that it's even difficult for me to put into words exactly the effect. All I can say is that on occasion I was aware that I was listening to two different kinds of transducers. (As a point of comparison, once I had the woofer level dialed in on the Martin-Logan Montis hybrid electrostatic, which I reviewed a while ago, the integration was seamless.) As I said, I don't want to hit this too hard, because it may be a function of the much smaller listening space. However, neither do I want to give the impression you need a baronial-size living room to house these speakers: They're physically large, but they worked perfectly well

in my 15' x 21' x 8' room, about seven feet out from the back wall.

The only thing that Robert didn't mention but that does need to be addressed is their appearance. Given what Muraudio has accomplished in this speaker, the styling certainly constitutes a fine example of form following function. And yet, that didn't stop the proliferation of wisecracks from audiophiles and non-audiophiles alike: gasoline pump, popcorn maker, water-cooler—you name it, I heard it. SOA—that is, Significant Other Acceptance—factor looms gigantic here. I love the sound, but I can't say I cotton much to the appearance. One big problem, I think, is that the review samples were fitted with an optional contrasting chrome trim (that separates the upper and lower sections and caps) that actually *accentuates* the mirth-provoking aspects of the appearance. The standard finishes are unicolor, which I suspect will help a lot. But I still think the jokes are going to continue—at least until the music starts playing, at which point all wisecracks are shut up and all critics silenced.

Regular readers of mine will know that while I'm often "impressed" by the large super-expensive monster systems that so many audiophiles seem to lust after, I rarely actually *like* them, and I've heard none I would personally give house space to. This is because I find their sonic presentations merely impressive—there's that irony-laden word again—or, to put it another way, all too typically *assaultive* rather than beautiful or powerful in the way that live music is beautiful and powerful. In that context, the PX1 is the only speaker system I've heard that costs more than my Quad 2805s that I would consider buying if I had the money. tas



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## Equipment Report

# Audio Physic Cardeas 30 LJE

## It Don't Come Easy

Andrew Quint

**N**on-audiophiles watching a member of our tribe move towards the purchase of a costly assault-on-the-art loudspeaker may believe that acquiring that component guarantees sonic nirvana. We members of the tribe know better. That understanding is a big part of the blend of excitement and angst that attends the decision to change out a major part of a music system. As Ringo Starr sang (when he could remember the words), sometimes “it don’t come easy.” I learned this lesson anew with the Audio Physic 30 Cardeas LJE, which I used as my only speakers for a two-month stretch this spring. A good deal of diligence with choosing complementary amplification was required to get them sounding their considerable best. But that effort was assuredly worthwhile, and I was very sorry to see these world-class loudspeakers go at the end of the review period.

The LJE of the product’s name stands for “Limited Jubilee Edition.” In 2015, to celebrate the German company’s 30th anniversary, Audio Physic announced it would be building 30 pairs, and only 30 pairs, of these loudspeakers. Of course, AP didn’t design a brand-new speaker with the plan of making just 60 of them. Rather,

this model represents the ultimate refinement of the Cardeas Plus+ that premiered in early 2014, which in turn evolved from the original Cardeas, introduced in 2009. The Cardeas Plus+ remains in production and costs \$32,995 or \$35,995, depending on finish. Manfred Diestertich, who has designed Audio Physic’s loudspeakers for 17 years, told me that once the thirty LJE pairs are gone, he expects that “a non-anniversary edition of the Cardeas will evolve from the latest design advances and be available for sale in the U.S.” In other words, you will still be able to purchase essentially the same loudspeaker being considered here after the numbered LJE sets have all sold—it’ll just have a different name. Don’t you just love marketing?

With all Audio Physic loudspeakers, one design obsession stands out, namely the aim of eliminating any unwanted resonances that could negatively impact the performance of those elements that are supposed to create sound. (This emphasis on mechanical factors is completely understandable, given Manfred Diestertich’s engineering background—see sidebar.) Numerous design decisions serve the goal of decoupling vibration-prone elements from



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the drivers, beginning with the drivers themselves. To avoid resonances associated with the metal cones that AP favors, a silicone/rubber ring is incorporated to apply direct pressure to the cone. Audio Physic calls this Active Cone Damping, maintaining that it's an effective way

### SPECS & PRICING

**Type:** Three-and-a-half-way, sealed enclosure

**Driver complement:**

One 1.75" Hyper Holographic Cone Tweeter (HHCT III), one 5.9" HHCM III midrange, two 5.9" HHCM III midrange/woofers, two 10.6" woofers

**Frequency response:** 25Hz–40Hz

**Sensitivity:** 89dB

**Impedance:** 4 ohms

**Recommended amplifier power:** 40–350 watts (into 4 ohms)

**Dimensions:** 12" x 46.9" x 23.4"

**Weight:** 163 lbs. each

**Price:** \$45,995

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to eliminate ringing and the consequent "metallic sound" of the drivers. All the drivers, including the tweeters, are ceramic-coated aluminum cones built to Audio Physic's specifications by Wavecor (AP owns the tools), and this consistency of driver material and form surely contributes to the top-to-bottom seamlessness of the sound that one hears. AP's drive units incorporate a dual basket, again intended to help decouple the drivers from the cabinet: an aluminum outer frame assures strength and a plastic inner basket provides optimized damping. The Cardeas has been—and remains in the LJE version—a six driver, three-and-a-half way design. Highest up on the narrow front baffle is a 5.9" HHCM III (Hyper Holographic Cone Midrange) unit and, below that, a 1.75" HHCT III tweeter newly designed for the LJE version—and now used in many models in the line. Next comes a pair of 5.9" midrange/woofers and, closest to the floor, two side-firing 10.2" HHC woofers that are wired in a push-pull-push configuration. The tweeter, midrange, and two mid/woofer drivers each live in their own sealed chambers and are decoupled from the enclosure with Audio Physic's SSC (String Suspension Concept) technology, a construction in which the drivers are not directly connected to the baffle. Examining the loudspeaker's exterior, one might conclude that the woofers' enclosure is a rectangular box comprising the bottom 45% of the LJE's vertical dimension of approximately 47 inches. In fact, the non-ported bass chamber is much larger, extending up behind the mid/woofer, midrange, and tweeter enclosures.

For the Cardeas Plus+, Diestertich introduced a stiff ceramic foam material, used internally to

provide structural stability and, because of its high porosity, acoustic absorption. The foam further adds to the inertness of the cabinet yet doesn't significantly reduce the volume of the woofer chamber. A black high-gloss aluminum front panel and bottom plate are unique to the LJE version. Otherwise, the backward-tilted cabinet, twice as deep as it is wide, has rounded side and back surfaces that can be assumed to provide the usual mechanical and acoustic advantages. The Cardeas 30 LJE is offered in two "jubilee" veneers, black ebony high-gloss and rosewood high-gloss. I can report that the latter is stunning with a level of execution that's the equal of fine furniture.

The crossovers (with exclusive Clarity Cap capacitors and copper foam technology) have also been decoupled from the enclosure with SSC materials. Audio Physic has long employed a "floating" configuration for its crossovers, meaning that serial electronic components within the crossover are arranged in both the positive and negative limbs of the signal path instead of only on one side. Manfred Diestertich's observation regarding this topology is refreshingly non-German-engineer-like: "The measured performance does not change at all but the audible result is amazing," he told me. In fact, a number of other loudspeaker manufacturers have taken up the practice, including Gauder Akustik, GoldenEar, and Sonus faber.

