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the absolute sound® hi-fi+

# GUIDE TO HIGH-PERFORMANCE LOUDSPEAKERS



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# Because You Care About Music™

You know the sense of anticipation before a live performance, the feeling of entering a great concert hall. You also know the pleasure of carefully selecting an outstanding recording, then listening to it with complete attention.

This same passion for music motivated Sony to develop the SS-AR1 Loudspeaker. The AR1 utilizes precision drivers, select woods and meticulous cabinetry to reproduce, as faithfully as possible, your favorite music – just as it was originally recorded.

So take a moment to discover why the SS-AR1 is being embraced by enthusiasts and professionals alike. You'll immediately remember why you care so much about music.

*"Brings new life to music  
I know intimately."*

**Cookie Marenco**

Executive Producer, Blue Coast Records

As an award-winning recording engineer, Cookie Marenco has worked with dozens of artists. Nearly a decade ago, she sought to take multi-channel sound to the next level by co-developing the acclaimed Extended Sound Environment (ESE) close miking system. She has used ESE to produce a series of exceptional titles for her own Blue Coast Records.

"You must hear the AR1's to believe the incredible detail in dynamics and frequency range," said Marenco. "My recordings sounded fresh and vital, bringing new life to this music I know intimately."



[sony.com/AR1](http://sony.com/AR1)

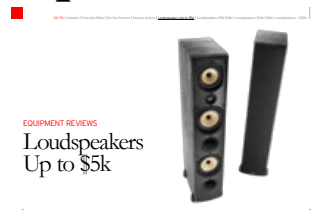
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# FROM THE Editor

**W**elcome to the 2011 edition of our Buyer's Guide to High-Performance Loudspeakers, brought to you by *The Absolute Sound* and *Hi-Fi Plus*. This issue is chock full of 31 full-length speaker reviews, covering products that range in price from the \$600 Silverline Minuet Supreme to the \$199,000 MBL 101 X-Treme—and everything in-between.

These reviews have been specially selected from the pages of *The Absolute Sound* and *Hi-Fi Plus* to bring you our top choices covering the widest spectrum of products, technologies, and prices. Whatever your budget or listening-room size, you're sure to find just the right loudspeaker for you. Once you've used this guide to create your short list, visit your local specialty audio retailer to audition your candidates yourself and let your ears decide.

Although the speakers in our Buyer's Guide cover a staggering price range, they have one thing in common that sets them apart from mass-market loudspeakers—they were all designed by skilled and caring enthusiasts. Every single one of our selections is a labor of love by a musically oriented engineer who tried to extract the best performance from his product. These designers are all driven by an obsession with sound quality, no matter what the loudspeaker's price. They

will try different drivers, cabinet materials, crossover parts, and internal wiring until they are satisfied that no further improvements are possible. This is as true for a \$600 high-end speaker as it is for a \$199,000 one.

This approach is radically different from the way mass-market speakers are created and sold. These “mid-fi” speakers—which often cost more than true high-end products—are created in the speaker companies' marketing departments to hit certain price points and appeal to particular demographics, not replicate the sound of live music. The engineers at such companies simply carry out the marketing department's directives. When they are finished with the designs, a “cost engineer” starts cutting corners in the design to increase the profit margin. These speakers feature lots of large drivers, big cabinets, and offer high “perceived value” at the expense of delivering real musical satisfaction.

By contrast, the high-end speaker is everything it needs to be—and nothing more. No gimmicks, no marketing buzzwords, and no hype. Instead, the high-end speaker will deliver your favorite music wonderfully reproduced night after night. So no matter what your budget, musical tastes, or listening environment, starting off with a true high-end design will virtually assure you of selecting a musically satisfying loudspeaker. And in this Buyer's Guide, we present 31 such candidates from which to choose.

Good listening.

**Robert Harley**

*Click here to turn the page.*

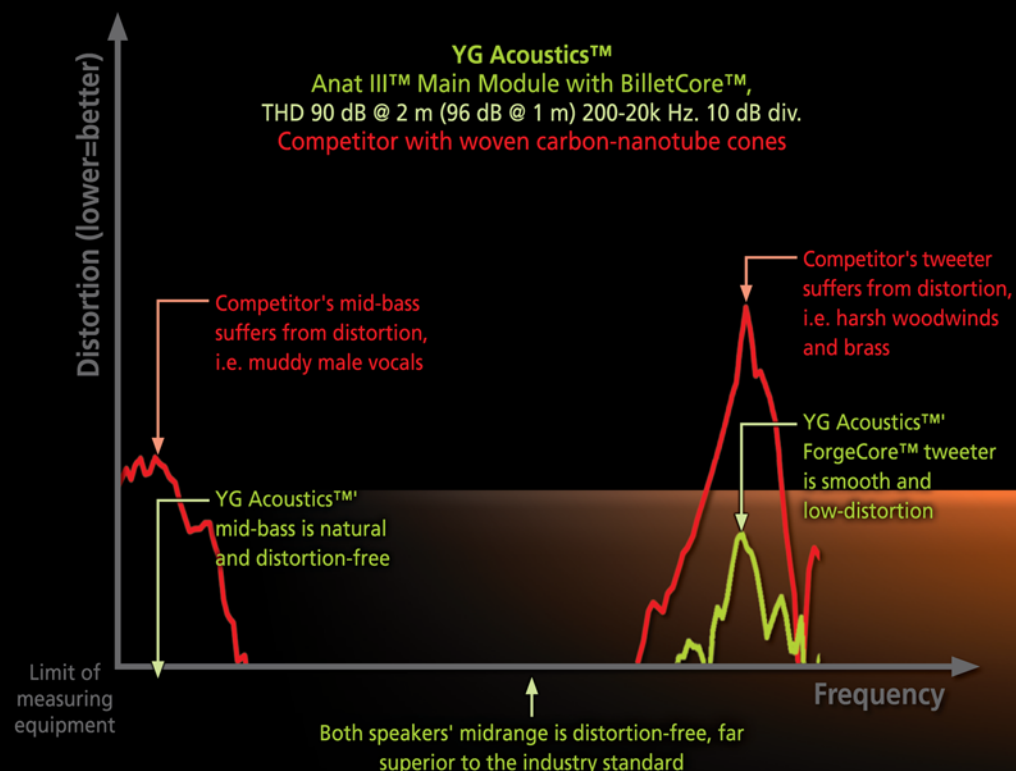
## Worldwide Innovation from YG Acoustics™:

Instead of pressing cones out of thin sheets, or weaving them of fibers, we "went crazy" and machined our new driver cones from solid billet!



## Why did we go to this extent?

The result, verified by independent measurements:  
YG Acoustics™ BilletCore™ drivers possess lower distortion than the competition.



This independent measurement was conducted by the Canadian National Research Council (NRC)



Designed by Yoav Geva

**YG Acoustics LLC**

4941 Allison St. #10, Arvada, CO 80002, U.S.A.  
Tel. 801-726-3887 • info@yg-acoustics.com  
www.yg-acoustics.com



## ON THE HORIZON

# Great New Loudspeakers Coming Your Way

Neil Gader



### PSB Speakers CS1000

A new category for PSB, the all-weather CS1000 is designed for open spaces with rugged, weatherproof construction. Its durable features include a thick, UV-resistant polypropylene cabinet, an aluminum grille, and rustproof terminals with a rubber cover for protection from the elements. Equally important are its multiple mounting options, based around a unique, highly flexible dual-axis bracket that allows the speaker to be perfectly positioned and aimed, even in tricky spaces. The speaker's two-way system includes a 6.5" woofer with a clay/ceramic injection-filled polypropylene cone and rubber surround and a 1" titanium dome tweeter to deliver full-range music reproduction. Additional features include a unique wire management system, a paintable enclosure and grille, and five-way, gold-plated binding posts.

**Price \$499 (all prices per pair).** [psbspeakers.com](http://psbspeakers.com)

### Focal Bird 2.1

The Bird 2.1 is an ultra-compact design composed of small, two-way satellites connected to the "Power Bird," which serves as a unified amplifier, 24-bit/192kHz upsampling DAC, and subwoofer in a single housing. Supplied with a Focal Kleer Technology wireless dongle, Bird 2.1 interfaces with the Apple iPhone, iTouch, and iPad, providing uncompressed wireless audio. An optional USB dongle (\$99.95) expands wireless connectivity to include any computer with a USB output. The user-friendly system includes a unified remote control and will accept a variety of analog and digital connections, both hard-wired and wireless. The units can be positioned horizontally, vertically, or even mounted on a wall.

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





## ON THE HORIZON



### Atlantic Technology AT-1

The AT-1 is the first production speaker to utilize H-PAS bass technology, developed jointly by the Atlantic Technology and Clements/Solus Loudspeakers. The H-PAS system (Hybrid Pressure Acceleration System) is a purely passive acoustic technology that allows speaker designers to achieve targeted, low-distortion/high-output bass performance with 50% smaller cabinets and smaller drivers. H-PAS combines elements of several speaker technologies: bass-reflex, inverse horn, and transmission line. The AT-1 utilizes two 5.25" drivers in an enclosure of approximately 1.6 cubic feet to produce bass that extends to 29Hz (-3dB). The AT-1 also uses an advanced 1" low-resonance tweeter that affords a lower crossover frequency (2kHz) than is normal in a two-way system. The result is wide dispersion through the midrange without the upper-midrange "beaming" normally exhibited by woofers in a two-way speaker.

**Price: \$1995 in gloss black.** [atlantictechnology.com](http://atlantictechnology.com)



### Velodyne Acoustics DD+ Subwoofers

The Digital Drive<sup>PLUS</sup> Series subwoofers from Velodyne Acoustics offer multiple ways to manage bass performance with real-time feedback via Velodyne's proprietary room-management software. Using the included microphone, just one touch of a button on the remote or front panel completely automates the seamless blend of subwoofer, system, and room within minutes. Eight fully parametric equalizers can be manipulated for smooth, even bass output. Crossovers, slopes, subsonic filters, and phase can be adjusted for the primary settings as well as for five presets, while getting feedback in real time. The DD+ Series utilizes newly engineered drivers with massive magnet structures, and six-layer, custom-wound voice coils with twice the excursion of their predecessors. Velodyne's patented digital high-gain servo-technology and a Class D amp deliver over 3000 watts of dynamic power.

**Price: DD-10+, \$2999; 12+, \$3499; 15+, \$4999; 18+, \$5999**

[velodyne.com](http://velodyne.com)

### Energy Veritas V6.3

Veritas has long represented Energy's flagship line. One of its newest leading models is the V6.3, a three-way, high-sensitivity (93.5dB) floorstander rated at an 8-ohm nominal impedance. The V6.3 features Energy's Convergent Source Module (CSM), which places tweeters and mid/woofers in close proximity to act as a single source for coherent, seamless dispersion. This technology provides flat on-axis frequency response and minimal levels of distortion and resonance.

The latest series also features advanced high-definition crossover networks, improved woofers, new voicing, and attractive, elegant wood cabinetry. The V6.3 is equipped with a 1" aluminum dome tweeter, a 5.25" Kevlar midrange and dual 6.5" Kevlar-cone woofers with ribbed elliptical surrounds. The 42.5" tower weighs in at hefty 57 pounds. Available in high-gloss piano-black or rosenut.

**Price: \$3000**

[energy-speakers.com](http://energy-speakers.com)





## ON THE HORIZON



### Nola Contender

The Nola Contender is the floorstander follow-up to the Boxer compact, a recent TAS Product of the Year recipient. The driver complement consists of two low-mass 6.5" bass drivers and a high-resolution, silk, soft dome tweeter. Each bass driver is housed in a separate independently tuned chamber and is individually ported—the upper driver is ported to the rear, while the lower driver via a downward-firing port. A true 3-way system the Contender benefits from increased midrange clarity, yet maintains the coherency of a good two-way. Like the Boxer it maintains a smooth 8-ohm impedance, and its moderately high 90dB sensitivity makes it a good match for low-power amplifiers. Bass response has been extended to a conservative 35Hz, with usable response to 25Hz, but like the Boxer its personality is quick and nimble.

**Price: \$3400**

[nolaspeakers.com](http://nolaspeakers.com)



### Monitor Audio GX300

The GX300 is one of seven models in the GX line. Standing over a meter tall, the three-way floor-standing GX300 sports twin 6.5" bass drivers, a single 4" midrange driver, and a high-frequency ribbon transducer. Frequency response is 30Hz to over 60kHz, among the widest available from any speaker. GX enclosures are hand-built from multiple laminations of MDF, hot-pressed to form a plywood shell. By virtue of its rigid and curved nature, and aided by radial internal braces and bolt-through driver fixings, unwanted vibrations and internal standing waves are radically reduced. Rifled grooves inside the port help to accelerate flow and reduce turbulence for faster more dynamic bass response. High-quality crossovers with premium-grade polypropylene film capacitors are used throughout. For added stability the die-cast alloy plinths of the floor-standing models provide a solid foundation.

**Price: \$5500**

[monitoraudio.com](http://monitoraudio.com)

## ON THE HORIZON



### Totem Acoustic Element Fire

A balance between form, function, art, and technology, the multi-angled design of the Totem Acoustic Element Series represents the embodiment of the unique architectural and geometric design concepts that have made Totem a leader in aesthetics as well as sound. There are three models in all: Fire, Earth and Metal. The latter two are floorstanders, while the Fire is a bookshelf design. The compact Fire (pictured here) is a two-way reflex that stands 16.6" tall. Impedance is rated at 8 ohms, with a sensitivity of 88dB. The Element Series also comes wonderfully appointed with custom-designed-and-machined aluminum back plates, precision-machined reflex ports, and platinum W.B.T. connectors (bi-wireable). The woofer is the 7" hand-assembled Torrent with a fully rear-damped cone, plus there are no active or passive crossover parts in the woofer section. Available in gleaming, four-coat polyester finishes: Dusk/Black or Ice/White.

**Price: \$5995**

[totemacoustic.com](http://totemacoustic.com)

### Naim Ovator S-400

The Ovator S-400 mirrors the technology and form factor of the acclaimed S-600 but has been designed for more modest listening rooms and moderate amplification. In dynamics and output the 42" tall S-400 gives very little away to the S-600. With twin 6.5" custom-designed rigid paper cone bass drivers, low-frequency response still reaches down to a rumbling 36Hz. The jewel in the crown, however, is the uniquely advanced 46mm Balanced Mode Radiator (BMR). Located above the woofers, within a decoupled enclosure, this drive unit reproduces the full bandwidth from the low midrange crossover point to well above audibility with flat frequency response, minimal distortion, consistently wide dispersion, and the absence of any mid/high-frequency crossover discontinuity. The visually stunning cabinet is constructed on the rigid foundation of a pressure die-cast aluminum plinth and uses a novel leaf-spring decoupled enclosure. The S-400 has a sensitivity of 88dB; nominal impedance is rated at 4 ohms; weight is 66 pounds.

**Price: \$6245-\$6845**

[naimaudio.com](http://naimaudio.com)



### GamuT M'inenT M5

The M5 is a 2.5-way floorstander and part of GamuT's new M'inenT range. The M5 uses a pair of 7" paper cone drivers for the mid/bass and bass units, while a double-ring-radiator tweeter with an optimally shaped stainless-steel waveguide handles the high frequencies. The dense enclosure is a combination of curved, laminated MDF side panels. Frequency response is a wide-ranging 34Hz to 50kHz. The seventy-five-pounder is rated at an easygoing 90.5dB sensitivity. Combined with its 4-ohm nominal impedance, the M5 should match up well with a wide variety of power amps. The entire M'inenT range uses Wormhole Signature cable as internal wiring—an in-house design said to optimize impulse response and eliminate cable-related resonances.