Audio Physic's devotion to acoustic isolation extends to the binding posts and the interface between speaker and floor. On the first score, it's generally underappreciated that cables can transmit vibration back to the speaker and thus to the drivers. All the speaker models in AP's

top lines are equipped with Vibration Control Terminals, (new exclusively modified versions are in the LJE) a substantial aluminum structure holding the binding posts and fitted with a rubber gasket that assures the mechanical isolation of the connecting hardware from the enclosure. On the second score, in lieu of spikes that directly contact the supporting surface, AP's spikes are screwed downwards through the front and rear outrigger supports to terminate in a plastic ball foot. Instead of draining vibrational energy from the speaker to the floor—the usual approach—where, theoretically, it can still do sonic harm—most of that vibration is converted to heat. With the ball feet in place, it's fairly easy to move the 163-pound speakers during the positioning process without damage to floor or carpet. For the ultimate in speaker-to-floor decoupling, the LJE owner is supplied with a set of VCF V Magnetic Feet with which to replace the ball feet. These devices have repelling neodymium magnets that serve to reduce the load on the SSC material that bears the weight of the speaker. (The magnetic feet are optional with the standard Cardeas Plus+; they can be purchased separately for use with other brands of loudspeakers, as well. They're not cheap—around \$1500 for a set of eight.)

The Cardeas 30 LJE's replaced my usual two-channel speaker system, a pair of Wilson Duette 2s complemented by a Wilson WATCH Dog subwoofer. My dedicated listening room is 15' by 15', with a ceiling height that varies from 11' to 13'. I hasten to reassure those concerned by the symmetric LxW dimensions that a hallway leading off from one sidewall near the front of the room serves to "unload" the space:

## Equipment Report Audio Physic Cardeas 30 LJE

Standing waves are not a problem. The truck that delivered the speakers to my place was met by a team of three audio pros—Roy Feldstein, the chief technical officer for VANA, Ltd. (now AP's North American distributor), VANA's managing director, Justin Feldstein, and Micah Shevaloff, a consumer electronics veteran handling Audio Physic's marketing/PR efforts. They spent several hours carefully adjusting the position of the LJE's and installing the magnetic feet, having settled on a location that had the speakers 8' apart (center-to-center) and two feet from the wall behind them. The distance from the front baffle to the sweet spot was also 8', with roughly 15 degrees of toe-in towards the listening position. This deployment, which could be viewed as a nearfield listening perspective, worked quite well and I made no changes after the three gentlemen departed. The owner's manual, which does include exceptionally helpful set-up guidelines, advises that the drivers for Audio Physic loudspeakers have been fully burned-in at the Brilon factory and that only a few hours of music or white/pink noise should be needed to bring them up to their sonic potential. Indeed, by the end of the day that they were installed, it was apparent I was hearing a top-echelon loudspeaker, competitive with other highly regarded models in their price range from Wilson, YG, Magico, Von Schweikert, and others.

The source material used to assess the APs was all-digital, coming from either an Oppo BD-103 universal player or a Baetis Reference music computer, feeding my usual Anthem D2v processor. Anthem's room-correction software was employed up to 800Hz which, as with virtu-

ally every other speaker I've used in the room, controlled any bass irregularities that speaker positioning didn't tame. Cabling was mostly current Transparent product. But which power amp(s), you ask? That's a journey you need to hear about.

Naturally, I started with my reference amplifiers, a pair of Pass XA 60.8 Class A monoblocks. To begin with the sonic metric referenced by Audio Physic's advertising slogan, "No Loss of Fine Detail," the LJE's ability to uncover musically relevant nuance—microdynamic shadings and subtle shifts in color—was as good as I've heard with any other loudspeaker, and that includes various electrostatic and ribbon designs. Want a tutorial on what was cutting-edge in studio wizardry circa 1982? Check out the 176/24 HDtracks download of Michael Jackson's *Thriller* to savor layer upon layer of instrumentals and vocals, subtleties of the decay and reverb applied to synthesizers, and Michael's distant yet clear-as-day vocal exclamations on "Beat It." Perhaps it's not necessary to hear so much of the minutiae that went into the creation of a pop masterpiece, but the point is you can. Sometimes, what we refer to as transparency in a good orchestral recording is actually a measure of detail retrieval. There's no better example than the Introduction to Part II of Stravinsky's *The Rite of Spring*, as heard with an HDtracks download of a 2013 performance from Yannick Nézet-Séguin and the Philadelphia Orchestra. The music is quiet but extraordinarily atmospheric, evocative, and complex—at one point, 31 staves are required in the conductor's score and many of those have two or three parts per staff. Without seeming the least bit "analytical,"

the LJE's reveal every shift in light, every timbral nuance that the composer conjured up to suggest a moonless night in prehistoric times with human sacrifice on the agenda.

It's apparent, I think, that the LJE's attention to resonance/vibration issues is what's responsible for the abundance of meaningful detail, and that translates into superior spatiality as well: Temporal smearing can obliterate a consistent sense of imaging and soundstage recreation. With the mid-1970s Philips recording of Handel's Op. 4 organ concertos, on a PentaTone SACD, the mechanical action—the clicking and clacking—of the small eighteenth century instrument played by soloist Daniel Chorzempa in a Dutch church can be heard to discretely originate from a plane behind where the sound of organ and orchestra seems to come from. With well-made recordings, these speakers disappear, to roll out a hoary audiophile cliché. But it's true. Listen to Paavo Järvi's nonpareil version of *L'histoire du soldat* (another PentaTone SACD) and note the precise localization of each of the seven players, as well as the correct scaling of the diverse wind, brass, string, and percussion instruments they play.

Who's to say if the Cardeas 30 LJE tonal consistency from top to bottom results from all six drivers in each speaker being made of the same material? But these half-dozen cones do speak with one voice. The treble is open, airy, and stress-free—a recording of, say, solo piccolo doesn't seem to originate from one part of the speaker's front baffle. Singers with the most recognizable voices, recorded in their prime—artists like Billie Holiday, Johnny Cash, Neil Young, or Adele—have the essence of their



## Equipment Report Audio Physic Cardeas 30 LJE

vocal sonorities reproduced with no anomalies imposed at the extremes of their ranges. There is one disc I own that, above all others, tells me what I need to know about a loudspeaker's tonal accuracy. It's one of three CDs that accompanies a coffee table book called *The Miracle Makers*, a volume presenting the histories and photographs of 30 of the world's finest violins, 15 from the workshop of the Stradivari family, 15 made by Giuseppe Guarneri del Gesù [review in TAS Issue 125]. The CD documents the violinist Elmar Oliveira playing, unaccompanied, 30 bars of the Sibelius Violin Concerto, alternating between Strads and Guarneris. Never before, in my long experience with this recording, have I heard a better differentiation between the two brands of fiddles—the cleaner, sweeter, more focused tone of the Stradivarius instruments as opposed to the darker, earthier, more sensual, and plaintive sonority of the Guarneris. It was close to hearing the instruments themselves with no intermediary electronic technology.

It was with dynamics and bass reproduction that the question of amplification loomed large. The Cardeas 30 LJE's performance with many—most—musical styles (chamber music, eighteenth-century orchestral, jazz, folk, plenty of pop, solo piano, and others) was clearly the best I'd heard in my room. But larger-scale material seemed to be alerting me that limits were being approached. While the LJE's recommended amplifier power is 40 to 350 watts into 4 ohms and the XA 60.8s are rated at 120 watts into that load, the Pass amps don't have an especially high damping factor, and they registered to me as underpowered. I set out to try more substantial amplification.

First up was a John Curl-designed Parasound HCA-2200 II stereo amplifier I own, an exceptional value in its day (and now, on the used market) that delivers 385 watts into 4 ohms. The Parasound definitely provided more low-end control and dynamic headroom but imaging was not nearly as holographic, and there wasn't the preternatural clarity I'd heard from Day 1 with the Pass XA 60.8s. Next, I tried a Primare A60 supplied by VANA, a stereo Class D design that provides 500Wpc for a 4-ohm loudspeaker. This component simply didn't click with my system the APs—the sound lacked dimensionality and timbral accuracy. I then prevailed upon nearby audiophile friends to borrow amplifiers. A Mark Levinson 532 stereo amp provided plenty of muscle but compared to the Pass, introduced a trace of harshness and didn't scale instruments or image as effectively as my reference monoblocks. Then, I got the Bernings.

The David Berning Quadrature Z monoblocks are OTL tube amplifiers costing \$30,000 per pair that deliver 270 watts into a 4-ohm load. The power supplies are regulated switching devices which explains why the amps aren't especially heavy and don't run particularly hot. The Quadrature Zs realized the full potential of the Cardeas 30 LJE speakers. Dynamics were scary-good: the eleven strokes that begin "Glorification of the Chosen One" in *Le sacre*, courtesy of four timpani and a bass drum, were cataclysmic, and I could differentiate the hits on timps from those on the big drum. Likewise, the fury of the Rondo-Burleske movement of Mahler's Symphony No. 9 (Michael Tilson Thomas/San Francisco on an SFS Media SACD) was experienced with concert hall acuity. Organ music

that pulled out all the stops (so to speak)—like the final movement of Messaien's *La Nativité du Seigneur*, "Dieu Parmi Nous," as played by Mary Preston on a Reference Recordings CD titled *Organ Odyssey*—was thrilling in its dynamic and low-frequency power.

I certainly don't mean to imply that the Berning monoblocks are the only amplifiers that will bring the APs fully to life with all stripes of music. I'm sure that there are dozens of others that will do so—and they won't necessarily cost \$30k (though such an expenditure doesn't necessarily strike me as out of line when you've spent \$45,995 for speakers). You just need to be aware that the excellent amps you already own may not be right for the Cardeas 30 LJE. These loudspeakers are not the most benign load in the world and, more importantly, they are exceptionally revealing of what comes before them in the audio chain. They will not suffer fools, or even some very fine components that might shine in another setting.

With suitable amplification, the Cardeas 30 LJE loudspeakers will provide a majestic, full-range listening experience with the most challenging source material in both smaller and larger rooms. They do so more successfully than any other two-box floorstander I've heard in my familiar listening environment. The LFEs are such highly resolving transducers that you may have to make some difficult decisions not only about which amplifiers to mate with them, but how to use those amplifiers. As a case in point, the Quadrature Z sports a front panel switch that allows users to choose different amounts of negative feedback, depending upon the loudspeakers they are driving. The "normal"

setting provides the most damping and, with many speakers including the LJE, extremely potent and visceral bass performance—fast, tight, tuneful, and impactful. A lower setting did open up the sound higher up in the frequency spectrum, at the cost of less tightly controlled bass. Ultimately, I chose the "normal" setting. Not every speaker will make such choices so critical. But to return to Ringo's metaphorical advice, "You've got to pay your dues if you want to sing the blues." The world-class performance that's possible with Audio Physic's limited edition loudspeaker may not always "come easy." But with persistence, you stand to get sound as good as most audiophiles can hope to achieve in a typical domestic environment. And that's surely worth a little anguish, don't you think? **tas**



## Equipment Report

### Ryan Speakers Tempus III

#### Not To Be Missed

Andrew Quint

**F**or the 2015 Rocky Mountain Audio Fest, my beat was loudspeakers costing less than \$20,000 per pair and, in advance of the trip to Denver, I meticulously studied the show guide and made a list of all the rooms I'd need to visit. Well, not meticulously enough. TAS's RMAF reports were up online within a week of the event and an early visitor reading my account wanted to know how I felt about the Ryan Speakers Tempus IIIs. Oops. I'd missed them, and posted my *mea culpa*. Fortunately, Robert Harley *had* heard the speakers and wrote that they "offered outstanding performance. Watch for a full review." It took over six months for a pair to become available but sometimes good things come to those who wait. Or can't read an audio show guide.

Perhaps I can be conditionally absolved for overlooking the brand in Denver last fall because Ryan Speakers had only been in business for about two years at the time. I should say *back* in business because from 1986 to 1993, Todd and Trevor Ryan of Riverside, California, made a number of well-regarded loudspeakers as Ryan Acoustics. (The MCL-1 bookshelf model was reviewed positively way back in TAS Issue 61.) The brothers have not been away from

the loudspeaker business since Ryan Acoustics closed shop. Todd has worked at Sonance for two decades, currently as the chief designer for this leading manufacturer of "architectural speakers." Trevor, for a time, was a principal of Motus Audio, which makes speaker drivers. The Ryans returned to producing their own audiophile loudspeakers in 2013 with Todd as Director of Design and Development and Trevor as Director of Operations.

The Tempus III sits atop a line of four models that starts with the R610, a two-way bookshelf speaker priced at \$2000 per pair, and moves up the range to two-and-a-half-way and three-way floorstanders, the R620 at \$3500 and the R630 at \$5000. The \$15,995 Tempus III is a 165-pound four-way design that employs a 1.1" chambered beryllium dome tweeter, a 4" midrange, a 6.5" mid/woofer, and a pair of side-mounted 8" woofers. Like many manufacturers, Ryan's drivers are manufactured in China—a fact that many prestigious high-end loudspeaker-makers tend to deemphasize. With this company, there's an important difference. Because of his position with Sonance, Todd Ryan actually lives for half of each year in Guangdong, the southern Chinese province where the country's booming





## Equipment Report **Ryan Speakers Tempus III**

electronics industry is located. He not only designs the drivers that are unique to Ryan speakers but also oversees their manufacture to a far greater degree than do other North American and European companies. Speaker manufacturers have their drivers made in Asia, of course, for economic reasons and there's a perception among some consumers that the quality of the work and labor conditions are potentially suspect. Trevor Ryan addressed the issue forthrightly when asked about it, explaining that workers in southern China generally come from the central and northern parts of the country to work in the electronics industry. "These workers have two long holidays when they travel back home to spend time with their families. If

### SPECS & PRICING

**Type:** Four-way, ported enclosure

**Driver complement:** One 1.1" chambered beryllium dome tweeter, one 4" midrange, one 6.5" mid/woofer, two 8" woofers

**Frequency response:** 24Hz–35kHz

**Impedance:** 6 ohms nominal, 4.1 ohms minimum

**Sensitivity:** 88dB

**Dimensions:** 10.75" x 48" x 27.5"

**Weight:** 165 lbs.

**Price:** \$15,995

### RYAN SPEAKERS

3380 La Sierra Avenue  
Suite 104-121  
Riverside, CA 92503-5225  
(951) 266-0030  
ryanspeakers.com

the working conditions and salaries were really unacceptable, they would find other places to work—but that is not what occurs in the factories that we have partnerships with. For us, the best sign that an employee cares about and enjoys what he is doing is that he returns year after year to the factory. Over time, these people become highly skilled. Many are promoted and work their way up through the factory."

Todd Ryan has advanced modeling software and instrumentation at his disposal and strives to achieve several sorts of "symmetry" in his driver design—symmetry of driver mechanics, magnetic symmetry, symmetry of the voice coil's inductance, and symmetry of the mechanical resistance of the drivers' suspensions. The midrange, midwoofer, and bass drivers all incorporate Ryan Speakers' proprietary diaphragm material, a laminate of Kevlar and Nomex. Bonding the two dissimilar materials together has the effect of eliminating the acoustical breakup each would have on its own. Ryan's Kevlar/Nomex laminate is very light—the midrange driver, for example, weighs only 4.5 grams. The Tempus III tweeter includes a Truextent beryllium acoustic dome "renowned for its extreme stiffness and low moving mass." It features a die-cast aluminum faceplate and a large receptacle behind the dome to minimize backpressure from the tweeter's rear wave.