**Price: \$13,500; M3, bookshelf, \$7500;**

**M7 floorstander, \$16,500**

[gamutaudio.com](http://gamutaudio.com)

## ON THE HORIZON

### Aerial Acoustics 7T

The latest loudspeaker from Aerial Acoustics is the 7T—a four-driver, three-way in a bass-reflex enclosure that stands 44.5" tall. Always well-regarded for its rigid, inert cabinets, Aerial uses multiple layers of curved, stressed, and laminated MDF and seven full cross-section braces in the 7T for remarkably non-resonant behavior.

The precisely damped midrange cone uses a specially compounded papyrus material and is isolated in a separate wool-filled chamber; the woofer cones are rigid, damped bi-laminate composites. Both driver types have cast magnesium frames, large magnets, and long linear excursions. The soft ring-dome tweeter is a dual-magnet type with a copper pole sleeve. The precision crossover networks use polypropylene film capacitors and low-oxygen copper air-core coils with high-current nickel-steel cores for the bass. Silver solder and Teflon-insulated high-purity copper wire are used throughout. Sensitivity is 89dB and nominal impedance is 4 ohms. Weight is an imposing 96 pounds each.

**Price: \$9850**

[aerialacoustics.com](http://aerialacoustics.com)



### Legacy Audio Focus SE

The imposing Focus SE exudes power and authority as only a 55" tall, four-way floorstander can. The six-driver system positions the 1" upper-treble and 3" lower-treble ribbon tweeters at ear level, while playing the twin 7" midranges to reduce floor reflection—the sound from each of the 7" drivers travels the same distance to the ear. The drivers' relative baffle positions help to cancel floor bounce and the associated dip in the lower midrange. The dual 12" woofers are loaded next to the floor, extending bass below 20Hz. The non-parallel cabinet walls are 1.125" thick, and sculpted to minimize diffraction. A true full-range product with 16Hz bass capability, the Focus SE operates at 95.4 sensitivity with a 4-ohm nominal impedance. Cone feet are specially engineered to reduce cabinet vibrations. Available in rosewood, cherry, and black pearl.

**Price: \$9250**

[legacyaudio.com](http://legacyaudio.com)



### Joseph Audio Perspective

The Joseph Audio Perspective offers a large measure of the Pearl 2's sound in a more compact form. With its slender profile, it combines the distinctive qualities of a mini-monitor with the power and impact that only a floorstanding design can deliver. The twin magnesium cone woofers and Sonatex Hexadyn tweeter are precisely matched and seamlessly integrated, thanks to the steep filtering of Joseph Audio's patented Asymmetrical Infinite Slope crossover. This allows the Perspective a unique sense of coherence—the sound retains the same character from top to bottom, greatly contributing to the overall realism of the listening experience. The acoustic design of the cabinet is complex and rigid, with multiple bracing that translates into greater clarity and focus. At a modest three-feet tall and an immodest 81 pounds each, the Perspective has a nominal impedance of 8 ohms. Available in maple, cherry, rosewood, black, and sepele.

**Price: \$11,800** [josephaudio.com](http://josephaudio.com)





## ON THE HORIZON



### MBL 120 and 126

A new generation of Radialstrahler joins the MBL line of loudspeakers—the MBL 120. It uses the same advanced enclosure concept that has already been applied to its legendary brothers and sisters, but has been specially engineered for medium-sized rooms. The tweeter and midrange frequencies are reproduced using the latest cutting-edge Radialstrahler units for the lifelike spatial sound experience which has long been the hallmark of MBL. Aligned in a push-push configuration, the two long-stroke lower mid/bass drivers are mounted on a solid aluminum block to eliminate spurious cabinet resonances, while the proprietary subsonic filter reduces chassis oscillation for superior bass response. The head plate of the speaker stand disappears into a recess in the enclosure, and the cables inside the stand are neatly aligned in a ground-level position, thereby eliminating unsightly hanging wires. For even smaller rooms consider the new entry-level MBL 126.

**Price:** MBL 120, \$21,400; MBL 126, \$11,800 satin, \$13,500 piano finish (stands, piano finish \$1630, \$1560)

[mbl-northamerica.com](http://mbl-northamerica.com)

### Audio Physic Avantera

The Avantera from Audio Physic recently debuted at the Munch High End Show. The 45.7" three-way floorstander is positioned just a notch below the Cardeas flagship from which it draws much of its technology. These include AP's second generation Hyper Holographic Cone Tweeter and dual basket HHCM high- and low-mid drivers. Additionally, four side-mounted woofers in push-push configuration cancel inertia-induced cabinet vibrations and have been specifically loaded to optimize speed and accuracy on impulse response. All drivers use ceramic-coated aluminum diaphragms with proprietary active damping system. The cabinet features internal diffusers and non-parallel walls to minimize standing waves while the rearward angled aluminum baffle promotes coherence and minimizes diffraction. Included are aluminum outriggers which are mounted on neoprene insulated metal inserts to further reduce energy transmission from the speaker to the floor. Sensitivity is 89dB. Available in five real wood veneer finishes and black and white high-gloss lacquer.

**Price:** \$22,500  
[audiophysic.de](http://audiophysic.de)





## ON THE HORIZON

### ProAc K6

The K6 is the latest in the next generation of ProAc high-end transducers. The 46"-tall, three-way, bass-reflex design builds on experience garnered in the development of the carbon-fiber drive units used in the Response D40 and Carbon Pro Series. The K6 deploys dual 6.5" woofers with custom polymer-impregnated Kevlar woofer cones and a 2" soft dome midrange, which has been re-engineered with a radical new horn-loading for improved output and response. High frequencies are attended to by a ribbon tweeter. The cabinet of the K series is a traditional ProAc mixture of HDF materials of differing thicknesses heavily damped with bitumen. The K6 is ported by an almost invisible vent, a design feature that loads the area at the base of the speaker. Sensitivity is rated at 90dB with a nominal impedance of 4 ohms. Hand-made in England, each pair is personally tested by Stewart Tyler, the managing director and designer of ProAc for the last 30 years. Weight is 97 pounds each.

**Price: \$24,000.** [proac-loudspeakers.com](http://proac-loudspeakers.com)

### Magico Q3

The Magico Q3 is the latest addition to the Q series and is built on the landmark Q platform—a fully braced and damped aluminum and brass, hard-anodized enclosure. A true three-way, acoustic-suspension design, it achieves a 90dB sensitivity rating in this moderately sized loudspeaker. Nominal impedance is 5 ohms but never dips beneath 2.8 ohms. Reminiscent of the Q5 it shares much common ground including a complete set of Magico-designed transducers that includes new and ultra-efficient Nano-Tec drivers—three 7" woofers and a 6" midrange. It also borrows the Q5's superlative MBe-1 tweeter, the continuous curve of the Q5's diffraction-minimizing baffle, and the Q5's collar-locking isolation footers. At 47" tall it's imposing but not overpowering except for its prodigious weight at 250 pounds per side.

**Price: \$34,000**  
[magico.net](http://magico.net)



### Verity Audio Amadis

The Amadis occupies a key position in the Verity Audio product line that places it a step up from VA's popular legacy speaker, the Parsifal Ovation. It's a twin module three-way design in a bass-reflex configuration. The custom 6" midrange and 9" rear-firing bass drivers are all new designs while the neo-ring soft dome tweeter, first used in the Leonore, has also been revised. New crossover topology is also featured. Verity's rich tradition of contemporary styling is reflected in the Amadis, with the latest industrial refinements including the gentle rearward slope of the midrange/tweeter baffle for precision time-alignment. Sensitivity is rated at 93dB with a nominal impedance is 8 ohms for a wide selection of amplifier choices. Beautifully crafted and finished in Italian lacquer.

**Price: \$29,995.** [verityaudio.com](http://verityaudio.com)



## ON THE HORIZON

### Genesis Loudspeakers 2.2 Junior

The Genesis 2.2 Junior is positioned as the model for those who don't have enough room to house the Genesis 2.2 four-tower line-source system, yet insist on enjoying the advantages of a line source. In order to create the G2jr, Genesis integrated a pair of side-firing, servo-controlled 12" woofers with the midrange-tweeter wings of the G2.2 flagship. The G2jr incorporates a single 48-inch ribbon midrange and twelve 1" ring-ribbon tweeters mounted on a solid 1.5" thick cast-acrylic baffle. The two woofers each incorporate their own accelerometers and 600W amplifiers. Three additional 1" rear-firing ring-ribbon tweeters complete this stunning dipole. The finish is a lustrous high-gloss acrylic black.

**Price: \$49,000**

[genesisloudspeakers.com](http://genesisloudspeakers.com)



### Scaena "Kearse" Subwoofers

In redesigning its subwoofers, Scaena assiduously avoided the common pitfalls and clichés of the segment. Rather than focusing on gratuitous theatrical effects or obsessing over the deepest possible extension or maximum SPLs, Scaena opted for improving its woofers to seamlessly and transparently integrate with its remarkable line of Iso-linear array loudspeakers. In a word they required a superbly musical sub that would disappear as a source of very low bass. After a lengthy audition process with a variety of state-of-the-art designs Scaena unveils the 18" "Kearse" subwoofers. Nicknamed for NFL defensive end and avid Scaena owner Jevon Kearse, its machined cylindrical enclosures are inert, and internally braced specifically for standing wave reduction. As with every change or improvement Scaena makes there's a no penalty upgrade for existing customers.

[scaena.com](http://scaena.com)

# Book Excerpt

## The Six Rules of Loudspeaker Placement

Robert Harley

Correctly positioning your loudspeakers is the single most important thing you can do to improve your system's sound. It's free, and can make the difference between mediocre and spectacular sound. Before spending money on upgrading components, be sure you've realized your system's potential with correct loudspeaker placement.

To hear the full magic of a high-quality audio system, you'll need to arrange your listening room in a way that allows the system to perform at its best. Otherwise, the effort and investment you've put into your system could potentially be wasted. Begin by positioning the speakers so that they, along with your favorite listening chair or seat, form a rough triangle as viewed from above (see Fig. 1). This will get you in the right ballpark and give you a chance to fine-tune your system for optimum performance later on.

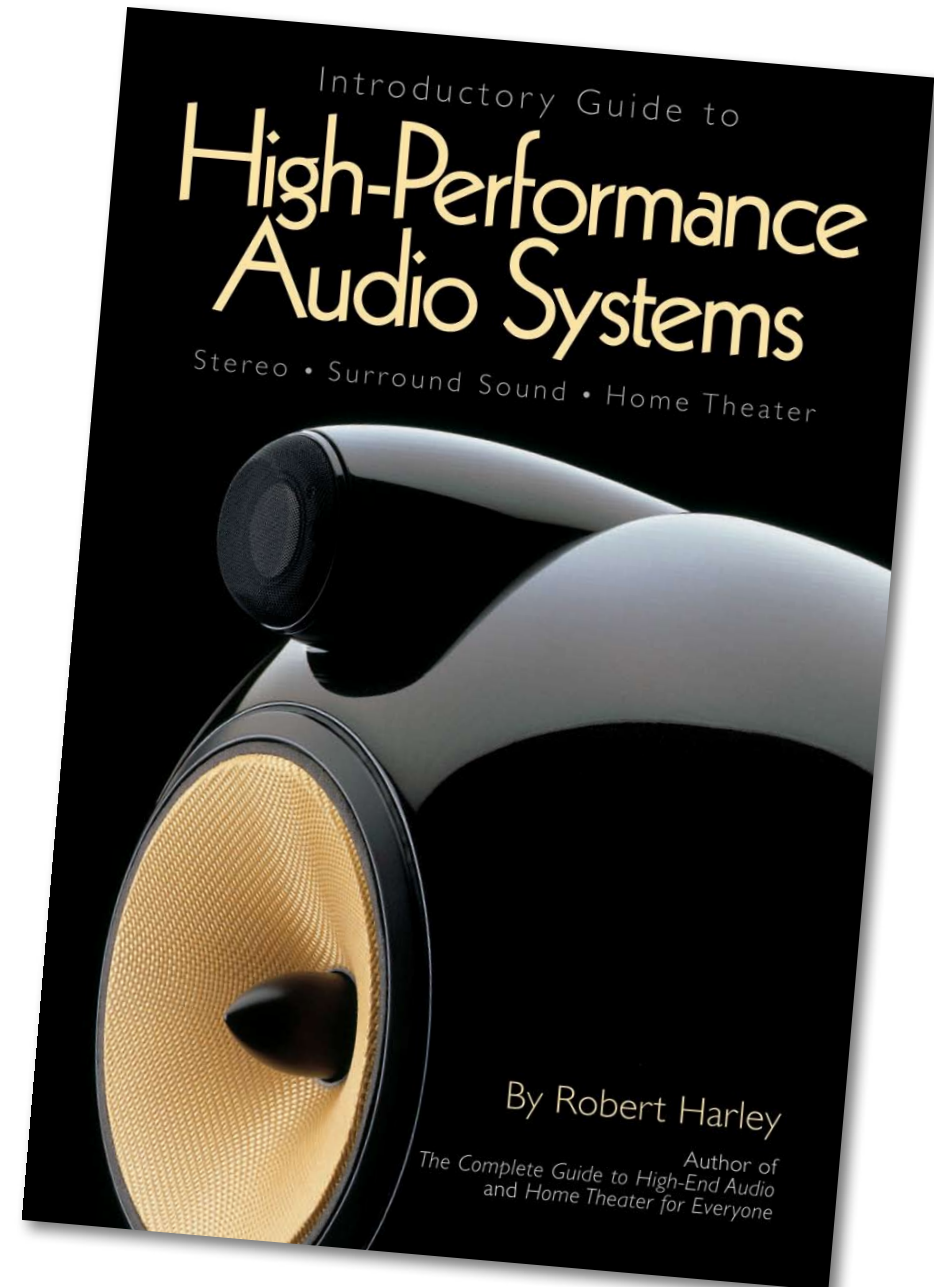
Loudspeaker placement affects tonal balance, the quantity and quality of bass, soundstage width and depth, midrange clarity, articulation, and imaging. In a multichannel system, correct placement immerses you in a three-dimensional soundfield, making your living room "disappear"

and transporting you into the film's action. As you make large changes in loudspeaker placement, then fine-tune placement with smaller and smaller adjustments, you'll hear a newfound musical rightness and seamless harmonic integration to the sound. When you get it right, your system will come alive. Best of all, it costs no more than your time.

Here are six fundamental rules for loudspeaker's placement.

**Rule #1:** The listener and loudspeakers should form a triangle; without this basic setup, you'll never hear good soundstaging and imaging.

The listener should sit exactly between the two loudspeakers, at a distance away from each loudspeaker slightly greater than the distance





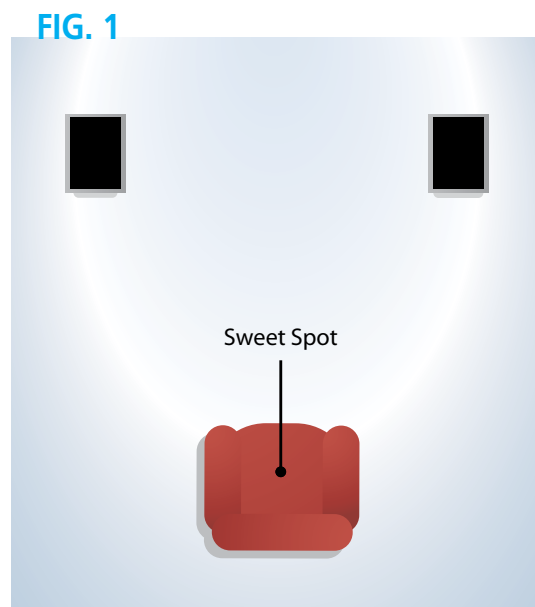
## FEATURE - The Six Rules of Loudspeaker Placement

between the loudspeakers themselves. Though this last point is not a hard-and-fast rule, you should certainly sit exactly between the loudspeakers; that is, the same distance from each one. If you don't have this fundamental relationship, you'll never hear good soundstaging from your system. If you want good sound, haphazard speaker placement just won't cut it.