Unlike the drivers that, under Todd Ryan's watchful eye, are made on the other side of the world, the cabinets are built in Riverside CA by an American company that actually produces enclosures for several other high-end loudspeaker manufacturers. The Tempus IIIs are substantial speakers, though Ryan explained that the driv-

ers and crossovers account for nearly 50 of the speaker's 165 pounds. The cabinet is fabricated from MDF an inch thick on all sides. (The exceptionally rigid side panels are made from four laminated ¾" MDF layers.) There's extensive internal bracing with ¾" MDF—two braces in the vertical direction and five horizontally. The midrange and midwoofer have their own sub-enclosures; the woofers' air space goes up behind these sub-enclosures to the top of the speaker. The bass chamber is ported near the floor. Todd Ryan told me that listening tests demonstrated that "placing the port tube in close proximity to the woofer produces the most cohesive low-frequency response." The side-firing woofers are connected in phase to minimize vibrational energy that could potentially be transmitted to the cabinet. The woofers are crossed over to the mid/woofer at a lower frequency (100Hz) than usual for configurations of this sort, and Ryan notes a positive influence on the "placement sensitivity" sometimes seen with side-mounted woofers. Ryan's literature is a bit mysterious regarding details of the Tempus III's crossover network, describing it as "a highly complex four-way design" that employs high-order, asymmetric slopes. Top quality parts are used—Clarity capacitors, Mundorf resistors, Solen inductors—and it's explained that because the large inductors in the woofer and mid/woofer crossovers can behave like "antennas broadcasting audio signals to any other inductors close enough to receive it," the crossovers are physically separated within the large cabinet.

The shape of the Tempus III approximates a backwards-leaning trapezoid, the tilt helping to assure time-alignment of the three drivers

mounted on the front baffle. The enclosure is quite deep at 27½" but a sense of massiveness is substantially mitigated by the narrow width of the speaker, from 8½" to 10½". (The sides of the Tempus III bow out slightly.) With tow-in as recommended, the speakers' sides are barely visible from the listening position, and I never felt that they visually overwhelmed the room. The Tempus IIIs are finished with a choice of wood veneers; they're not sexy but the workmanship is exemplary. The two sets of binding posts on the rear panel are of Ryan's design, machined from solid oxygen-free copper plated with nickel, suitable for either spades or banana plugs. Inside the speakers, the binding posts are soldered directly to the crossover network.

The Tempus IIIs arrived carefully packed in cardboard boxes with a well-judged amount of supporting foam. Unboxing them is definitely a two-person job but once the speaker is upright, one can move them unassisted without much difficulty before installing the supplied spikes. The 12-page owner's manual has excellent setup instructions. The Tempus IIIs have a driver arrangement and dimensions that are very similar to the Audio Physic LJE Cardeas loudspeakers considered in Issue 266, and I started by placing the Ryans where the German speakers had fared well. This ended up being close to the ideal location. After I'd had the speakers up and running for a few weeks, Todd and Trevor Ryan, visiting some of their East Coast dealers, stopped by to listen for a few hours and optimize the setup. Other than to assure that the Tempus III were perfectly level, pretty much all they did was to toe the speakers outward a few degrees—which did make a substantial improvement, in

## Equipment Report **Ryan Speakers Tempus III**

terms of solidifying images. When all was said and done, in my 225 square-foot room, the Tempus IIIs were about eight feet apart (center baffle to center baffle), between 18" to 22" from the wall behind the speaker, and approximately nine feet from the ideal listening position. Two sets of monoblock amplifiers were used, in turn, to power the Ryans, Pass XA60.8s as well as David Berning Quadrature Zs, and an Anthem D2v pre/pro was consistently in the system. Sources were an Oppo-93, a VPI Scoutmaster with JMW tonearm and Sumiko Blue Point EVO III cartridge played through an Audio Research PH2 phono-stage, and a Baetis Reference music computer. Interconnects were Transparent, except for the Shunyata Anaconda AES/EBU used from Baetis to Anthem.

The Ryans strongly urge users to bi-wire the speakers, and hope you'll remove the nickel-plated brass jumpers with which the Tempus IIIs are shipped. I began my listening with the jumpers in place, utilizing my usual Transparent Ultra (Generation 5) speaker cables. The only bi-wire set I own are the outrageously over-achieving AntiCable Level 2 Performance Series model (\$164 for a six-foot pair!) and I was more than a bit surprised at the improvement I heard in transparency, dynamic nuance, and soundstage continuity when I substituted them for the Transparent cables. When Trevor and Todd visited, they brought a set of Cardas Clear Beyond bi-wires for me to borrow. These cables moved the dial further in a positive direction, providing a better sense of openness and tonal complexity (they damn well better, at roughly \$10,500 for an eight-foot pair) but given the degree of improvement heard with the Anti-

Cables, I wondered if the supplied jumper bars might be degrading the sound. I had on hand a set of Transparent "bi-wire adapters," specifically designed to replace the jumper bars in a bi-wireable speaker like the Ryans, and found that they narrowed the gap in performance between the Transparent single-wire and the AntiCable bi-wires. I do feel that bi-wiring is preferable with the Tempus IIIs—it usually is with most loudspeakers—and kept the Cardas product in place for most of my evaluation. But I do wonder if Ryan should revisit the composition/design of the jumpers it supplies, recognizing that some customers, for various reasons, are going to decide on the single-wire option.

The Tempus IIIs were the only loudspeaker in my reference system for five weeks and I thoroughly enjoyed their residence. With both tubed and solid-state amplification, the Ryan flagship was highly effective in communicating the musical meaning of whatever reached its binding posts. The sound was vital more than it was vivid, the kind of speaker that might not stop you in your tracks at a dealer but, at home, encourages you to listen straight through two-disc concert albums. Whether the material was chaste ("Will We Gather at the River?" from Anonymous 4's *1865*) or majestic (the brass chorales in the finale of Bruckner's Symphony No. 5, as performed by Benjamin Zander and the Philharmonia Orchestra) the Tempus IIIs consistently locked on to the basic character of the music and largely eliminated themselves from the equation.

The Ryans are not super-detailed loudspeakers, yet their reproduction of vocal and instrumental texture is very specific, and thus realis-

tic. The Hagan String Quartet, in concert and on SACD, manifests a gorgeously blended sonority that can be heard especially well in the Andante movement of Beethoven's Quartet in D major, Op. 18, No. 3. There are good reasons for their richly complex yet homogenous ensemble sound—these musicians have been playing together for a long time (three are siblings) and they use a set of matched Stradivarius instruments—and the Tempus IIIs permit one to savor it fully. Or listen to Ricki Lee Jones's eponymous first album, to the "rightness" of the tonality of her youthful voice, a slight roughness superimposed upon an almost childlike quality. The Ryan's ability to deliver natural musical textures is a significant advantage, as there is such a thing as too much detail. Most of the vocals on Lyn Stanley's *Potions from the 50's* were recorded at a different time, in a different studio than the jazz instrumental accompaniments. An over-analytical speaker could reveal that fact to a distracting degree but the Tempus III's give a convincing impression of a performance occurring in real time.

When it comes to issues of spatiality, the Tempus IIIs perform quite well. A superb orchestral recording dating from 1958 that I only recently came to know is a selection of movements from Tchaikovsky's *The Nutcracker*, Efreim Kurtz conducting the Philharmonia. (The Parlophone original was remastered for an XRCD on the Hi-Q Records label.) With both the Pass and David Berning amps, the soundstage was gratifyingly broad and deep, and the degree of instrument localization within the soundfield was believable, specific without having an over-etched quality. Likewise, the scaling

of instrumental and vocal images was redolent of a live concert experience, as demonstrated on another recently issued XRCD with soprano Mariella Devia as the featured performer in an all-Mozart program (Master Music XRCD24-NT018.) With "Regina coeli," K.108, the Ryan speakers neither exaggerate nor minimize the relative acoustic masses of soloist, chorus, and orchestra, the proportions of which contribute significantly to the naturalness of the 1997 analog recording.

In terms of tonal balance, these speakers



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do not editorialize. The human voice lives, of course, in the critical midband and if a vocal is aggressively recorded and equalized, that's what you'll hear: "Baltimore" from Lyle Lovett's *Joshua Judges Ruth* was an example that came up as I listened to favorite albums. That's not to say, however, that dynamics present on the original recording are in any way suppressed. The Rickie Lee Jones album noted above was recorded well before the onset of egregious dynamic compression of pop recordings. The emotional intensity of the climax to the song "Last Chance Texaco" comes through loud and clear with the Ryan speakers.

Though rated down to 24Hz +/-3dB, the Tempus III's low end doesn't register as especially prodigious. This may be a good thing, the consequence of a well-executed side-firing woofer system, which can minimize standing wave problems. I always use DSP room correction that, as performed by the Anthem pre/pro ARC software, allows the user to choose how far up the frequency spectrum to apply the correction. The Tempus IIIs required less correction than any other loudspeaker I've had in my room—only up to 500Hz (5000Hz is more typically necessary to smooth out irregularities.) Bass was naturally connected to higher frequencies, without bloat or overhang and with excellent pitch differentiation. By no stretch of the imagination was the low end in subwoofer territory, qualitatively or quantitatively. There wasn't china-rattling, pant-leg-flapping bass, the gut-wrenching visceral impact that so many audiophiles seem to crave—and the musical validity of which I often question. I listened with great satisfaction to the Philadelphia Orches-

tra's recording of the Saint-Saëns "Organ" Symphony, ripped from my Ondine SACD. I was at one of the concerts in May of 2006 from which this recording derives, sitting in Row L. Though the experience was thrilling, with the orchestra and organ (the largest concert hall instrument in the U.S.) playing full out, there was no pant-leg-flapping going on at Verizon Hall that night. Good bass reproduction is about more than just visceral sensation.

The Ryan Tempus III is a smartly designed loudspeaker, the most ambitious commercial effort to date from an engineer with both high-end ideals and extensive manufacturing experience. Most speaker designers piously maintain that the decisions they make are in the service of creating a musical device, even as the emphasis of their promotional efforts (and the coverage their product receives) tend to emphasize exotic materials, unusual aesthetic choices, and ear-grabbing elements of the audiophile's perceptual palette—detail, soundstaging, bass extension, and so on. Sometimes, an audio product can add up to more than the apparent sum of its parts. Consider this as well. The price of Todd Ryan's best effort is around the same as "entry level" models from a number of higher cachet brands. This is not because Todd Ryan has cut corners in any way. If your speaker budget is up to \$20k, by all means listen to the usual suspects but also try to audition the Tempus IIIs—the company now has around 30 dealers and is steadily adding more. You may conclude that it represents one of the more exceptional values in a full-range audiophile loudspeaker that's available. As for me, I won't be missing Ryan Speakers at shows anymore. Promise. **tas**

"With the (Wavelet) correction on, there was an overall increased sense of precision in playback with my speaker system. Perceived images of performers and instruments became more clear in space with main vocals being the most obvious beneficiary of the processing."

"Clarity, precision and detail without sterility are the Legacy's calling cards here."

Carlo Lo Raso, *Secrets of Home Theater & High Fidelity*



"The combination of the Aeris and Wavelet provides some of the most musically realistic sound I've ever encountered... producing cleaner and more musical sound at every dynamic level."

A. Cordesman, *The Absolute Sound* January 2017

## Our Top Picks Floorstanding >\$10k



### 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. DS, 249



### Wilson Audio Sabrina

**\$15,900**

The Sabrina is the smallest and least expensive floorstander in the Wilson line. Entry-level, maybe, but with no observable shortcuts. Its sonic character is marked by a commanding and linear top-to-bottom energy. It's a ripe sound, a relaxed sound, with a slightly warmer signature that may surprise the brand's followers. It's a Wilson, of course, so it's animated by remarkable dynamic energy, extreme low-level resolution, and a sense that it willfully wants to drive music forward rather than let it passively lay back. The Sabrina artfully combines low-level resolution with the most delicate bass dynamics. Unsurpassed in a smaller listening room, this sweetheart is pound for pound the best Wilson Audio loudspeaker available today. NG, 256



### Magico S1 Mk II

**\$16,500**

There was a time when Magico's enclosures were made primarily of wood; now they're all aluminum, every model. For both the S Series and Q Series, Alon Wolf has his "platform" established and continues to advance the performance of the drivers and other components he puts into these optimized enclosures. The two-way, sealed-box Magico S1 Mk II floorstander is indeed as much a Magico as the S7 or the Q7, and must be a top consideration for anyone in the market for a loudspeaker up to \$20k. As the saying goes, it "comes from good stock." AQ, 270



### Legacy Aeris with Wavelet Processor

**\$22,975**

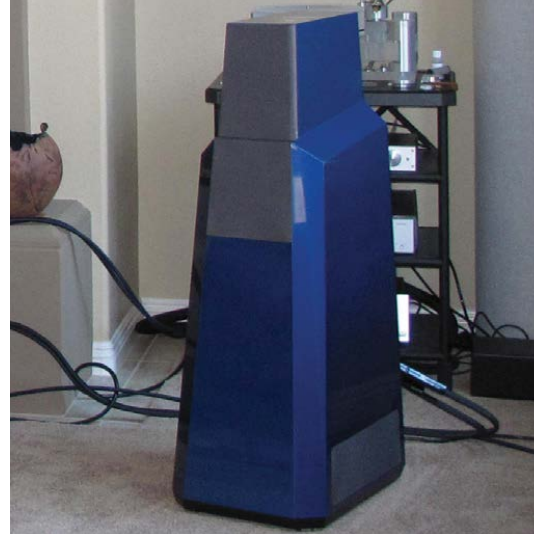
The combination of the frequency- and time-domain-optimized 4.5-way Aeris loudspeaker and its companion Wavelet DSP processor/crossover provides some of the most musically realistic sound reviewer AHC has ever encountered. This duo takes digital processing and room correction a vital step forward, and show that a DSP'd speaker can reach levels that are even competitive with the best purist speakers, and some that sell for far higher prices. AHC, 269

## Our Top Picks Floorstanding >\$10k



**Von Schweikert Audio VR-55 Aktive**  
**\$60,000**

The application of VSA's pioneering (and remarkably cost-effective), patent-pending, noise-reducing cabinet technology combined with specially developed custom-built drivers from Accuton and Scan-Speak results in a level of performance that GW feels breaks new ground in resolution, transparency, and transient response below the \$100,000 mark. The VR-55's resolute yet sweet and extended high frequencies, vibrant and expressive midrange, and astonishingly fast and accurate bass make it a natural at revealing finely detailed pitches, rich harmonics, and accurate textures. GW purchased his review pair as his new reference loudspeaker. GW, 256



**Vandersteen Model 7 Mk II**  
**\$62,000**

Based on new drivers made from carbon-fiber-clad balsawood, the Model 7 strips away a layer of coloration and artifacts, revealing an absolutely glorious purity of timbre. You simply don't hear the cones when listening to music through the Model 7, which is electrostatic-like in its clarity, transparency, and openness. The extensive bass adjustments, made possible by the powered woofer, allow the Model 7's response below 120Hz to be tailored to your room. (New Mk II not yet reviewed.) RH, 206



**Muraudio PX1**  
**\$63,000**

This superior omnidirectional electrostatic hybrid greatly impressed REG, who had not realized that music reproduced in the home could sound quite like this. The purity, the smoothness, the roundness, the filling of the room, the effortlessness, the deep bass extension, the sense of speakers vanishing as sources, and the stability of the sound with respect to listener position, all combined to disarm his critical self and switch him over to the state of a listener hearing live music in a great concert hall, immersed in an ambient soundfield, albeit with the locations of instruments still clearly perceived. "A nonpareil if ever there was one." REG, 258



**YG Acoustics Sonja 1.2**  
**\$72,800**

The two-module Sonja 1.2 is available as a fully passive system or a semi-active system with adjustable on-board amplifier and crossover for the same price. The upper module houses two 6" aluminum "BilletCore" mid/woofers, and one 1" waveguide-mounted "ForgeCore" silk-dome tweeter in an MTM array. The lower module holds a 10.25" woofer. Sonically, the Sonja seems to reproduce recordings with all their beauty and drama intact. It does not give the impression of being tuned in some way to dazzle the listener with a hyped-up sense of resolution. Accordingly, the long-term listenability of this speaker is simply marvelous, even though it can also deliver very high levels of detail. KM, 256