**Fig. 1** shows how your loudspeaker and listening positions should be arranged. The listening position—equidistant from the speakers, and slightly farther from each speaker than the speakers are from each other—is called the “sweet spot.” This is the approximate listening position where the music will snap into focus and sound the best.

The ideal speaker separation should produce a strong center image and a wide soundstage. There will likely be a position where the center image (of a vocalist in the center of the stage, for example) snaps into focus, appearing at a stable, pinpoint location exactly between the loudspeakers. A musical selection with a singer and sparse accompaniment is ideal for setting loudspeaker spacing and ensuring a strong center image. With the loudspeakers fairly close together, listen for a tightly focused image exactly between the two loudspeakers. Move the loudspeakers a little farther apart and listen again. Repeat this move/listen procedure until the central image starts to become diffuse or less focused, indicating that you've moved the speakers slightly too far apart for optimum sound. Then, just push the speakers slightly closer together again until focus is restored.

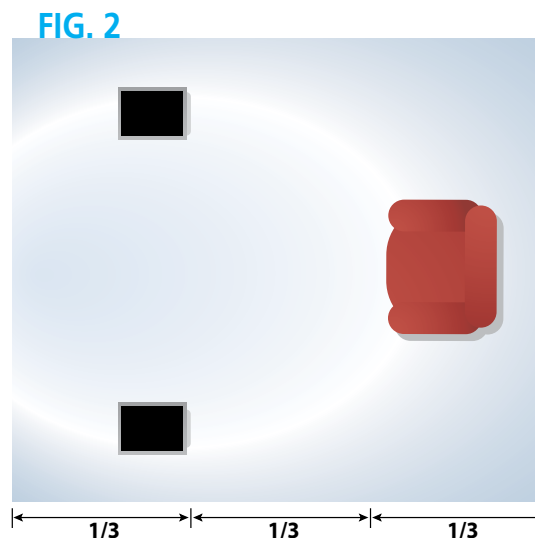
A center-channel speaker in a multichannel system makes this left-right speaker placement



less critical, but only when watching movies or listening to multichannel music. The center speaker helps deliver a solid soundfield across a wider listening area, allowing everyone to hear the precise placement of sounds, not just the person sitting in the middle.

**Rule #2: The nearer the loudspeakers are to walls and corners, the louder the bass.**

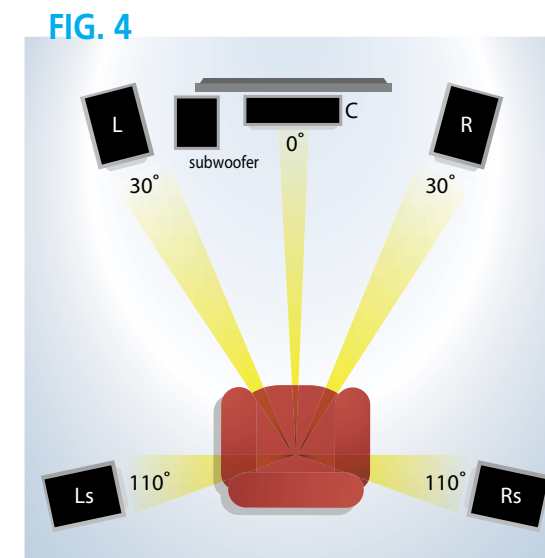
Loudspeakers placed close to walls will always exhibit some degree of bass reinforcement (called “room gain”), making the musical presentation sound weightier. The closer to the corners the loudspeakers are placed, the more bass you'll hear. A simple fix for boomy bass is to move the speakers out into the room and farther from the rear and side walls.



**Rule #3: The loudspeaker and listener positions in the room affect the audibility of room resonant modes.**

Room resonant modes are reinforcements and cancellations at certain frequencies that create peaks and dips in the frequency response, which can add an unnatural boominess to the sound. It's a good idea to place speakers to minimize the effects of room resonant modes so that bass is better defined and midrange clarity increases.

A well-known rule of thumb states that, for the best bass response, the distance between the loudspeakers and the rear wall should be one-third of the length of the room (**Fig. 2**). If this is impractical, try one-fifth of the room length. Both positions will help the loudspeaker integrate with the room. Starting with these basic configurations, move the loudspeakers and the listening chair in small increments while playing music rich in low frequencies. Listen for smoothness, extension, and



how well the bass integrates with the rest of the spectrum. When you find a position where the bass is smoothest, you should also hear an increase in midrange clarity and definition.

**Rule #4: The farther out into the room the loudspeakers are, the better the soundstaging will be—particularly depth.**

Generally, the farther away from the rear wall the loudspeakers are, the deeper the soundstage—that feeling of hearing objects (musical instruments) existing in three-dimensional space in front of you. A deep, expansive soundstage is rarely developed with the loudspeakers near the rear wall. Pulling the loudspeakers out a few feet can make all the difference between poor and spectacular soundstaging.

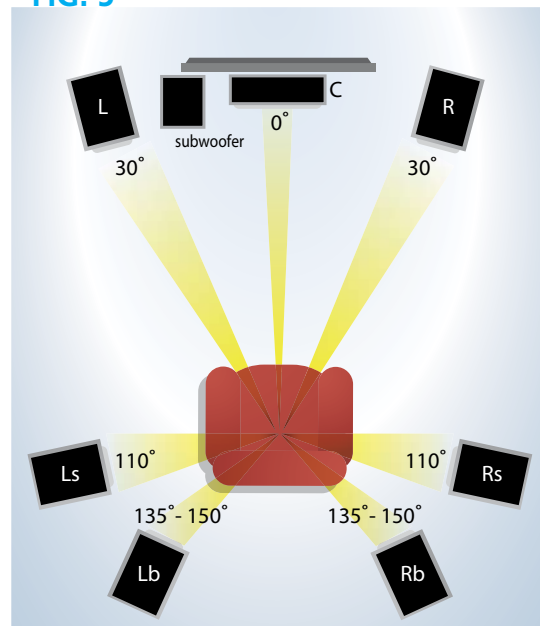


## FEATURE - The Six Rules of Loudspeaker Placement

### Rule #5: Listening height affects tonal balance.

Most loudspeakers exhibit changes in frequency response with changes in listening height. These changes affect the midrange and treble, not the bass balance. Typically, the loudspeaker will be brightest (i.e., have the most treble) when tweeters are at ear level and aimed straight at the listener. Most tweeters are positioned between 32 inches and 40 inches from the floor to coincide with typical listening heights.

FIG. 5



### Rule #6: Toe-in (angling the loudspeakers toward the listener) affects tonal balance, soundstage width, and image focus.

Toe-in is pointing the loudspeakers inward toward the listener rather than facing them straight ahead (see Fig. 3). There are no rules for toe-in; the optimum

amount varies greatly with the loudspeaker and the listening room. Some loudspeakers need toe-in; others work best firing straight ahead. Toe-in affects many aspects of the musical presentation, including mid- and high-frequency balance, soundstage focus, sense of spaciousness, and immediacy.

Most loudspeakers sound the brightest directly on-axis (from directly in front of the loudspeaker). Toe-in therefore increases the amount of treble heard at the listening seat. An overly bright loudspeaker can often be tamed by reducing toe-in, so the loudspeaker does not point straight at the listener. Some models, designed for listening without toe-in, sound far too bright when heard on-axis. Experiment with toe-in until you hear just the right amount of treble. (Hint: Identical toe-in of both speakers is crucial).

### Multichannel Speaker System Placement

The six rules for loudspeaker placement for a left/right stereo speaker pair apply equally well to a multichannel speaker array. When positioning a center and surround speakers, you should start with a solid foundation of correct placement for stereo reproduction.

Starting with the center speaker, its tweeter should be no more than 2 feet higher or lower than the main left and right speakers. It's not always possible to adjust the center-speaker height, which is often dictated by the height of your television. Ideally, the tweeters from the front three speakers should be at the same height.

Here's a simple yet amazingly effective trick to increase the dialogue intelligibility from your center-channel speaker: if the speaker is placed atop a television or shelf, align the center-channel

speaker's front baffle (the surface on which the drivers are mounted) flush with the television or shelf edge. This placement reduces unwanted acoustic reflections off the TV or shelf, resulting in a smoother frequency response and improved dialogue articulation.

For the same reason, the left and right speakers should be pulled forward of the television, with their front baffles in front of the TV.

Placement of the surround speakers is less critical than placement of the front three speakers. Start by positioning surround speakers at 110 degrees from the front of the room, as shown in Fig.4. This placement helps create a greater sense of immersion in the sound field. Ideally, you want to hear surround speakers *without* being able to pinpoint their exact locations (otherwise, they would too distracting). If this optimum placement isn't possible (if your listening couch is against the rear wall, for example), place the surround speakers to the sides of your couch and experiment with toe-in until you find a position where the speakers are audible but not distracting (again, you don't want to be able to pinpoint the locations of the speakers).

If you have a 7.1-channel loudspeaker array, position the four surround speakers according to the diagram in Fig.5.

### The Final Touch

After you've found the best loudspeaker placement, install the carpet-piercing spikes (if any) supplied by the manufacturer and adjust the spikes so that the loudspeakers (or speaker stands) don't rock. If you have wood floors, remember to place protective metal discs beneath the spikes.

Loudspeaker positioning is a powerful tool for

achieving the best sound in your listening room, and it doesn't cost a cent. Take advantage of it.

Excerpted and adapted from Robert Harley's book, *Introductory Guide to High-Performance Audio Systems*. © 2007 by Robert Harley. To order, call toll-free (800) 888-4741 or visit [www.hifibooks.com](http://www.hifibooks.com).

## EQUIPMENT REVIEWS

# Loudspeakers Up to \$5k



# Silverline Minuet Supreme Loudspeaker

## Desktop Delight

Steven Stone

Everyone has some movie lines stuck in their heads. “I like leeetle things...” uttered by Ian Holm while playing Napoleon in *Time Bandits* is one of my all-time faves. This line bubbles up to the top of my consciousness every time I go to CES looking for small loudspeakers to review. The Silverline Minuet Supreme speakers are certainly little things; only 5.5” wide, 9” tall, and 7.25” deep. When I saw them in Alan Yun’s room at CES last year, I felt an instant attraction. After looking through the extensive list of reviews on his site, I felt a bit late to the dance—they’ve been reviewed by a lot of people. So when Alan revised the Minuet and turned it into the Minuet Supreme, I was first in the queue for review.

### WHAT MAKES IT SUPREME?

The Minuet Supreme is the extension of the original Minuet with several minor but critical improvements. First the crossover point was changed from 3.5kHz to 3.7kHz. According to Yun, “this gives the tweeter a more relaxed presentation in the lower highs coupled with more extension. This new crossover point also enhances the midrange and lower midrange with more weight.”

The cabinet is the biggest cosmetic change. Instead of cheap-looking wood-grain-vinyl, the new Minuet Supreme has switched to real wood veneer. Going to veneer also necessitated some other production changes. Yun said, “The

cabinet of the Minuet Supreme is more rigid than the original Minuet. The Supreme uses a 1/2” particleboard compared to the 3/8” of the original. Overall the Supreme’s cabinet is an inch deeper. These changes give the Minuet Supreme a much lower cabinet resonance without making the cabinet too ‘dead.’”

Instead of exotic materials, the Minuet Supreme relies on tried-and-true technologies, a silk dome tweeter and paper cone midrange driver. Yun’s reasoning is straightforward. “I fell in love with dynamic paper cone drivers when I first heard them. My humble opinion is that paper cones usually have a more neutral and robust midrange, even though the bench measurements are not as



## EQUIPMENT REVIEW - Silverline Minuet Supreme Loudspeaker

good as other materials. Although sandwiched materials and ceramic cone drivers achieve clean tight performance, many have a kind of dryness I find emotionless. A good paper cone driver always has more ‘humanity.’”

Another weapon in Yun’s designer’s arsenal is the driver itself. “I use a long-throw over-hung design. The cone is 1/2” above the spider. This ‘mini’ driver with an effective diameter of 3.25” yields an unusual peak-to-peak excursion of 1/2”, which enables the Minuet Supreme to achieve a free-resonance point below 50 cycles. Except for the driver frame, the motor magnet, spider, and T-Yoke are custom made for me. Due to its efficiency, this driver can play effortlessly in the mid-90dBs.”

In order to get a seamless match with the woofer Alan Yun used an ultra-lightweight silk soft dome tweeter. To cope with the heat generated by the driver, it has both internal ferro-fluid heat dissipation and a heat sink on the back. Yun says, “I love a soft dome silk tweeter because it gives a warmer sound and eliminates the fatigue usually found on hard materials such as metals, diamond, or ceramics.”

Even the real rosewood veneer on the Minuet Supremes was chosen as much for its sonic effect as aesthetics. “There are so many different wood veneers available. Personally, I prefer the Danish rosewood we’re using on the Minuet Supreme. The sound from this veneer is more ‘organic’ than other veneers I tried.”

As Yun said, “To build a very small mini-monitor without giving away quality is very challenging, especially under the restrictions of a budget. Still, the Minuet Supreme has PP capacitors, 6N copper internal wiring, bi-wireable high-

quality binding posts, machined and brushed anodized solid aluminum speaker binding post boards.” Getting all this in a speaker that sells for \$600 a pair would have been unthinkable only a few years ago.

Back in 2007 Neil Gader reviewed the original Minuet speakers. He found the originals to be “gregarious and voluble with a hint of spotlighting on top. Harmonically the Minuet has an intrinsic sweetness that just won’t quit... Although it attains some impressively high SPLs, when stressed it will sit on vocals a bit, pushing them back a couple rows...like every mini-speaker I know of, the Minuet can’t summon the linearity and sheer *gravitas* that larger multi-driver speakers extend to the lower frequencies...if your tastes run strictly to Mahler or Metallica it might be a bit overmatched; otherwise, the Minuet is musicality personified.”

The Minuet Supreme retains all the sonic strengths of the original model, but adds greater dynamic range to the mix. Although I still wouldn’t recommend the Minuet Supremes for a large or even middle-sized room, in a small room tethered to at least one subwoofer the Minuets can deliver an amazing amount of both detail and musicality. Because I like using gear in its most appropriate setting, most of the time I used the Minuets in my desktop system where they delivered high SPLs with no hint of distress. My personal peak-SPLs came long before the Minuet’s.

Even on a desktop, less than two feet away, the Minuet Supremes do a superb disappearing act. They rival the Role Kayaks in their ability to produce a complete picture of the soundstage with no hint of the actual location of the drivers

or box. My test for this is simple; I close my eyes, spin around in my chair a couple of times, and then try to pick out where the speakers are. With the Minuet Supremes I failed miserably.

I’m very partial to monitors that deliver all the information a recording has to offer. On difficult to unravel recordings, such as the Punch Brothers’ *Punch*, the Minuets had no trouble successfully revealing even the subtlest spatial information. Each instrument and each voice occupied a particular location in three-dimensional space. Some speakers can’t quite nail those things; they’re too flat and one-dimensional, or too vague. The Minuet Supremes put every instrument exactly where it should be. I’ve never heard a speaker on my desktop that does a better job of preserving all the locational cues imbedded in a recording.

Using my iPod Touch and the AudioTools App I was able to test the Minuet’s dispersion. Both pink and white noise proved the listening window on my desktop was larger than any normal human in a sitting position could move out of. Only when I stood up did the pink and white noise frequencies begin to shift due to high-frequency roll-off. Within 30 degrees of parallel with the tweeter there were no audible traces of high-frequency shift.

When I talked with Alan Yun about the Minuets he emphasized that getting the midrange right was a primary design goal. I think he succeeded. The Minuets are exceedingly musical speakers due primarily to their midrange character. They remind me of the Spendor SP1s in that they never sound harsh or screechy, unless the music actually is harsh and screechy. The Minuets also have a seductively natural presentation that is

the antitheses of hyped-up hi-fi sound. Perhaps this is what designer Yun calls “humanity.”

While the Minuets do provide a remarkable amount of lower-midrange and upper-bass energy for their size, don’t expect them to generate the sort of punch that you’ll feel in your diaphragm from a full-range speaker. On the tune from Lawrence Arabia’s *Chant Darling*, “Apple Pie Bed,” these little speakers tried hard to keep up in the lower midrange and deliver some punch, but several small speakers in my collection, including the ATC SCM 7, Paradigm S-1, and Aerial Acoustics 5Bs, produced more lower-midrange and upper-bass impact. These all have larger drivers and

### SPECS & PRICING

#### Silverline Minuet Supreme Loudspeaker

Type: Two-way bass-reflex mini-monitor

Driver complement: One 1” silk dome tweeter, one 3.25” pulp paper cone mid/woofer

Frequency response: 60Hz-28kHz

Sensitivity: 88dB

Nominal impedance: 8 ohms

Crossover frequency: 3.7kHz

Recommended power: 10-300 watts RMS

Dimensions: 5.5” x 9” x 7.25”

Weight: 15 lbs.

Price: \$600/pr.

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## EQUIPMENT REVIEW - Silverline Minuet Supreme Loudspeaker

larger enclosures. Obviously there are limits as to what even the best-designed 3.5" driver in a small ported cabinet can generate in the way of slam.

As you might expect from such a diminutive transducer, the Minuets have truncated bass extension. But since their roll-off is smooth and hump-free, it's easy to mate them with a subwoofer. With both the Earthquake MK IV 10 and JL Audio Fathom f112 subs, I found a 70Hz crossover point worked nicely, letting the Minuets generate the leading edge while the subwoofer delivered the main part of the wave.

As more audiophiles embrace computer-based audio systems the cheesy transparent plastic speakers that populate many desktops will be replaced by transducers that can actually sound like music. The Silverline Minuet Supreme speaker is an ideal candidate for such a position. It is revealing, musical, and, perhaps best of all, human. *tas*



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# PSB Image T6

## Science Meets Black Art

Robert E. Greene

**I**n years gone by, audio people used to refer to speaker design and manufacture as a Black Art. And they had a point. Not so long ago, hand-doped drivers and special response-contouring in crossovers to (try to) fix driver errors were the rule.

But times change. New materials have made drivers better behaved and more consistent in manufacture. And advances in test procedures and test facilities have made the evaluation of designs easier—PSB’s new T6 reviewed here was designed with the help of the Canadian National Research Council (NRC) acoustic testing lab. In effect, speaker design has been considerably rationalized. This all ought to add up to good speakers being less expensive to design and build. And in this respect the PSB Image T6 is a very much a case in point. It is rationally designed, and it does indeed offer remarkable musical performance at its price. And yet, the art has not gone out of the whole process. Designer Paul Barton told me that, while the general outlines of his design follow theory, much of what he does is a matter of intuition as far as the fine details are concerned. And, of course, the fine details matter a great deal. Well, one can only admire how superbly his intuition works and be glad for his mastery of the aspects of the process that remain in effect an art.

A quick tour of the sound, from the bottom

up: The T6 has real bass, –3dB at 35Hz, a little “bloom” but good pitch definition, and realistic warmth and fullness. No miniaturization here! Its double-port and double-woofer design give really smooth bass— lower, middle, and upper—in the actual listening room through correct treatment of the floor-loading issue, unfortunately a rarity in floorstander designs but very much a feature here. The midrange is very clean and quite neutral sounding. And the treble is extended and again very clean sounding.

Resolution of detail is excellent. One gets a real taste of high-end presentation of detail at this semi-budget price. These speakers are extraordinarily transparent. If you wanted to write down every note of every part of a multi-layered piece of music just by listening, this would be a good speaker to use. The drivers seem well-behaved, indeed, and the sound very clean and clear. Perceived distortion levels are very low. (So are the measured levels, from the manufacturer’s measurements.) It is an audiophile tradition to say that no dynamic-driver speaker can approach electrostatic low levels of distortion, but the T6





## EQUIPMENT REVIEW - PSB Image t6



sounds quite close to that low level of distortion. The midrange is really clean and pure.

Imaging is also excellent—the speakers have minimized diffraction and they vanish into the soundfield most satisfyingly. Interestingly, the out-of-phase sound on test tracks for speaker phasing is more perfectly directionless and the in-phase more tightly focused than usual. I shall have a few sonic nits to pick later—after all, this is a TAS review—but this is high-end sound in all directions, never mind the low price.

The speakers look elegant. The dark cherry finish of the review samples has the warm glow of fine furniture, and the curved surfaces give a special gracefulness. After a listen in our audio room, Paige approved enough not only of the sound but also of the looks to suggest moving the T6s up into the living room. They made the cut in both sound and appearance.

The design goal of the PSB T6 as I understand it was to make a speaker with flat response, wide and uniform radiation pattern, and (as Paul Barton described to me) not only smooth off-axis frontal behavior but smooth directivity, smooth “power response.” The power response was intended to be free of glitches and to droop smoothly with increasing frequency in the top end, smoothly sloped down with increasing frequency in “room response.” This might be called a textbook ideal, but it is far from easy to pull off!

Incidentally, I am really indebted to designer Paul Barton for his detailed answers to my technical questions and for sharing a great deal of information on the measured performance of the T6s. But for people who worry about such things, I listened long and wrote this review except for very minor revisions before seeing any measurements at all—not even my own, as my measurement system was temporarily down. My comments on frequency response were based on

listening and experimenting with what small EQ changes improved the sound to my ears, not on any preconceived ideas from measurements. Interestingly, my observations fit essentially line by line with the measurement information supplied later by Paul Barton from the Canadian NRC facility.

A bit technical there in the description, all that about power response and so on—but it all adds up to things that are musically important. The well-balanced sound comes out into the room with real naturalness and no sense of the listener being restricted to a tiny sweet spot, nor of the sweet-spot sound being erratically different from the overall “room sound.”

Now there are alternative approaches to making a speaker work in a room involving much narrower radiation patterns, and it is no secret to TAS readers that I have a soft spot for the narrow-pattern approach. But truly, the most crucial point is not so much wideness-versus-narrowness as such, but rather smooth variation of the pattern with frequency, and this the T6s do very well. This speaker really sounds like music at some deep level and very much *not* like a speaker, in a way hard to put into words in detail but very easy to hear.

The T6s are not perfect—if they could be, what would the higher-priced PSB models be for? The tweeter, while very pure sounding, has to my ears a slightly different tonal color than the midrange driver, a little metal-dome sweetness—not unpleasant, just a bit of extra color, heard mostly on high massed strings. Also to my ears, the treble is slightly “hot” in the real top, in the context of overall flat response, and the sound a little bit “hard.” Paul Barton, as I understood him, is quite intent upon not having any of the British “politeness,” which was derived from a combination of a deliberate dip in the 2–6kHz range—the “BBC [or Gundry] dip”—and the directionality arising at the top of the operating range of large midrange drivers. Fair enough, to eschew this, an esthetic judgment call—but to my ears

## EQUIPMENT REVIEW - PSB Image t6

the T6s go a bit too far in the other direction with what seems to me a little excess around 4kHz. The T6s do not do much tempering of the wind to the shorn lamb as far as program material is concerned.

The exact perceived balance can be altered by changing seating height and by more or less toe-in. The speaker has a quite smooth variation of response with respect to such changes, so one can use them for adjustment to taste without introducing coloration.

The midrange does a fine job of the human voice, which sounds natural and naturally balanced. Most instruments are similarly well served. The T6s were not at their absolute best on solo piano recordings, on which the speaker exhibited a certain coloration of the specifics of piano tone. This is subtle, though, and might pass without notice unless you listen to a real piano in direct comparison. I think this came from a little bit of extra energy from the midrange driver, a little projection around 1.5kHz, since a little EQ down at that frequency largely eliminated it. (This little excess can make the midrange driver come out a bit at close range on material that is at all midrange-forward). But overall, the sound is quite uncolored.

The treble is so clean that its slight excess, if excess it be, is less disturbing than it could be, and for some types of music the little extra zip and presence may actually enhance the experience. I get some idea that the T6 is perhaps intended for young people and their livelier music, with the more expensive Synchrony line, which I gather has a slightly less “live” balance, intended for the older, presumably richer, but more sedate customers.

I experimented with pulling the treble/upper-mid

down a little. Lenbrook Industries, parent company of PSB, also owns NAD, whose products feature tone controls, so I did not feel guilty experimenting with such adjustments, though I used the Z Systems rdp-1 digital EQ rather than a tone control in the usual sense. For things like classical orchestral music, this small adjustment, specifically pulling a dB or so out at 4kHz and as noted a tad out around 1–1.5kHz, gave what seemed to me a more natural balance. But the T6s as they are were by no means unsatisfactory. Indeed, they are very much in line with current practice in the high end where a dB or two of extra treble has seemingly become regarded as preferable to a dB or two too little. But a little less treble made things better to my ears.

The bass was much to my liking, warm, full, yet defined in pitch. The bass has, compared to, say, sealed boxes optimized for bass tightness, a little “bloom”—like a concert, arguably, but perhaps not ideal for some music where bass tightness is called for. For orchestral music, it was fine indeed. Overall, the sound was very smooth and natural. And orchestral sound was well balanced and exceptionally convincing.

As I mentioned, the T6s really dealt effectively with the floor-loading issue, a pet peeve of mine: It is all very well to say that rooms vary, and of course they do. But everyone has a floor. It is dismaying that most floorstanders do not do anything to accommodate the loading by the inevitable floor. This can be a huge effect, both in terms of measurement and, more importantly, musically.

Much to PSB’s credit, the T6s were deliberately designed to work correctly with a floor beneath them. The PSB Web site makes an explicit point

of this, as well it should. The musical effect was profound and profoundly desirable. Round and about, one can find reviews commenting on how the PSB floorstanders are overly warm. Don’t you believe it! This is what music really sounds like, and invidious comparison to other floorstanders is just revealing the others’ floor dip. And floor dip is neither on the recordings nor a feature of real music. And if you are inclined to use DSP to make the bass in room even closer to perfect, you will find not much to correct and the correction easy, since the speaker lacks those cancellation dips that are so hard to deal with.

The T6s sounded remarkably like a real orchestra on the Telarc *Bolero*, with the spectacularly well recorded *Carmen* Suites in particular. The T6s also revealed clearly the striking tonal beauty of the Dvorak *Legends* recording by Fischer and the Budapest Festival Orchestra [Philips]; they also revealed the microphone patterns and the differences among the tracks, which come in two sets, recorded at different times.

The result was truly like what HP calls the gestalt of a real orchestra, with minimal sense of sound from speakers as such. Smaller scaled music—Ulf Bastien’s *Winterreise* recording [Ars Musici], for example—was equally convincing. And the resolution of detail, the clarity, the intelligibility of words, the positioning of images precisely and convincingly were all most gratifying both in audiophile and in strictly musical terms.

It is a perennial topic among audiophiles, how far recorded music is from live, with the glass-half-full side commenting on the similarities, the half-empty side noting the differences. To an extent surprising in a relatively inexpensive speaker, the T6s make the argument for similarity to live sound

very convincingly. These speakers can sound remarkably like the real thing. And you will never be able to go back to speakers with that floor dip between 100 and 300Hz again, that is for sure.

Perfect, not quite, but startlingly close at the price, yes, indeed. **tas**

### SPECS & PRICING

#### PSB Image T6 Loudspeaker

**Type:** Three-way floorstanding loudspeaker

Driver complement: Two 6.5” woofers, one 5.5” midrange, one 1” titanium dome tweeter

**Frequency response:** Bass: -1.5dB at 45Hz, -3dB at 32Hz, -10dB at 28Hz; treble: +/-1.5dB at 20kHz

**Sensitivity:** anechoic, 88dB; in room, typically 91dB

Impedance: 8 ohms nominal, 4 ohms minimum

**Power handling:** 200 watts program maximum, 20 watts minimum recommended amplifier power

**Dimensions:** 43” x 7.75” x 14.75”

**Price:** \$1199/pr.

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# Nola Boxer

## The Little Loudspeaker That Could

Neil Gader

**F**or high-end aficionados, Nola needs little introduction. Its open-baffle dipole designs, which include the Baby Grand and the majestic four-tower flagship, the Grand Reference IV.1, are the stuff of dreams for many of us. Music is reproduced on such a transparent and forceful scale that even the most jaded will listen with rapt attention. The good news for those just starting up in the high end is that veteran designer and Nola president Carl Marchisotto has an equally deft touch with small affordable speakers, as Nola's latest effort, the Boxer, clearly attests.

At barely fifteen-inches tall the Boxer is an unassuming, blue-collar two-way compact in a bass-reflex enclosure—it's also the only box speaker that Nola makes. The Boxer's loaded by a rear-firing twin-flared port for low distortion and noise. It incorporates a low-mass 6.5" bass/midrange driver with a laminated pulp cone. The high-frequency driver is a high-resolution silk dome tweeter. The crossover is a shallow-slope design using high-purity polypropylene caps, air-core inductors, and 2% metal-film resistors. It incorporates the same vibration-isolated, hand-wired crossover as Nola's bigger models and the same passive components used in Nola's \$22,000 Metro Grand. It is assembled by hand with point-to-point wiring, using a proprietary low-loss oxygen-free copper wire.

The physical profile of the Boxer may be working class, but, oh my, does this baby play uptown. Its overall sonic character is unerringly musical, midrange-ripe with a fine balance of warmth and detail and the propulsive energy of a finely-honed athlete. Its presentation is not shy or recessed; its treble isn't brittle or

fatiguing. There's substance to every octave with no energy suck-outs. The result is a wide-range dynamic transducer that is always musically truthful. The soundstage is very large and open, yet has excellent focus. The Boxer also exhibits the moves you'd expect of a smart two-way—vivid images, quick transient responses, and the kind of resolution I encountered on Lyle Lovett's "North Dakota" from Joshua Judges Ruth [Curb], where the soft vocal harmonies and parallel melodic lines snapped into focus at even the lowest levels.