## Our Top Picks Floorstanding >\$10k



### MartinLogan Neolith

**\$79,995**

MartinLogan swung for the fences with the Neolith, mounting a roughly 4' x 2' XStat electrostatic panel atop an enclosure that houses a front-firing 12" driver and a 15" rear-firing woofer. Once you've heard the transparency, resolution, and sheer sense of nothing between you and the music that the Neolith's big panel delivers, you'll be spoiled for life. Surprisingly, these virtues of electrostats are combined with seamless integration with the bass, resulting in a speaker with full frequency extension and dynamics along with fabulous transparency. The Neolith is beautifully built and finished (available in seven colors), highly flexible in room-matching, and backed by a solid company with 33 years of experience in building electrostatic loudspeakers. An unqualified triumph that competes in the upper echelon of today's best cost-no-object loudspeakers, the Neolith was The Absolute Sound's 2015 Overall Product of the Year. RH, 259



### Magico Q7 Mk II

**\$229,000**

Magico has taken the Q7, a speaker RH has long considered to be the state of the art and, surprisingly, made it significantly better. The Q7 Mk II benefits from an entirely new tweeter designed from the ground up, a midrange diaphragm made from graphene (a new carbon-based material), and a redesigned crossover with exotic capacitors. The Mk II obviates the classic dilemma of resolution vs. ease by combining extraordinary midrange and treble resolution with tremendous delicacy and complete lack of hardness and glare. The reduction in distortion is so profound that the Mk II sounds as though it has a different tonal balance, but the two speakers have identical responses. Although the woofer section remains unchanged, the Mk II's bass is considerably improved, perhaps by virtue of the greater midrange resolution reproducing bass instruments' overtones. The overall result is a much deeper connection with music. If there's a better loudspeaker than the Q7 Mk II, RH hasn't heard it. RH's ultimate reference. RH, 256



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# SUBWOOFERS

## Contents

JL AUDIO E110 • JL AUDIO GOTHAM • REL T7I • GOLDENEAR SUPERSUB XXL

*Click any product name  
to read that review*



## Equipment Report

### JL Audio E-Sub e110

#### 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 *Sounddoctor Test CD V 2.6.1*, available (for \$18) on-line at <http://www.sounddoctor.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 Sounddoctor 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 Sounddoctor 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 Sounddoctor CD, which contain music with very deep bass. As these tracks





## Equipment Report JL Audio E-Sub e110

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). 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 Sounddoctor 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*: Re-

versing polarity on the main speakers, playing a test tone at the crossover frequency (Tracks 2 through 17 on the Sounddoctor 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 Sounddoctor 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 pre-amp 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

### 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.

10369 North Commerce Pkwy

Miramar, FL 33025-3962

(954) 443-1100

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:** Soudution 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, Soudution 520, Zanden 120, Constellation Perseus

**Power amplifiers:** Soudution 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 Report JL Audio E-Sub e110

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 a higher crossover frequency can make for a more seamless sound. Alas, it can also make for a substantially *different* sound than what you're used to from your main speakers alone.

Let's face it: You've spent a lot of time and a lot of money on your loudspeakers. Presumably, you picked them from a myriad of others because you prefer the way they sound on the music you typically listen to. This doesn't mean, of course, that you think they are perfect. (Or why opt for subwoofers?) What it does mean, 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 surer-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 driv-

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## Equipment Report JL Audio E-Sub e110

er (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

### 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**

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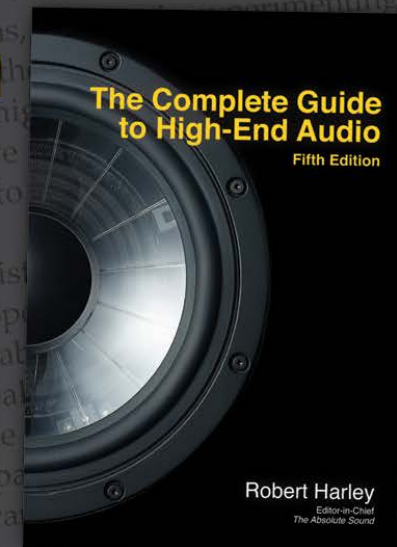
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## Equipment Report JL Audio E-Sub e110

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 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. (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 col-

or, 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**



## Equipment Report

# JL Audio Gotham Subwoofer and CR-1 Crossover

New Dog, Old Trick

Jonathan Valin

**A**s you know, I am not a fan of subwoofers—that is, I *wasn't* a fan of subs until I ran headlong into JL Audio's e110 about a year ago, and concluded (to my astonishment) that when this compact, affordable sub was paired with a superb two-way like the \$27k Raidho D-1, it came so close to the sound of my \$200k reference loudspeakers—at one-sixth their price—I could scarcely tell the difference. (Well...there was this: Though superior to every big transducer I'd heard in low-end resolution and extension, the Raidho D-1/e110 combo *did* reduce image size and slam compared to big speakers—a by-product of the low crossover point I deliberately chose to more fully preserve the virtues of the Raidho monitor and of a two-way mid/woof's inevitable power-handling limitations in the upper bass.)

Now I've run headlong into another astounding JL Audio sub—this time its top-of-the-line, \$12,000 g213 Gotham. And while its price is considerably higher (and its 360-pound bulk vastly greater) than that of the \$1700 e110s, the conclusion I'll reach, as you'll soon see, is

very much the same. If you mate a pair of Gothams with an affordable but highly capable multiway, like the \$5k Focal Aria 948 that Our Ms. Mullins reviews in this very issue, and channel the subs and the mains through JL Audio's superb \$3k CR-1 low-pass/high-pass active crossover, you can, once again, build a loudspeaker system that competes sonically with the Big Boys for roughly one-sixth of what the Big Boys cost—and, unlike the e110/D-1 combo, this time there is no downside when it comes to image size and slam.

Moreover, with the Gothams there is a rather significant additional bonus—to wit, when these subs are paired with those selfsame Big Boys, they will also elevate *their* performance to new levels of wonderment. The Gothams are simply that versatile and that spectacularly good. In fact, to spill the beans, if I haven't already, the Gothams are the most powerful, most extended (19Hz!), most finely detailed, and, paradoxically, given their sheer size, most invisible subwoofers I've heard in my home.

How do I explain this sea change in subwoofer performance—and my newfound appreciation

of those thumping boxes (or, at least, these two from JL)?

Well, it probably amounts to this: JL Audio has spent the past two decades assiduously researching and developing unique subwoofer technologies, and it has thrown every single one of them into the Gothams, beginning with a feature that simply wasn't readily available up until a few years ago (although variants of it are now commonplace)—what JL calls its ARO (Automatic Room Optimization) System.

What ARO does is effectively (quite effectively, as a matter of measurable fact) take the room out of the equation precisely where rooms inevitably play the greatest havoc in the low end. Triggered by pressing a pushbutton on the top panel of each Gotham (and cancelable via the press of another button), JL's Automatic Room Optimization system generates a series of bass-range calibration tones, played back through the woofer and measured at the listening posi-

tion by means of a supplied, laboratory-grade calibrated microphone that is plugged into a mike jack on the sub. The mike sends its readings back to the Gotham, where built-in circuitry “analyzes the shape and magnitude of the primary response error and configures an appropriate filter to tame it.” Though ARO can be slightly tricky to implement (setting the proper playback level to conduct the tests takes some volume-dial twiddling) and by design only addresses the single most problematical room-induced bass-range peak, when ARO finally does do its thing, the results are remarkable. That 60–80Hz hump that plagues virtually every listening room? Gone as if by magic. [*The improvement in bass smoothness rendered by ARO in a*



## Equipment Report JL Audio Gotham Subwoofer and CR-1 Crossover



*JL Audio Fathom f113 subwoofer in my brother's system was nothing short of miraculous.—RHJ*

In addition to the remarkable ARO system, the Gotham also incorporates JL Audio's proprietary Dynamic Motor Analysis system, its patented W-Cone unit-body cone-assembly technology, its patented Elevated Frame Cooling design, its patented Floating Cone Attach Method (FCAM), its patented OverRoll Surround, its patented Radially Cross-Drilled Pole-Piece, its patented Engineered Lead-Wire System, and its patented High-Damping Feedback Circuit. In case you weren't counting, that amounts to

seven patented technologies in a single woofer assembly, which must be some kind of record. The U.S. Patent Office doesn't hand these things out like party favors, folks—a lot of science has gone into the Gotham's design and construction. (To read more about this science and the benefits that JL claims it confers, go to <http://www.jlaudio.com/g213-gloss-home-audio-gotham-powered-subwoofers-96237>.)