But what makes the Boxer so special is the extent to which Marchisotto has transported the qualities of his large-scale, open-baffle designs into such a petite box. There's much the same characteristic air and openness without any boxiness—not surprising given Marchisotto's history of designing iconic dipole speakers for the likes of Dahlquist and Alon. For much of the Boxer's sonic excellence, the credit must go to its exemplary mid/upper bass, which was solid and tight and extended in my room. Unlike many compacts that can't punch their way out of paper bags, the Boxer has enough drive to recreate orchestral-



## EQUIPMENT REVIEW - Nola Boxer

style weight, soundstage cues, and concert-hall immersiveness. During the opening segment of Tchaikovsky's Violin Concerto in D Major with Anne Sophie-Mutter [DG], the Boxer immediately conveyed the way the orchestra wakes up the hall's acoustic. And during Jen Chapin's rendition of "Renewable" from ReVisions [Chesky], the Boxer punched outside of its weight class, reproducing the dueling baritone sax and standup bass with dynamic authenticity. It should be noted that the large port outputs a great deal of energy, so distance from the rear wall does require some experimentation.

Ultimately the Boxer, like every other speaker, has limits. When over-driven, the port's tuning will intrude and thicken the mix—the lowest notes of

cello or brass or plucked bass viols become less well defined, somewhat reducing timbral clarity and low-level decay.

Any major issues? Not really, and the trade-offs—such as they are—are honest and distributed with a subtlety that doesn't dampen the quality and intensity of the Boxer's overall performance. In the vocal ranges I noted a small presence-range droop, a hint of sibilance, and, as was to be expected, a bit of compression during high-octave flurries of percussion. During Glinka's The Lark [RCA], the solo piano's energy and air were not always fully reproduced; as a result lower midrange arpeggios were dynamically a bit muted, and the treble octaves slightly glassy.

Post review, I asked Marchisotto about the challenges of designing at this price point: "The keys are the midrange and midbass areas. We aim for a clear dimensional midrange with as much 'air' as we can get and a naturally dynamic, clean midbass. Many designs today compress the midbass in order to attain more apparent detail. I find these designs tiring to listen to, as they are not musical, regardless of the other sonic characteristics provided." In my view, mission accomplished—a designer after my own listening biases.

The Nola Boxer exemplifies what a budget two-way compact should be. Easy to underestimate, it's the kind of ringer that doesn't telegraph its intentions until the bell sounds. That's when you realize you've placed your bet on a winner—and that the competition had better duck and take cover. **tas**

### SPECS & PRICING

#### Nola Boxer

**Type:** Two-way, dynamic driver, bass reflex loudspeaker

**Driver complement:** 6.5" laminated cone, 1" silk dome

**Frequency response:** 44Hz-28kHz

**Sensitivity:** 90dB

**Impedance:** 8 ohms

**Dimensions:** 15.5" x 8" x 11.5"

**Price:** \$1500/pr.

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# Magneplanar 1.7

## Get Out The Mastercard!

Jonathan Valin

**N**ot too long ago I proposed an article to our Editor in Chief, Mr. Harley, to be called “What Would You *Really* Buy?” By this I didn’t mean what our reviewers would buy if they had access to a Rubidium Mastercard, but what they could actually afford with their own meager funds. Without a question or a doubt, the speaker I’m about to review is the one I’d opt for—and (unless it’s been replaced by something even better from Magneplanar) will be the one I do opt for when the Magico M5s and Soullution 700s stop showing up at my door and I’m finally turned out to pasture.

The \$1995 Magneplanar 1.7 boxless, floorstanding, dipolar (they radiate equal sonic energy front and back), quasi-ribbon loudspeaker—the first new loudspeaker from Magneplanar in better than a decade—was the most eagerly anticipated introduction at this year’s CES. Happily, its debut turned out to be a smashing success. Even more happily, its “debut” in my listening room has been a smashing success. I have now listened to the 1.7s for almost four months, and I can say with confidence that they are worthy successors to the 1.6s, the speakers I have long thought (and often called) *the* best buys in high-end audio.

Truth be told, I think the 1.6s also are (or were, prior to the arrival of the 1.7s) the best speakers in the Maggie line, at least in one (to me) critical respect. Much as I admire the “true ribbon” Maggie 3.6s and 20.1s (both of which I’ve reviewed in various iterations), I have always had a problem

with, well, their true ribbons. Precisely because of their superiority in transient response and resolution, Maggie’s true ribbons have always stuck out a bit compared to the quasi-ribbon or planar-magnetic panels they are mated with. Indeed, I have generally had a problem with speakers that attempt to mate a ribbon or electrostat to any other driver, save for another ribbon or electrostat (although see my review of the Nola Baby Grand References in this issue for a notable exception). Yes, Maggie’s true ribbon is a marvel of speed, resolution, low distortion, and extension, and, yes, it was and remains superior in those regards to the “quasi-ribbon” that Maggies uses in the 1.6 and now the 1.7. But when you can persistently hear a driver as a separate element in the presentation, it makes the speaker as present as the music it is reproducing, rather spoiling the illusion that you are listening to one seamless transducer, which, as I’ve noted in



## EQUIPMENT REVIEW - Magneplanar 1.7

the past, is as close as hi-fi gets to creating the illusion that you are listening to *no* transducer.

For those of you who don't understand the difference between "true" and "quasi" ribbons, let me explain. In a nutshell the incredibly lightweight foil of a true ribbon *is* the driver—it simultaneously conducts the signal and vibrates to turn it into sound waves. In a "quasi-ribbon," the foil is not the driver—or not exactly. In a quasi-ribbon, that strip of aluminum foil is itself attached to an extremely lightweight strip of Mylar; the foil, which is suspended between permanent bar magnets, acts as the signal conductor (a planar voice coil, if you will), transmitting the signal to the entire surface of the Mylar, which, in turn, vibrates to produce sound. As a point of comparison, in a traditional planar-magnetic panel the Mylar driver is not driven uniformly over its entire surface by a foil of aluminum as it is in a quasi-ribbon; instead, it is driven by a latticework of thick signal-conducting wires that are attached to the Mylar itself. The difference in the uniformity of drive and in the relative mass of the driver should be obvious.

Up until the 1.7, all Maggie speakers used a mix of ribbon (typically for high frequencies), quasi-ribbon (typically for high frequencies and upper mids), and planar-magnetic drivers (typically for the lower mids and the bass), which, as I just noted, made for variations in uniformity of drive, uniformity of dispersion, uniformity of moving mass, and uniformity of power-handling that could sometimes be heard as slight discontinuities in the overall presentation. This was particularly true of the transition between ribbon tweeter and quasi-ribbon or planar-magnetic panels, but also of the transition between quasi-ribbon and

planar-magnetic panels.

What makes the 1.7 such a landmark—and a departure—is that every driver in it, from its super-tweeter panel to its tweeter/upper-mid panel to its lower-mid/bass panel—is a quasi-ribbon, making this the first Magneplanar to use ribbon technology in *all* of its drivers. The speaker's crossover has also been carefully redone, as has its "enclosure" (the 1.7s use a stiffer aluminum-and-MDF frame rather than Maggie's traditional all-wooden one). The result is a loudspeaker of superior "uniformity"—a speaker's whose power-handling, dispersion, resolution, and overall presentation are more "of a piece" than *any* previous Maggie design. (This does not mean, BTW, that the 1.7 will outdo its bigger brothers in some critical areas. Maggie's true ribbon tweeter, taken on its own, remains a superior transducer, and the considerably larger planar-magnetic mid/bass panels in the 3.6 and 20.1 simply produce "bigger," fuller, deeper bass than the smaller quasi-ribbon bass panel in the 1.7.)

Frequency response of the 1.7 is said to range from 40Hz–24kHz (which the eagle-eyed among you will note is not all that different than the frequency response of the 1.6). Its sensitivity is rated at 86dB/500Hz/2.83V. Its impedance is 4 ohms. All of which means that, like the 1.6 and every other Maggie, the 1.7 will take some power to drive, although how much power depends on the size of your room, the kind of music you listen to, and the levels you are comfortable listening at. (In my medium-sized room I'd estimate 100Wpc minimum, making the tube-powered \$5995 ARC VS115 and Odyssey's \$995 solid-state Khartago excellent matches.)

At the start of the review period I drove the

1.7s with two of the most transparent solid-state amps I've heard—the \$115k Soulution 700s and the \$80k BALabo BP-1 Mk-II—coupled (via Tara Labs Zero and MIT Oracle MA-X) with the best preamps I've heard—the Audio Research Reference 5, Soulution 720, and BALabo BC-1 Mk-II, and the Audio Research Reference 2 Phono and Soulution 750 phonostages—and fed by the best sources I've heard—the Walker Proscenium Black Diamond Mk II record player with Da Vinci Grand Reference Grandezza Mk II cartridge and the "Level 5" United Home Audio TASCAM 15ips, two-track tape deck playing back fabulous second-generation mastertapes from The Tape Project. I realize that this is overkill, but let it be known that I could live happily with the 1.7s as my speakers in systems that are as ultra-high-end as these were. *That's* how good they are.

I'm going to begin with some general observations about how the 1.7s sound.

First, yes, the 1.7s are audibly and substantially more coherent than previous Maggies—more of a piece top-to-bottom than the 1.6s, the 3.6s, and the 20.1s.

Second, the addition of the super-tweeter has greatly improved the treble over that of the 1.6s—more air, more detail, more transient speed, more bloom. But, be aware that played *very* loudly (and I'm talking well above 100dB+ SPL peaks) that tweeter can turn bright in the upper mids as the panels reach the limits of their excursion. The quasi-ribbon bass is improved, too, in resolution and dynamics, although I wouldn't say it goes any deeper than that of the 1.6s (at least, not in my room)—solid, resonance-free, and remarkably finely detailed down into the mid-to-upper 40s. Do note that, like the tweeter, the bass panel can

also be overdriven at very loud levels.

It's almost a paradox that Maggies and dipoles in general like to be played louder to sound their liveliest and most room-fillingly natural (although see the paragraph below for how the 1.7s have improved on this). The paradox is that if you play them *too* loud those panel-excursion limits I just mentioned tip them over into distortion. There is a sweet spot on the volume knob where the Maggies will sound their substantial best, particularly on large-scale music. This sweet spot is not hard to find; you can easily do it by ear. As soon as the treble starts to glare and stick out on trumpet blasts and the bass to dry up or to break up with a sound rather like that of dust on a phonograph needle on, say, a big bass-drum strike, you need to back the volume down. Don't worry. You'll still be able to play plenty loud—just not as loud as, oh, Nola Baby Grand References.

Third, as I just implied, the 1.7s will play loudly more eagerly than the 1.6s, although they still may not be the ideal stadium-rock speaker. More importantly from my point of view, they will also play more convincingly at low-to-moderate levels than the 1.6s (or any Maggie I've recently heard). Like their newfound overall coherence, this is a major departure from previous Maggies. While they sound progressively more room-fillingly realistic as you turn the volume up to a lifelike level, they do not sound anemic dynamically at lower volumes nor do they seem short of (or oversupplied with) bass or treble.

Fourth, they image better than any Maggie I've yet heard. I assume this may be a side-benefit of the uniformity of drive, dispersion, and power-handling of their all-quasi-ribbon complement of drivers (and it may have something to do with the



## EQUIPMENT REVIEW - Magneplanar 1.7

addition of the separate super-tweeter, too). In any event, the “mouth-as-big-as-a-bass-drum” effect of many previous Maggies is...gone. While they still have lifelike image size (at lifelike volumes), the focus of the images is vastly improved—almost to the level of something like the point-source Magico M5, which is a paragon of imaging. Coupled with their speed, openness, and neutrality, this improved focus makes voices—always a strong suit of Maggies—just that much more “there.”

Fifth, their soundstaging is simply the best I’ve heard from a planar dipole. With the right source (like The Tape Project’s dub of Reference Recordings’ *Arnold Overtures*—horrible music, great sound—or the superb Philips LP of Richard Rodney Bennett’s terrific Piano Concerto), your jaw will drop when you hear the way these relatively demure panels fill the back third of your room with precisely layered, minutely detailed, incredibly deep, wall-bustingly wide sound.

Sixth, when it comes to enclosure colorations it goes without saying that a boxless planar like a Maggie has a leg up on most dynamic speakers. No boxes mean no box colorations. This almost guarantees a very good “disappearing act” and remarkable openness, “outside-the-box” imaging, and wall-to-wall soundstaging, and can (and in this case does) mean lower levels of the colorations that come from the resonances of a cabinet. (However, and we will come to this, box colorations aren’t the only kind of colorations speakers are heir to.)

Seventh, the 1.7s are considerably higher in resolution at low, moderate, and high SPLs than the 1.6s, from top to bottom. Though I wouldn’t say they are as transparent to sources or as finely detailed as, oh, the MartinLogan CLXes (nothing

is) or the Magico M5s, they are nonetheless very finely detailed and transparent. Save in the bottom octave or octave-and-a-half, where they peter out, you aren’t going to miss much if anything with these little numbers.

Eighth, they are exceptionally neutral in overall balance. Provided that you don’t overdrive them, the 1.7s sound the same shade of neutral gray in the treble, the midrange, and the bass, and bring the same transient speed and dynamic range to every octave in which they play. No, they are not as colorless and transparent as the twelve-times-more-expensive CLX electrostats. Like all Maggies they have a slight touch of grain—an overlay of very-very-low-level sandiness that is distinctively Magnepan. You don’t hear this grain so much on instruments or voices (well, you do, but it doesn’t distract), as you do in the air of the hall or in the silences between notes. Somehow it makes that air and those silences seem more audible, more active, less acoustically inert—the way a bit of fine grit suspended in water makes its motion more visible. It may be a coloration but, to my ear, it can be a curiously lifelike one.

Ninth, the 1.7s are intoxicatingly realistic. There is something about Maggies that simply sounds like the real thing, particularly in the midrange, particularly on voices. Maggies aren’t the only speakers that have this supreme gift (Magicos have it, too—in spades—and so do CLXes and so do Nola Baby Grand References). But some combination of neutrality, coherence, transient speed, image size, dispersion, dimensionality and bloom, and resolution of texture has always made Maggies sound more real than a large percentage of their competition. Here—with the right recordings, at the right levels—that realism

(at least in the midband) is simply unmatched, in my experience, for a speaker at this price point or, really, for anything even remotely close to its price point.

What makes this last point even more compelling is the way these speakers hang together—combining all the plusses I’ve just enumerated—on very large-scale music. You expect these smaller full-range Maggies to shine on a Joan Baez ballad or a Bartók quartet or a Chopin mazurka (Maggies are simply great on piano, possibly, as Dick Olsher once brilliantly speculated, because their planar wavelaunch comes closer to the planar wavelaunch of an actual piano). What you don’t expect—or, at least, I didn’t—is what they can do with a full orchestra in full cry. Guests who came to audition the 1.7s—experienced listeners, including several illustrious manufacturers—almost swooned when they heard these little numbers playing back the Janáček Sinfonietta [Denon]. I’ve talked before about the huge brass choirs (and the thrilling brass anthems) in this piece, but, honestly, to hear these instruments spread past the far walls on your right, almost to the ceiling, the trumpets clearly elevated on risers, each instrument focused with “count-’em” clarity and singing out without any apparent dynamic compression (unless, of course, you push the panels too hard) and with superb definition of pitch, with as lifelike a timbre as any speaker I have in house, and with superb attack and decay is a thing of jaw-dropping wonder—and a thing that the 1.6s, for all their virtues, couldn’t bring off nearly as well.