However, you won't need a Xerox of a patent application and a magnifying glass to assess the results of what JL hath wrought. This is a subwoofer—housed in a hand-fabricated-and-finished, curved-fiberglass enclosure (no parallel surfaces)—that uses two (count 'em) thirteen-and-a-half inch drivers *per side* (that's 214.7 square inches of effective piston area per sub, for those of you with scorecards), each powered by a built-in 3800W RMS Class D amplifier and each capable of *four-inch* peak-to-peak excursions, 19Hz extension, and seemingly unlimited, distortion-free output. To put this plainly, with the Gothams you will get wallop in the low end like you've never heard before. And yet, the most telling thing about the sound of these subs isn't the sheer wall-shaking, window-rattling, chest-thumping, distortion-free loudness with which they play *sforzandos* and *crescendos*—you'd expect that from two pairs of 13.5" woofers—but, rather, their ravishing refinement on *mezzofortes* and *pianissimos*.

Here is a subwoofer that is just as capable of realistically reproducing the dark, organ-like pedal point of a contrabassoon as it is the depth-charge detonation of a concert bass drum. Here is a subwoofer that can distinguish contrabass lines from those of cellos, while

### SPECS & PRICING

#### JL AUDIO

Miramar, FL 33025-3962

(954) 443-1100

[jlaudio.com](http://jlaudio.com)

**Price:** Gotham subwoofer, \$12,000; CR-1 crossover, \$3500

#### JV's Reference System

**Loudspeakers:** Raidho D-5, Raidho D-1,

Avantgarde Zero 1, Avantgarde Trio/Basshorn, MartinLogan CLX, Magnepan .7, Magnepan 1.7, Magnepan 3.7, Magnepan 20.7

**Linestage preamps:** Soudation 725, Constellation Virgo, Audio Research Reference 10, Siltech SAGA System C1, Zanden 3100

**Phonostage preamps:** Audio Research Corporation Reference Phono 10, Constellation Audio Perseus, Innovative Cohesion Engineering Raptor, Soudation 725, Zanden 120

**Power amplifiers:** Soudation 711, Siltech SAGA System V1/P1, Constellation Centaur, Audio Research Reference 250, Lamm ML2.2, Zanden 8120, Odyssey Audio Stratos

**Analog source:** Walker Audio Proscenium Black Diamond Mk V, TW Acoustic Black Knight, AMG Viella 12

**Tape deck:** United Home Audio UHA-Q Phase 12 OPS

**Phono cartridges:** Clearaudio Goldfinger Statement, Ortofon MC Anna, Ortofon MC A90, Benz LP S-MR

**Digital source:** Berkeley Alpha DAC 2

**Cable and interconnect:** Crystal Cable Absolute Dream, Synergistic Research Galileo LE, Ansuz Acoustics Diamond

**Power cords:** Crystal Cable Absolute Dream, Synergistic Research Galileo LE, Ansuz Acoustics Diamond

**Power Conditioner:** Synergistic 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

also holding the low-pitched wind and brass instruments doubling those lines in unwavering focus. Here is a subwoofer that will sustain the decay of a grand piano's bottom-octave notes like a *sostenuto* pedal. In other words, here is a subwoofer that will reveal *everything* in the bass (including the depth, width, height, and resonant signature of the recording venue)

with the same lifelike clarity, speed, density of tone color, and dynamic range that Magico's Ultimate III horn brings to the midband or Raidho's superlative ribbon tweeter brings to the treble. And the best part is that here is a subwoofer that can do all these things—and when it comes to the bottom octaves I really haven't heard anything else that can match it—without

## Equipment Report **JL Audio Gotham Subwoofer and CR-1 Crossover**

screwing up the midrange.

Of course, it takes the usual amount of painstaking work to get the blend between the Gothams and your main speaker just so. But, thank goodness (and JL), here also, at long last, is a subwoofer that gives you the tools to make this magic happen.

The Gotham itself comes equipped with a low-pass crossover with two different, user-selectable slopes—a second-order (12dB/octave) Butterworth filter and (my preference) a fourth-order (24dB/octave) Linkwitz-Riley filter. (In addition to its steepness—down 100dB per decade [ten times the crossover frequency]—the Linkwitz-Riley filter has the estimable advantage of 0dB gain at the crossover hinge point. Given that you're likely to cross over somewhere in the 50–80Hz region, *not* adding energy precisely where rooms do the most damage is a better idea.)

In addition to its low-pass filters, the Gotham has calibrated controls for subwoofer gain, phase (0–360°), crossover hinge point (30Hz–130Hz), and E.L.F. (extreme low frequency) trim. (This last cuts and/or boosts frequencies below 20Hz to compensate for excessive ultra-low-bass “room gain” in small-to-medium-sized spaces.) The only thing the Gotham doesn't have—and, rather paradoxically, the e110 does—is a high-pass filter.

I would imagine this was not so much an oversight as a tacit acknowledgement that woofers this big, powerful, and deep-reaching are most likely to be used in elaborate home-theater systems, where “bass-management” (low-pass and high-) will be handled by surround-sound/home-theater electronics. However, that does

rather leave two-channel listeners in the lurch. In my experience, running any subwoofer/satellite system with a low-pass-only crossover scotches one of the advantages of using a sub, which is to transfer some of the heavy lifting from the woofer or mid/woofer in the main speaker to the woofer in the sub. (In addition, and despite propaganda to the contrary, running the main speaker full-range often makes achieving a seamless blend between it and the sub a good deal more difficult, as there is bound to be a region of considerable overlap between the two bass drivers.)

Happily, JL Audio has an answer to this problem, as well, its new CR-1 outboard crossover.

Now, to be honest, in the past I was no more a fan of outboard subwoofer crossovers than I was of outboard subwoofers. The very idea of sticking another piece of electronics—generally of considerably less than high-end transparency—between your preamp and your amp was and is anathema to old-timers like me. So when JL Audio's Brett Hanes, the resident engineering genius behind many of JL's subwoofer breakthroughs (and a genuinely amiable and modest young man), showed up at my digs with the CR-1 I was less than enthused.

I should've known better, given my previous experience with Brett's work for JL.

While I can't say that the CR-1 is completely invisible sonically, it is unquestionably *far* more transparent than any active subwoofer crossover, built-in or external, that I've tried—and over the decades I've tried a few. In Brett's words, the CR-1 was “engineered for audiophiles by audiophiles,” its design based on years of calibrating subwoofered systems for picky high-enders. **tas**



## Equipment Report

### REL T7i

#### The I Has It

Neil Gader

**I**t might be a common perception, but a subwoofer's role isn't limited to just adding an octave or so of bass response and going boom. Ideally it should be all about the quantity and *quality* of low frequencies that restore a bass-shy system to a musical equilibrium—a balance that permits the full breadth of the recording to be realized. In short it's not just how much but how well. If this sounds like a distinction in search of a difference, then you'll need to spend some time with the REL T7i.

As many enthusiasts are aware, REL makes some of the classiest subwoofers in the high end. The T7i is no exception. Finished in a deep, glossy black (white is also available), and discreetly appointed with solid aluminum accents, the T7i is not much larger than a postage stamp (OK, at about a square foot it's a *little* bigger than that). The T7i does its business with a forward-firing 8" driver which is backed up by a bottom-firing 10" passive radiator. This alignment is a reversal over its predecessor, the T7, which placed the active woofer in the downward position with the passive firing forward.

As REL woofer-in-chief John Hunter described

to me, the new T lineup benefitted from the development of the Series S line. The Series S reminded him not only of the importance of both a lighter/stiffer driver but of the issue of self-quieting, which Hunter describes as design and engineering "intended to produce a cone/driver that starts and stops well and immediately quiets down and does not continue ringing." Basically, no overshoot. And, given the choice between lighter and stiffer, stiffer was the big winner sonically. Nonetheless, the T7i still employs a composite of lighter-weight paper—REL even took the carbon black out of the paper because it added 1.4 grams per cone (who knew?). For stiffening the cone, REL designed specially prepared alloy center caps that overlap much of the surface area of the diaphragm. This innovation improved damping and resulted in slightly less weight and almost three times the rigidity. Additionally, cabinet depth was added to properly dissipate the backwave. And cabinet wall mass was increased to a full one inch. The fine Class AB 200W amp was left unchanged.

The back panel houses rotary settings for output plus the tiniest 39-step increments for adjusting the crossover over a range of 30–

120Hz. There are dual low-level RCA inputs, plus an LFE, but the high-level input is and has always been the preferred installation. A lengthy Neutrik connector is provided for this purpose. It carries within its jacketing four wires for connection to an amplifier's speaker taps. Famously, REL subs do not use high-pass filters—the main speaker's performance envelope will remain unaltered. There's a phase

toggle, as well.

Corner placement is suggested by REL to begin, facing on a room diagonal. This not only maximizes room gain but allows "for the most linear low bass wave launch...the ability to tune the sub to the axial node of the room, or longest throw distance." In my small room, this procedure works but don't be shy about experimenting.





## Equipment Report REL T7i

I ran the T7i with a range of compact loudspeakers that included the B&W 805 D3, Revel Concerta2 M16, Elac Uni-Fi UB5 (reviews forthcoming) plus my own ATC SCM20SL pro-monitor. These all have varying amounts of bass extension, roll-off characteristics, and sensitivity—differences that were easily compensated for with the T7i crossover and output settings. The low 84dB sensitivity of the sealed-box ATC, for example, required bringing up the output slightly, while the deeper extension and superior efficiency of the ported B&W necessitated a lower crossover setting and a slight reduction in output.

I evaluated the T7i like I do all subwoofers—an interwoven, three-perspective approach of assessing extension, integration, and musicality. In extension the REL was as good as its word, descending with authority into the low thirty-cycle range and perceptibly lower as it rolls off. Not quite the full bottom octave (20Hz) but true sub-bass territory, nonetheless, and an achievement for such a small sub.

Sonically, each of the T7i/speaker combinations I listened to registered as more present, with greater weight and wider dynamic impact, and perhaps, most importantly improved dimensional and ambient information. The opening riff on Michael Jackson's "Billie Jean" was especially instructive. The establishing groove, a tandem of kickdrum and bass guitar lays the groundwork for this iconic mega-hit. Operating without the REL, bass response was articulate and fast, but dynamically a bit restrained and lacking in the hip-gyrating impulse of the dance floor. Adding the REL to the system raised the sound and weight of this riff into a different category of im-

pact, expressiveness, and bloom. Similarly, the marvelous "Duetto" from Stravinsky's *Pulcinella* required the T7i to reproduce the thick, grumbling mood and timbral details of trombone and doublebass. Without such direct comparisons, it's easy to overlook—and I know I have—the relationship between frequency and dynamics. If the system isn't reproducing the lowest bass frequencies, that range will similarly have its dynamics rolled off as well.

I listened to Tony Bennett's "Just in Time" from the recently released LP Bennett/Brubeck, *The White House Sessions, Live 1962* [Columbia/Impex]. The drummer and bassist have a nice, swinging rhythm line going, but it takes the REL to reveal individual identities. Removing the REL causes the individual textures and timbre of these instruments to meld into one another. This is where the musicality of the T7i comes to the fore. The best subwoofers I've encountered are just as much about detail and definition as they are about extension.

For classical music listeners, the most immediate rewards come in the form of ambient information. A prime example would be the LP of the Copland *Fanfare* [Dallas, Johanos: Analogue Productions], which depends on the explosive kettledrums and trombones to establish the majesty of the piece. Take the REL out of the system, and the cavernous, immersive soundstage becomes a narrower, more generic space.

Or, take the example of a solo 88-key piano. Its lowest note, an A, produces a 27.5Hz tone. (The 97-key Bösendorfer can hit 16.5Hz but that's another matter.) Most of this massive low-frequency energy is radiated by the

huge wooden soundboard that underlies the piano's frame. And this is why most LF-limited loudspeakers sound like tinker-toys trying to reproduce a concert grand. Add the T7i and a piano recording like *Nojima Plays Liszt* [Reference Recordings] takes on powerful

### SPECS & PRICING

**Drivers:** Active drive unit, 8" long-throw; 10" passive radiator

**Lower frequency response:** 30Hz at -6dB in-room

**Inputs:** Hi-level Neutrik Speakon, low-level single phono, LFE phono

**Dimensions:** 12" x 14.3" x 15"

**Weight:** 36 lbs.

**Price:** \$999

### REL ACOUSTICS NORTH AMERICA

800 Addison St.  
Berkeley, CA 94710  
(510) 990-6005  
rel.net

### Associated Equipment

Sota Cosmos Series IV turntable; SME V tonearm; Sumiko Palo Santos cartridge, Ortofon Quintet Black, Ortofon 2M Black; Parasound JC 3+; dCS Puccini Player; Lumin A1/L1 Music Player; Synology NAS; MacBook Pro/Pure Music; Synergistic Atmosphere Level Four, WyWires Platinum, Nordost Frey 2 & Audience Ohno; Audience Au24SE & Kimber Palladian power cords. Audience USB, AudioQuest Carbon firewire; VooDoo Cable Iso-Pod

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The T7i faces some serious competition from another REL. It's the Series S/5, which recently garnered my 2016 Golden Ear Award. The comparison reveals the difference between a very fast, small-driver, 30-cycle sub like the T7i, versus the 20Hz, considerably more costly S/5 (\$2500) with big drivers. It comes down to the amount of weight and the foundation-rocking extension of the larger S/5. I could hear the limits of the T7i when reproducing the steady sustain of the deepest pipe organ notes—it was one of the only times it revealed itself as a sound source. The S/5 comparatively got its seismic groove on and poured forth as if connected directly to the Earth's core.

I had the opportunity to add a second T7i to the system and the results, I hate to admit, are pretty addicting. Why more than one? A pair of subs moves more air and can smooth the overall room response as they manage the peaks and nulls within the listening space. They become less prone to our own localization antennae. If your budget allows, adding a second sub is also a great option if the system moves to a larger room.

Has REL managed the impossible? Well, not quite. But that doesn't mean the T7i isn't worth popping a couple of champagne corks over. As a companion in smaller rooms where placement requires discretion, its footprint-to-performance ratio makes it near second-to-none in its category. And that makes it another outright winner from the good lads at REL. **tlb**

## Equipment Report

# GoldenEar Technology SuperSub XXL

## Big Bass in a Small Package

Jacob Heilbrunn

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**SPECS & PRICING**

**Frequency response:** 10Hz–200Hz  
**Drivers:** Two 12" long-throw high-output bass; two 13" x 15" quadratic planar infrasonic radiators  
**Amplifier:** 1600-watt ForceField switching amplifier  
**LFE line-level input:** Unfiltered (no low pass)  
**Right/left line-level input:** Variable high-pass from 40Hz–150Hz  
**Dimensions:** 17 3/8" x 19 3/4" x 16 3/8"  
**Weight:** 78 lbs.  
**Price:** \$1999 each

**GOLDENEAR TECHNOLOGY**  
 P.O. Box 141  
 Stevenson, MD 21153  
 (410) 998-9134  
 goldenear.com

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