So what are this little gem’s downsides? Well, I’ve mentioned some of them. The 1.7s can be overdriven if played too loud. Although they have

excellent definition in the bass and go deep enough to reproduce timp strikes with wall-shaking power (e.g., the Sinfonietta), they will not play much below 40Hz or so, which for some of you may mandate subwoofers (good luck on that, BTW). In addition, and as noted, they have a typical touch of Maggie’s planar-magnetic grain. Since they are dipoles, they can be tricky to place (although, theoretically, their figure-eight radiation pattern eliminates the sidewall reflections that drive you nuts with wide-dispersion box speakers). And at five-feet-five-inches tall, they may be demure by full-range Maggie standards but they are considerably larger than many dynamic speakers and, consequently, tougher to fit into certain rooms. Then there is this: Planar dipole speakers, ’stat or ribbon, rather tend to

### SPECS & PRICING

#### Magneplanar 1.7 Loudspeaker

**Type:** Three-way, full-range, quasi-ribbon, dipole loudspeaker

**Frequency response:** 40Hz-24kHz

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

**Impedance:** 4 ohms

**Dimensions:** 19" x 65" x 2"

**Weight:** 40 lbs. (each)

**Price:** \$1995/pr.

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## EQUIPMENT REVIEW - Magneplanar 1.7

foreshorten image depth or volume. Don't read this wrong. I don't mean stage or soundfield depth, at which the Maggie 1.7s are superb, and I don't mean perspectival (front-to-back, side-to-side) clarity, which is another Maggie strength. What I do mean is that the image of a voice or a violin coming off the 1.7s' screens can sound rather the way it would look if it were projected onto those screens. In other words, it can sound a bit flat and two-dimensional, particularly with solid-state electronics.

I talk about image volume in my ARC Reference 5 review (elsewhere in this issue), and it is not, inherently, one of the 1.7s' strengths. The funny thing here is that these slightly flattened, seemingly "projected" images don't want for natural richness of color or detail or power or even body, in the sense of natural tonal weight; they just don't seem as filled-out, as three-dimensional as voices and violins can sometimes sound with cone speakers. It's rather as if you are getting a slice off the front of the instrument instead of the whole enchilada.

There is a partial cure for this problem, however. Tubes. Particularly ARC tubes, which have always made such great matches with Magneplanars. I've tried both the mighty 610Ts and the not-so-mighty VS115 with the 1.7s, and I can highly recommend both. Do understand, however, that there will be minor trade-offs, particularly in low-end and top-treble grip, power, definition, and resolution, with tubes. To be honest, I tend to gravitate toward solid-state amps with planars for their superior control and drive, but that ARC sound is ravishing in its own right and will go a long way to supplying the third dimension that solid-state electronics lack.

Finally, a word or two about setup. Whether

you have the 1.7s mounted in Mye Stands or on their own long, thin, flat feet, you will want to keep them as far away from sidewalls (yeah, I know) and backwalls as possible. You will also, and this is a difference necessitated by Maggie's new quasi-ribbon super-tweeter, want to toe them in so those tweeters are aimed roughly at your ears. Typically, Maggie dipoles are set up parallel to rear walls; the 1.7s sound better angled in. Of course, you'll want to make slight adjustments to toe-in, placement, and listening distance to suit your room and your ears. Be aware that the Maggies come as left/right pairs, and that switching left and right will switch the orientation of the super-tweeter. I prefer—and Magneplanar recommends—the tweeters to the inside.

Bottom line? I think you already know. Like the 1.6s, the 1.7s are the most lifelike speakers I've heard in their price range—or anywhere near it. I could live with them (and did) in a system that costs 150 times more than they themselves do. IMO, they're just plain great. *tas*

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# Definitive Technology BP 8060 ST

Kirk Midtskog

**T**he BP 8060 ST is a slim, medium-height, cloth-covered tower speaker with outrigger stabilizer feet. You could say that it is designed for a “lifestyle” aesthetic, while still delivering genuine sonic value. It would fit right in with many home décors, including an audio-video setup, although I evaluated the BP 8060 ST solely as a stereo pair. The 8060 makes no apology for looking domesticated. You can’t see any of the drivers, for example, because the cloth wrap is designed to stay in place all the time. How non-audiophile.

As a *bipolar* loudspeaker, the BP 8060 ST projects sound to the front and the rear; both waves are in-phase with each other. By contrast, a dipolar loudspeaker’s front and rear outputs are out-of-phase with each other. When used solely as front stereo speakers, dipoles usually require a fair bit of distance from the backwall and, sometimes, careful attention to room treatments behind the speakers—in effect making that area of the room act a bit like the cabinet of a typical, cone-’n’-dome, dynamic speaker. Typical *bipolar* speakers take this a bit further. They tend to create even more audible output to the rear because the rear wave is in phase with the front one (and thus less likely to be partially canceled out), thereby lending a greater feeling of size and spaciousness to the overall soundscape—albeit with somewhat less image focus.

This is where Definitive Technology’s special take on bipolar design kicks in. Definitive reduces the

rear output by 6dB to more closely approximate an ideal balance (according to various experiments) of direct and rear-reflected sounds. Definitive says that 6dB attenuation of the rear drivers’ output creates more focus, but still generates enough rear output to produce a perception of expansiveness coupled with that feeling of not being locked into a small sweetspot. Because of the reduction in output, the new Definitive speakers can now be placed much closer to a rear wall. Does it work? Yes. While I didn’t have a classic bipole on hand for comparison, I can verify that the “Forward Focused Bipolar Array Technology,” as Definitive calls it, does live up to its goal of blending focus with expansiveness, and the sweet spot is indeed not a small strike zone. The 8060’s tonal balance and soundstage remain basically intact for a width of about three people sitting closely side by side on a couch. An mbl Radialstrahler it is not, but you get the idea.





## EQUIPMENT REVIEW - Definitive Technology BP 8060 ST

The 8060 manages to get its relatively robust bass (and efficiency) from such a svelte cabinet through an on-board, 300-watt, Class D amplifier that powers one side-firing 10" woofer with two 10" passive radiators—one on each side. The bass amplifier includes a volume control for the woofer. Definitive wanted to make the four 8000 Series Bipolar Supertower models as easy to use as possible by taking away the trickier elements of integrating a subwoofer with the rest of the speakers' drivers. Those other drivers are a D'Appolito cluster (mid-tweeter-mid) at the top of the front baffle and a single mid-tweeter combo at the top of the rear baffle. The midrange units are 4.5" composite polymer cones and the tweeters are 1" pure aluminum domes. The midrange drivers have two surrounds each, one on the outer rim (as usual) and one on the inner edge where the cone meets the base of the center-mounted waveguide (where a phase plug would normally go). This patented double-surround arrangement is claimed to give the cone greater linearity, while also allowing a longer excursion, thus making the driver act more like a slightly larger one without some of the negative effects of using a larger driver (mass, inertia, dispersion pattern, etc.). The phase-plug-like function here is actually provided by a mushroom-shaped waveguide rather than the bullet-tip plug we normally think of. This particular waveguide is said to better mitigate some of the negative interactions of varying wavelengths being simultaneously emitted by different sections of the cone, which can cause tonal shifts or even, theoretically, cancellation of some frequencies.

What does a \$2000 pair of speakers with all of this stuff in it sound like? The BP 8060 ST is a smooth, agreeable, full-sounding speaker that

can be considered a good all-arounder for those who value a large sound in a sleek package. The overall tonal balance of the 8060 falls just a bit to the warm and forgiving side of neutral without sounding cloying or syrupy. Of course, some of its tonal character can be adjusted by the on-board bass amp's volume control. I started out with the bass control at 12 o'clock but found that backing it off to about 10:30 worked best, because it alleviated bass overhang in my room. With the speakers positioned 30" from the sidewalls, 63" from the back wall, and about 7.5' apart (as measured from the front tweeters), I ended up with a toe-in that fired outward to about two feet beyond my shoulders. While the 8060 can be placed much closer to the back wall than I put it, my room layout makes a lesser distance to the rearwall problematic. Definitive's Paul DiComo helped with the initial setup, and he left satisfied that the 8060 would not be shortchanged by my positioning. More toe-in increased image focus, but it also reduced the openness of the soundstage; hence, the "in-between" positioning. The speaker is easy to drive. I could turn down the volume a few notches and get roughly the same level compared to my regular speakers. Power music, like various passages of *Pomp and Pipes* [Fennell/Dallas Wind Symphony, RR], did not make the 8060 (and my main amp) sound ragged or stressed as most passive speakers do, no doubt because the on-board amp carried the bulk of the demanding load.

I try not to get hung up on preconceived ideas of what a device will sound like based on materials or topology, but the 8060's pure aluminum tweeters are the smoothest aluminum-based (alloy or pure) metal tweeters I have heard. There is a commendable level of detail without the attendant

glare or shrillness that too often comes with aluminum tweeters at this price level. The BP 8060 is also fairly well integrated from top to bottom. The 8060's bass could be better defined and more articulate, but I really only noticed this because I am used to the Dynaudio Confidence C1, a \$7500 speaker (with dedicated stands). Yes, the 8060 has more powerful bass, but the C1—believe it or not—comes mighty close in overall extension, and the C1 certainly has better resolution in the bass by quite a bit. The 8060's midrange is clear and inviting. The overall resolution of the 8060 is not price-level-busting but still quite good. While the 8060 does not have the electrifying musicality of the more expensive Dynaudio Excite X32 (\$2800, Issue 205), the 8060 balances fullness with enough resolution to blend everything into pleasant, rewarding listening with all kinds of music from solo classical violin to huge Bollywood soundtracks.

Soundstaging is wide enough to extend about a foot beyond the speakers' sides and reasonably deep, starting at the back of the cabinets and extending to the rear from there (which just happens to be how I like it). When the recording allows for it, a great deal of the area behind the speakers fills up with a stable soundstage. The rendering of continuousness and "air" is not up to the bar set by more expensive speakers like the C1 or B&W 805 Diamond (\$5000, Issue 210) or even, to a lesser extent, the Dynaudio X32, but it is still commendable. Individual image outlines are nicely defined but never exaggerated, and—as the recording allows—are generally placed into a larger, better-defined context rather than spotlighted in a vaguer ambient setting. The overall effect, to use a comparison to a live experience, is to place

your listening seat a bit farther back in the concert hall than mid-hall. You won't hear leading edges as well as you would if you were sitting closer, but you still get a musically valid experience.

The 8060 faired well with my Ayre K-1xe preamp and GamuT M200, as if it reveled in being pushed by the system. The BP 8060 ST is a fun, civilized, easy-to-use speaker, and that pretty much sums it up. I enjoyed its relaxed way with large music one moment and its delicate handling of intimate music the next. **tas**

### SPECS & PRICING

#### Definitive Technology BP 8060 ST Loudspeaker

**Type:** Three-way, powered-woofer, pressure-coupled floorstander with passive radiators

**Drivers:** One 10" cone woofer, two passive 10" bass radiators, three 4.5" composite polymer midrange units, two 1" aluminum tweeters

**Frequency response:** 33Hz-25kHz (-3dB)

**Sensitivity:** 92dB (2.83 V/1 m)

**Impedance:** 8 ohms

**Power handling:** 300W

**Recommended amplifier power:** 20-300W

**Dimensions:** 5-15/16" x 44-3/16" x 13-7/16" without stabilizer feet (add 5-1/8" to width with feet).

**Weight:** 54 lbs. each

**Price:** \$2000/pr., available in black only

#### DEFINITIVE TECHNOLOGY

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# GoldenEar Triton Two

## Sophistication and Value by Design

Chris Martens

**I**n the early 1970s Sandy Gross helped co-found Polk Audio and then teamed with Don Givogue in 1990 to found Definitive Technology. Now, Gross and Givogue have joined forces again to create a third loudspeaker company: GoldenEar Technology. At each step along the way, Gross and team have consistently pursued an idea that I, for one, hold dear—namely, the notion that high-end audio should be a sport for all to play, not just an elite few with deep pockets. Naturally this means figuring out ways to build loudspeakers that deliver authentic high-end sound, yet sell at sub-high-end prices. Sadly, history has shown us that while many loudspeaker-makers have learned to talk the talk of “affordable high-end audio,” relatively few seem able to successfully walk the walk. Why, then, should GoldenEar succeed where so many have tried and failed?

Well, a big part of the answer is that Gross and Givogue are seasoned industry veterans who share a common goal and who complement one another perfectly. Sandy is the visionary, the one with the keen and discerning ears, and the one whose restless and inventive streak drives him to make good things better. He also has an uncanny gift for creating speakers that fulfill the aspirations and desires of music lovers, yet are priced within reach of enthusiasts of moderate means. Don, in turn is the technically rigorous pragmatist, the no-nonsense engineer, and the one whose deep manufacturing expertise and discipline yields cost-effective speakers with sonic benefits that

are observable, repeatable, and real. Putting their talents together, Gross and Givogue have come up with what may be their most accomplished loudspeaker to date: the GoldenEar Technology Triton Two floorstander (\$2499/pair)—a speaker that debuted last fall at CEDIA 2010 and has been impressing critical listeners ever since.

The Triton Two is a three-way, five-driver, dual-passive-radiator-equipped floorstander with a built-in powered subwoofer. Highlights include an HVFR (High-Velocity Folded Ribbon) tweeter the design of which is patterned after Dr. Oskar Heil’s famous “Heil Air Motion Transformer” tweeter. GoldenEar says the “HVFR tweeter propagates sound waves and



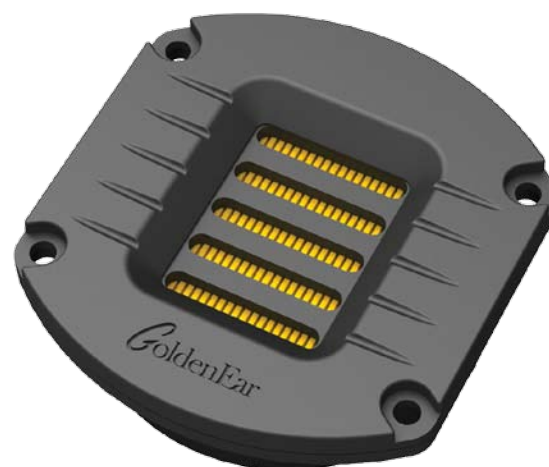
## EQUIPMENT REVIEW - GoldenEar Triton Two

moves the air by *squeezing* it with its accordion-like pleated diaphragm, rather than *pushing* it as conventional drivers do.” The resulting driver is said to provide exceptional treble extension and transient speed, plus high output levels with very low distortion. Additionally, the Triton Two incorporates a pair of cast-basket, MVPP (Multi-Vaned Phase Plug-equipped) 4½-inch midrange drivers arranged in a D’Appolito-type configuration alongside the HVFR tweeter. GoldenEar says these midrange drivers “achieve smooth linear frequency response extending above 20kHz” (much higher than the upper limit of the driver’s operating range in the Triton Two). The point of all that surplus bandwidth is to make sure the midrange driver offers sufficient transient speed and textural nuance to keep up with the lightning-fast Heil-type tweeter.

The lower part of the Triton Two tower houses a built-in powered subwoofer, which incorporates dual 5" x 9" woofers coupled with dual 7" x 10" passive radiators (which GoldenEar colorfully describes as “infrasonic radiators”). The oblong shape of the drivers and passive radiators is said to help resist certain types of diaphragm resonances and breakup modes that can occur with traditional circular woofers. The subwoofer is powered by a 1200-watt, DSP-controlled digital amplifier. GoldenEar says the amp “has a Programmable Logic Device (PLD) machine with a nearly instantaneous 278ns update time to perfectly manage a myriad of functions including soft-clipping, DC offset control, output-stage anti-saturation protection and discrete multi-band limiting.” Together, these elements give the Triton Two bass that extends down to a claimed lower limit of 16Hz.

Like Henry Ford’s famous Model T the Triton Twos are offered in “any color you want as long as it’s black.” The entire speaker enclosure, whose slender, tapered, airfoil-like shape is very easy on the eyes, is covered by a stretchy black fabric grille sleeve, which looks great and saves buyers the expense of costly lacquered or veneered cabinet panels. There is, however, a gloss-black trim plate that clips to the top of the speaker, covering the opening of the grille sleeve, thus giving the fabric cover a pleasingly organic and seamless appearance. A matching black floor plate, which is supplied with threaded spikes, helps stabilize the towers while making them more resistant to potential tip-over accidents. But enough of background; let’s talk about the Triton Two’s sound.

Starting with first things first, let me observe that—once you get the user-adjustable subwoofer output levels dialed-in properly for your room—the Triton Two system offers very smooth and neutrally balanced tonal response, with excellent



extension at both frequency extremes. Better still, the Triton Two’s offer plenty of definition, detail, and resolution, but do so without imposing any of the rough edges or other painfully self-evident sonic compromises those qualities sometimes entail.

In a very real sense, the Triton Two has been voiced from top to bottom, with the sheer excellence of its sophisticated HVFR tweeter setting a high performance standard that the rest of the speaker reaches upward to meet. GoldenEar’s HVFR tweeter provides sumptuous treble detailing and realistic high-frequency harmonics, as well as beautifully capturing the sense of “air” surrounding instruments, yet it does all this without the slightest hint of edginess, stress, or glare. The sound is so free from the usual treble problems of spotlighting, etching, or artificial edge-enhancement that some listeners perceive the speaker to be slightly rolled-off on top. While there may be a small (and I mean very small) grain of truth to this assessment, I think what’s really going on is that listeners acclimated to sharp-edged piston-type drivers simply don’t know what to make of the HVFR tweeter’s almost eerie smoothness. Over time the HVFR tweeter will spoil you rotten, because it tends to make other high-frequency transducers (even some quite good ones) sound a little hard-edged, aggressive, or overstressed by comparison.

But a pleasant surprise is that the Triton Two’s MVPP midrange driver matches the positive qualities of the HVFR tweeter step for step, so that it offers excellent transient speed, textural nuances aplenty, and wonderful qualities of easygoing purity and transparency. Most importantly, the midrange driver is fast enough

and subtle enough to blend seamlessly with GoldenEar’s Heil-type tweeter, so that I observed no textural discontinuities at all. This is saying a mouthful when you stop to consider that many speakers equipped with Heil-type tweeters (even some very costly ones) exhibit obvious discontinuity problems where the tweeters sound fine but make piston-type companion drivers sound sluggish by comparison. In the Triton Two, you hear an uncannily sweet, smooth, seamless marriage between GoldenEar’s MVPP midrange driver and HVFR tweeter—a marriage

### SPECS & PRICING

**Type:** 3-way, five-driver, dual-passive-radiator-equipped floorstander with built-in powered subwoofer

**Driver complement:** One High-Velocity Folded Ribbon (Heil-type) tweeter, two 4 1/2" mid/bass drivers, two 5" x 9" woofers, two 7" x 10" passive radiators

**Built-in amplifier:** 1200-watt subwoofer digital/DSP-controlled amplifier

**Frequency response:** 16Hz-35kHz

**Sensitivity:** 91dB

**Impedance:** 8 ohms

**Dimensions:** 48" x 7.5" x 15" (height includes mounting base, without spikes)

**Weight:** 60 lbs.

**Price:** \$2499/pr.

#### MANUFACTURER INFORMATION

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(410) 998-9134  
goldenear.com

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## EQUIPMENT REVIEW - GoldenEar Triton Two

responsible for much of the real sonic magic of which this system is capable.

What exactly is the nature of this sonic magic? I would say the speaker's most spectacular and compelling qualities involve its mind-blowingly vivid imaging and effortless 3-D soundstaging. It is upon these twin virtues that all the speaker's other strengths hinge. Assuming you have the Triton Twos reasonably well positioned in your room, you can expect to experience moments where sounds seem almost completely free from the speaker enclosures—as if they are originating on their own without any apparent effort or even involvement on the speakers' part. And once sounds have been liberated from the confines of the speaker enclosures, they unleash the kind of gripping, “sound outside the box” experience that many listeners will find revelatory.

Let me expand on this point for a moment. Many otherwise fine high-end loudspeakers leave me underwhelmed in that they strive to get most sonic virtues right, yet maddeningly produce left and right “blobs” of sound that cling to the speakers like spent chewing gum on a park bench—yecch! In contrast, however, the Triton Two's demonstrate a nearly world-class ability to produce downright spooky three-dimensional soundstages—complete with the requisite depth, breadth, and height—and they do so without requiring much if any tweaking. One practical upshot of this is that you can, if you wish, position the Triton Two's much farther apart than you would most speakers without causing the dreaded “hole in the middle” to appear. You can also use the separation distance between the speakers as a tuning tool that enables you to strike a realistic balance between imaging specificity (the closer



the speakers are together, the more focused the sound will be) versus soundstage width (the farther apart the speakers are, the wider the soundstage becomes). Just find the appropriate balancing point in your room and *voilà*: instant realism—or something pretty close to it.

To hear how the Triton Two's smooth yet revealing highs and mids coalesce to create such convincing holography, try listening to “Solitary Orchid” from Zhao Jiazhen's *Masterpieces of the Chinese Qin from the Tang Dynasty to Today* [Rhymoi Music]. For those of you not yet acquainted with the Qin (pronounced, I am told, “chin”), let me mention that it is a remarkable, zither-like, fretless, stringed instrument, ancient in origin, and capable of astonishing range, dynamic subtlety, and delicacy. It serves not only as an acid test for imaging and soundstaging qualities, but also for timbral and textural accuracy. When reproduced accurately on this track, the Qin should present itself in a natural, moderately reverberant acoustic space, while exhibiting a

certain hushed, focused intensity and a voice that is articulate and piquant, yet subtly sweet. (This is harder to do than you might think, since some speakers manage to make the Qin sound hard and screechy—like an alley cat stuffed into a bag of broken glass.). But happily, the Triton Two made beautiful sense of Zhao Jiazhen's performance, here.

Several aspects of the Triton Two's handling of “Solitary Orchids” were impressive. First, I was struck by the focused intensity of the image of the Qin at center stage that the Triton Twos achieved; many speakers claim to create “palpable” images, but the GoldenEars actually deliver the goods. Second, I was enchanted to hear the speaker faithfully capture the extremely rich and complex harmonics of the Qin, and to hear it reveal interactions between those harmonics and reflective surfaces within the recording venue, thus conveying a believable sense of the performance space. Third, I found that the GoldenEars captured even the smallest details of Zhao Jiazhen's performance, right down to the most delicate and intricate fingering noises, plucking sounds, glissando-induced string squeaks, and sustained high-pitched harmonic overtones (I'm told that, in keeping with ancient traditions, composers of music for the Qin provide detailed notes showing how and where such incidental performance noises should appear). In short, the Triton Twos produced a rich, sophisticated, and profoundly evocative treble/midrange sound that belied their modest price.

Down below, the Triton Two's powered subwoofer section provides no-excuses full-range bass, without sounding thick, bloated, or overbearing. Unlike some speakers that claim

to provide “full-range” bass but that exhibit substantial roll-off below 40Hz, the Triton Two offers significant bottom-octave output, routinely reaching way down low to reproduce deep bass notes you might not have known were present in your favorite recordings. For this reason, listeners will want to spend time judiciously adjusting the subwoofer's output levels (it is easy to crank in more low bass wallop than you bargained for, so restraint is the order of the day). The Triton Two's bass-to-midrange integration is very good, but not quite up to the standards established by some of the best current \$5k - \$10k/pair speakers. There's not much missing, though, apart from subtle touches of heightened midbass transient speed, textural finesse, and focus—qualities you might find and enjoy in speakers such as the new Magnepan MG3.7 (\$5500/pair). But note that the Maggies cost more than twice what the Triton Two's do, are much harder to drive, and deliver bass that doesn't actually go as low or play as loudly. My point is that while the Triton Two's low-end characteristics are not perfect, they strike an admirable compromise between depth of extension, power, and finesse—all of which can be achieved while driving the GoldenEars with very modest amplifiers.

To give the low end of the Triton Two's a meaningful workout, I put on the second movement (Scherzo: Allegro molto) of the Copland Organ Symphony [Michael Tilson Thomas, San Francisco Symphony, SFS Media, SACD] and came away duly impressed. The final three minutes or so of the movement give you an opportunity to hear the low register of the organ in juxtaposition to the sound of loud low percussion instruments, which the GoldenEars



## EQUIPMENT REVIEW - GoldenEar Triton Two

handled with both grace and real gusto. There is sufficient pitch definition for you to hear the deep, well-focused sound of low-pitched notes emanating from the organ itself, followed a split-second later by the slightly more diffuse rumble of those notes reverberating and then decaying within the recording space (Davies Symphony Hall, San Francisco). Similarly, the concussive “thwack” and “boom” of the large drums sounded just about ideal—clean and controlled, yet appropriately full-bodied at the same time.

Finally, let me draw your attention to two significant and interrelated aspects of the Triton Two's performance; namely, the fact that it is relatively high insensitivity (91dB) and an extremely easy load to drive (in large part because the speaker's built-in subwoofer amplifier shoulders virtually all of the low-frequency workload). As a result, the Triton Two can be driven to very satisfying volume levels by only moderately powerful amplifiers, though it is—as you might expect—very sensitive to amplifier quality. Sandy Gross, for example, drives his personal pair of Triton Twos with a relatively small, low-output SET amplifier, which is the sort of option you can't realistically hope to pursue with such affordable high-end speakers as the excellent but decidedly power-hungry Magneplanar MG1.7s. In practical terms, this means the Triton Twos are not only fine value-priced speakers in their own right, but also make suitable platforms upon which to base excellent value-priced *systems* (this in contrast to well-priced speakers that require a gazillion dollar's worth of amplification in order to sound their best).

One additional point to note is that if you choose to use one system both for music *and*

movie playback, GoldenEar offers a set of voice-matched surround and center-channel speakers so that your Triton Two's can easily become the centerpieces of a superb multichannel surround system—one that, by definition, includes *two* built-in powered subwoofers. Interestingly, a complete Triton Two-based five-channel surround rig costs only \$3495—an option that music-minded movie enthusiasts might want to consider.

GoldenEar's Triton Two establishes what I consider new high-water marks in terms of all-around performance per dollar. The system gets all of the big things right, such as smooth and neutral tonal balance, good sensitivity, full-throated dynamics, and absolutely killer surround-sound imaging. But it also provides many of the small but significant performance touches that differentiate great speaker systems from merely good ones—such as transient quickness, textural subtlety and finesse, resolution of low-level sonic details, plus the ability to convey a desirable and elusive quality of sonic effortlessness. Once again, Sandy Gross and Don Givogue have managed place the key elements of high-end sound within reach for music lovers not made of money. **tas**

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# Sonus faber Liuto Monitor

## Compact Elegance

Neil Gader

**O**ur sonic expectations for compact loudspeakers have risen dramatically in recent years. Every aspect of small speaker performance has benefited from advancements in materials technology and analysis and computer-aided design. Output has increased; driver and cabinet colorations have decreased. Across-the-board, the musical experience is more consistent. More importantly—especially for those of us about to open our wallets—the impact has been felt at every price level from the elite to the humble.

The relative size and simplicity of the compact speaker have always had certain sonic advantages, and today those advantages are even more pronounced—for instance, point-source-like imaging and detail and freedom from cabinet resonances are better than ever. That's not to say that everyone is a fan of the small speaker in spite of its virtues. Its size also sets limits on bass extension and dynamic range and tends to make them best suited to smaller listening spaces. I should know: I'm a small room listener. But as a big fan of little speakers, such reservations tend to pale in significance. And recent experience has shown me that, today, in a showdown between large and small speakers it's not always clear just who's kicking sand in whose face.

Case in point, the \$2998 Sonus faber Liuto Monitor. It's the compact, stand-mounted cousin to the full-bore Liuto, a floorstander that I playfully dubbed the Bad Boy of Italy (sorry Silvio) in Issue 199. Why? Because it had a combination of Sonus'

harmonious virtues—micro-finesse, speed, and the characteristic Sonus warmth—and yet it didn't stand down in the face of material that demanded a heap of dynamic slam, extension, and stage-strutting bravado. The Liuto could make short work of Pantera as easily as it made love to Pachibel.

The Liuto Monitor, piccolo-sized in comparison, may not be up to that level of Bad Boy brio, but to the extent that it imparts much of the Liuto's full-bodied excitement, it has been mentored well. It's a bass-reflex design with a rear-mounted port. If the uppermost drivers look familiar, they should. They include the Liuto's 25mm soft dome tweeter and a 6" thermo-molded polypropylene textile cone mid/bass adapted for the Liuto Monitor. The crossover point rises slightly from 3kHz to 3.5kHz.

The Liuto Monitor streamlines the traditional Sf form without sacrificing heritage accents. That continuity includes the lute-shaped enclosure, the engraved brass nameplate, the warmth of the

leather-like grained surfaces, and the sculpted end caps of the vented rear panel. The stands are works of art—graceful and rigid, with a top plate that is cross-drilled for securing it to the threaded holes in the bottom of the Liuto Monitor's enclosure. Heavy knurled knobs allow even chunky fingers to tighten down the included spikes and mounting screws. Frankly, unless you're dropping the Liuto Monitor on a shelf I can't imagine living without the stand.

In tonality and general sonics, the Liuto Monitor hews to the Sf company line by focusing first on capturing natural richness and a bit of romance throughout the midrange. This is consistent with my experience of Sonus faber. Its speakers have a flair for the dramatic, imparting an almost operatic dimension to the sound. At a mere 13" tall the Liuto Monitor has a lighter overall balance than the three-way Liuto, but that would be expected as it must make-do without the ministrations of a dedicated midrange driver. Still I found its midrange character often echoed



## EQUIPMENT REVIEW - Sonus faber Liuto Monitor

the warmth and fleshiness of its sibling, if not the sheer dynamic zing.

The Liuto Monitor doesn't sound skeletal like so many minis can. Tonally they are not ruler-flat, so, yes, there's a bit of a lift in the low treble. But as I listened to k.d. lang's cover of "After The Gold Rush," this anomaly seemed reasonably reined in—with nothing close to an overdose of sibilance. However, evidence of some added treble energy is perceivable during Mary Gauthier's country rocking "Sugar Cane" from *Filth and Fire* [Signature Sounds], I could hear an emphasis on transient textures emanating from the guitarist's flat-pick and a bit more rosin and grit off the bow on the fiddle strings. Collectively these subtract a bit of soundboard resonance and mask the note's natural decay. Also the Liuto Monitor's upper midrange is not quite as forward as I've come to expect from certain familiar vocal recordings; rather, it's just a little relaxed. As a result, Holly Cole's smoky cover of Tom Wait's "Take Me Home" [Alert] slips slightly rearward of the front baffle of the speakers. The Liuto Monitor, on the other hand, revels in reproducing an abundance of tactile musical timbres. More than just flat surfaces, you can feel the lower-pitched flutter of drum-skins and sundry other instrumental resonances.

Imaging and soundstaging are, in a word, exceptional. Although these factors are acknowledged strengths of the contemporary compact speaker, the Liuto Monitor's ability to throw concise images in a dimensional space is superb. The speaker conveys the otherworldly sense that the presentation is completely liberated from the enclosure and free from driver-localization artifacts. In fact, I made a discovery during Holst's Suite No. 2 with the Dallas Wind

Ensemble [Reference Recordings]. There's a densely packed brass-section crescendo that the players hold a few bars. The sound is ripe with resonance and bloom, but as the collective notes decay there's also a cymbal almost imperceptibly overlaid above the brass section—just a slight effervescent sizzle that would be easy to mistake for an artifact of the recording on a less highly resolved speaker.

Given the modest size of the mid/bass driver there are some dynamic and amplitude limitations, but the Liuto Monitor shouldn't be underestimated. During the Holst it delivered a sophisticated blend of finely graduated mid- and low-level dynamics from the brass and wind ensemble. This is where small speakers often turn anemic, but trumpet and trombone signatures were pristine, and there was a good balance of transient attack and bloom. However, there are limits. For true Bigfoot-bass like pipe organ, or say, a baritone sax, the Liuto Monitor can only take the large-speaker impersonation so far. Roundhouse punches of deep bass are cushioned for self-preservation, and you can almost hear the transducers girding themselves for the blow to come.

Likewise, the scale of images is proportionate to the number of instruments populating the soundstage, which is to say smaller collections of musicians fare better in terms of scale accuracy. A solo classical guitar like Michael Newman off of a Sheffield direct-to-disc can sound stunningly real. However, a symphonic work of monumental proportions like Vaughn Williams' *Antartica* [Naxos] loses a little something in translation in the majesty and vastness of acoustic space. In this sense the small driver is too short on cone

area to replicate the full sensation of air movement in the original venue.

Every level of a stereo audio chain involves the art of compromise. For the compact speaker it's the bass octaves and dynamics. Sonus faber is a company that knows the territory like a truffle dog knows a Piedmont forest. Today it's not enough to make a well-crafted product. For a successful small speaker you need to be a little crafty, as well. And the Liuto Monitor is shrewd in the way it finds an authoritative voice. First there's a persuasive but not over-weighted upper midbass that smoothly rolls-off and avoids major dips and humps. There's good extension and output into the upper midbass and a distinct lack of the port colorations that muddy images. Lastly, it plays plenty loud but within limits so as not to unhinge its spectral balance and compress that dynamic envelope. As a result the Liuto Monitor cultivates a sense of even-handed authority, enough to prevent a common malady of small speakers—an overly prominent treble range, which in the absence of low-end balance tends to project a flinty and dry character.

The Liuto Monitor's solid mid/upper-bass response makes it an equally good candidate for a subwoofer (see REL R-218 review this Issue). But then you need to consider that if the total cost with stands and the aforementioned sub places the system within about \$700 of the full-blood Liuto, what would the play be? A small listening room would have to be factored into the equation. Also, there's the form factor—the Liuto Monitor makes for an incredibly light footprint in a room and even with the REL the system is virtually invisible. The Liuto is physically imposing but it's also hard to deny the gusto of a true three-way.

And then there are listening habits. If small-scale, more intimate music is primary, then a sub could be irrelevant. Mahler and pipe organ lover? Run, don't walk to grab a sub. The other advantage of the Liuto Monitor is that the expenses are more incremental—you're free to add the sub as the budget permits. Whatever the decision, it's a nice quandary to find yourself in.

Returning to my original premise, what makes the Sonus faber Liuto Monitor so satisfying is the way the company has taken the sonic virtues that we take for granted in its larger offerings like the Liuto, and infused many of those elements into one of its smaller performers without losing what makes a compact so special. In my view these factors, along with premium execution and craftsmanship, make the Liuto Monitor one of the most elegant and versatile small speakers available. **tas**

### SPECS & PRICING

**Type:** Two-way, vented-box, stand-mount loudspeaker

**Drivers:** 1" soft dome tweeter, 6" polypropylene-textile mid/woofer

**Sensitivity:** 86dB

**Nominal Impedance:** 8 ohms

**Dimensions:** 17" x 7.3" x 13.3"

**Weight:** 17.6 lbs each

**Price:** \$2998/pr. (stands, \$798/pr.)

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# Vienna Acoustics Mozart Concert Grand SE

## Do I Hear A Waltz?

Neil Gader

**S**ome loudspeakers are simply born to dance. It's part of their bloodline. They reproduce music with a distinctly light, nimble touch in much the same way Fred and Ginger seemed to defy the laws of gravity and float across the ballrooms of the silver screen. Vienna Acoustics loudspeakers evoke this sense of live music's immediacy in ways that leave other loudspeakers chugging to catch up. I heard this when I spent time with the Haydn Grand, noted the same trait with VA's concentric-flat-driver flagship, the Music, and now with the Mozart Concert Grand SE.

The latest version of the Mozart now merits the SE moniker. Typically connoting "Signature Edition," Vienna Acoustics opts for "Symphony Edition." Like the original it's a 2.5-way floorstanding speaker designed in a bass-reflex configuration with twin rear-firing ports. More evolution than revolution, the SE continues the VA tradition of extreme attention to detail at every stage of design and production. Fit and finish are superb—as good as they get in this range. I should add that visitors to my listening room inevitably ran their fingers across the impeccable cabinet, admiring every minute detail as if caught in the tug of an extraterrestrial tractor beam.

The narrow 38" tower employs a thick one-and-a-half-inch front baffle with one-inch sidewalls. VA describes the bracing pattern as "relatively

complicated," with the addition of a lot of internal batting material. Vienna Acoustics' cone drivers are noteworthy for their transparency, not just sonically but literally. All designs are in-house. The X3P cone material for the transparent 5" mid/bass driver is a derivation of VA's polypropylene hybrid cone technology and combines TPX, a thermoplastic used in its XPP cones, with three polypropylene based synthetics. The 5" ribbed mid/woofer is in fact the same XPP Spider-Cone used in the up-market Beethoven Concert Grand. The goal, of course, is to match very low mass with high damping and extreme rigidity for control. These transducers also use an inverted rubber surround to reduce cone edge-resonances. Treble duty is the responsibility of a proprietary 1.1" hand-coated, silk dome tweeter delivered from Scan-

Speak. It's slightly oversized in diameter and was selected to aid dispersion, an advantage for buyers opting for wide spacing between speakers.

Common to all Vienna Acoustics speakers is the mandate that crossover components hew to tight 1% tolerances—that is except for the inductors, which must meet an even more stringent 0.7% tolerance. Sonic margins are equally rigorous with each production pair frequency-matched to within 0.5dB of the reference pair—the original pair designed by the Peter Gansterer-led team. This achieves a level of consistency that ensures that the final owner is hearing exactly what Gansterer himself hears from his creation rather than a loose approximation. The speaker terminals are also VA-designed and use brass/silver with gold contact points, which are said to achieve a quieter



## EQUIPMENT REVIEW - Vienna Acoustics Mozart Concert Grand SE

interface. All internal wiring is twisted to reject any crossover-borne noise. Heavy crackle-finished cast-aluminum footers stabilize the narrow towers and are supplied with spikes and dimpled pucks to protect wood floors.

Sonically, the first things that come to mind with the Mozart Grand SE are speed and coherence. Whether it's the obsession with highly select crossover components or the small quick drivers liberally aided by a clean dynamic tweeter, the result is wide-band frequency response and transparency that create satiny string sections, clean concise winds, and distinct placement cues from deep within the symphony orchestra. The Mozart Grand SE possesses a micro-dynamic resolving power that keenly suits classical and acoustic music. Tonally the speaker is not devoid of character. It's more finely boned in presentation and conveys a lightness and delicacy that often accompanies smaller driver in narrow columnar enclosures—only this one has genuine mid-thirty Hertz bass and great midrange dynamics. This transparency is underscored by a leaner more sinewy quality that sets limits on the orchestral scale the Mozart can achieve. There's a small energy dip in the presence range that flatters the dimensional aspects of symphonic music, but it also reduces some of the in-your face energy and grit from Pat Benatar's scorching vocal from "Love is a Battlefield." The brass section from Copland's *Fanfare* [Reference] takes on a smoother almost glassy quality but for me lacks a bit of attack and urgency. Similarly, on solo piano, my favorite instrumental metric, the Mozart SE communicates a stunning soundboard reverberation, and captures the weight and rush of air in the bottom two octaves. But the relaxed upper mids are

almost too pretty, lacking at moments the forward thrust and sound pressure that a well-struck run of notes would have.

Because of its mid- and upper-bass energy, placement options are important. Anticipating room issues, VA provides foam plugs for the ports but I tended to prefer tweaking via repositioning. That said, I came away with mixed feelings regarding bass response. On the one hand I loved having my eyelids pinned back during the final section of Holst's "Jupiter" from *The Planets*. On the other, bass response could thicken at times and I felt that the speed often couldn't quite match the unalloyed quickness of the SE's mids, particularly at high volume levels. Which is to say that every speaker has limits and the Mozart Concert Grand SE is not the kind of speaker that a DJ is going to take along to a rave party. This is not a knock—it's only to point out that the Mozart is more of a parlor speaker designed to play at realistic levels in medium and smaller rooms rather than pounding out the chorus to Queen's "We Will Rock You" at a halftime show at L.A.'s Staples Center.

The Mozart Grand SE playbook is equally impressive at low levels, producing a degree of realism and acoustic space that I associate with real concert-going. It's as if you're not listening softly through electronics, rather that you're in a concert hall and sitting back a few rows to experience the performance from a different but undiminished perspective. It's the rare box enclosure that doesn't leave a sonic imprint on the music. To one degree or another most absorb micro-dynamics and transient speed and momentum like a well-placed speed bump in front of the music. And that's not even considering the colorations that ported designs often bring

to the table. However, in the critical midrange VA has minimized these concerns to the point of irrelevance with the Mozart Grand SE. The result is not just that individual images are cleanly and openly represented but that they are also set within a brilliantly dimensional soundstage. When the Mozarts reproduce the Turtle Creek Chorale, during the Rutter *Requiem*, the unbroken continuity of the delicate vocal array spreading across the hall's soundspace is inspiring. It becomes a transparent curtain of energy, corner-to-corner, with a depth and dimensionality that are rewards unto themselves.

The Mozart Grand SE may have a sensitivity of 90dB but that's at a rated 4 ohms nominal impedance, so moderate power is essential. That's the difference between the level of power required to establish a heart beat and what is needed to release the SE's inner athlete. To illustrate this, there's Natalie Merchant's "Peppery Man" from *Leave Your Sleep* [Nonesuch]. I first heard this track at this year's CES in the VTL room. An OMG moment ensued. The M450 Series III monoblocks were driving the TAD Reference One speakers and as soon as Luke and Bea Manley identified the song I knew I'd be ordering it posthaste. Among the musical marvels on this track are the Fairfield Four vocalists and a stomping tuba which anchors the track in the way a stand-up bass otherwise might. The point to all of this is that with smaller amplifiers, sub-100 watts, this track could sound a bit bloated and veiled. The typical judgment might be rendered that the speaker has issues like vent noise and overhang or a noisy enclosure. But not so fast, because once I laced up the ARC DSi200 integrated to the Mozart Grand SE the tuba's full character was revealed. It was still full-bodied but

much more controlled, and its timbre was more clearly defined, while the rubbery lack of resolution was replaced by superior pitch clarity and more transient detail from the mouthpiece to the bell.

The Mozart Concert Grand SE is a floorstander of many strengths but it has the soul and the moves of a compact. A terrific value, yet so beautifully constructed and appointed it could easily be at home with the black-tie-and-Chanel crowd at an opening night gala at the Vienna Opera House or Musikverein. And if that's not something to dance about, I don't know what is. **tas**

### SPECS & PRICING

#### Vienna Acoustics Mozart Concert Grand SE

Type: 2.5-way bass-reflex tower

Drivers: 1.1" tweeter, 5" X3P mid/bass, 5" XPP spider-cone mid/woofer

Frequency response: 30Hz to 22kHz

Sensitivity: 90dB

Nominal impedance: 4 ohms Dimensions: 38.25" x 8.1" x 13" Weight: 116 lbs./pair

Price: \$3500/pr.

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# REL R-218 Sub-Bass System

Neil Gader

**T**he REL R-Series sub-bass systems have been substantially improved for 2011, and are now called the Serie R. The mid-priced, three-model line sports improved amplification from its Class D circuit, revised driver design, retuned filter networks, and even upgraded cabinets. The \$1299 R-218 considered here is the entry-level model and sports a single downward-firing 10" driver in a rigidly braced, high-gloss-lacquered MDF cabinet. By contrast the larger R-528 and R-328 feature an active front-firing driver and a down-firing passive radiator.

Let's face it: Visually most subwoofers are fashion emergencies, but REL has restyled the ungainly box by adding a luminous, hand-rubbed piano-black lacquer finish and some bespoke aluminum treatments. Its footprint is modest and by subwoofer standards; the impression is elegant and discrete. The build quality—always a REL hallmark—is even better in this new model, with seams so tight they look waterproof. The back panel controls are set on an aluminum plate that cloaks the internal amp and circuitry. They include a crossover-frequency control, phase toggle (0° or 180°), separate volume controls for LFE and high-level/low-level inputs, and the high-level Speakon socket that connects the main system amplifier to the sub. An IEC mains socket allows for a detachable power cord of the user's preference.

REL subs are equipped only with low-pass filtering —the main speakers are run full-range with no high-pass filter. REL assumes the main speakers already produce a fair portion of the low-

frequency spectrum. In contrast a sub fitted with high-pass filtering also selects the low-frequency rolloff point of the satellite—an additional feature that has its own compensations for bass-shy satellite speakers by relieving the smaller woofer of bass responsibility and, thereby, improving dynamics and output. Some will argue, on the other hand, that the additional filter and circuitry can also result in unwelcome colorations.

The recommended method of connection is via the Neutrik Speakon high-level cable, which is included. This interconnect sends the signal from the speaker taps of the main system amplifier to the subwoofer. The subwoofer receives the identical signal or “voice” that the main speakers are seeing—a method central to the REL philosophy that integrates the sub into the entire chain of the audio system (because of the REL's very high 100k Ohm input impedance it has no effect on your power amplifier). REL recommends placing the subwoofer in the corner behind the main speakers as a starting point, and



## EQUIPMENT REVIEW - REL R-218 Subwoofer

the manual offers detailed instructions for setting the phase switch, crossover adjustment, and level control. Crossover settings have been simplified for the R-218. A single knob is substituted for the “coarse” and “fine” adjustments found on the more elite models. The crossover knob selects on of about forty frequencies over the range of 30Hz to 120Hz. There are no hash marks to indicate the crossover frequency; users are encouraged to set the crossover frequency by ear rather than by an arbitrary frequency. Using a couple of familiar bass-oriented recordings and a friend to man the

controls makes the set-up task a cakewalk.

The sonic results are what I’ve come to expect and admire from REL subs—an even-handed balance between pitch and extension, with little to no cabinet coloration or resonance. In extension, the R-218 plummets easily and with good output into the upper twenty-cycle range, and it does so without drama. It’s stable and controlled at all levels and doesn’t begin crabbing around the room like some hapless subs I’ve encountered. Most importantly, and fulfilling the primary directive, there’s a near seamless transition between sub and satellite. Using the Sonus faber Liuto Monitor (reviewed elsewhere in this issue) and my own somewhat larger ATC SCM20 monitors, the R-218 takes familiar recordings like Jennifer Warnes’ “Famous Blue Raincoat” [Shout Records] and returns the growl from the bowed standup bass to the conversation within the song. The tenor sax is weightier and more expansive. On this track the ability of the REL to integrate with the main speakers saturates the music with a heavier, more humid character, and soothes what would otherwise be a dry vocal. It’s a difference more in keeping with the melancholy atmosphere of the song.

Like every REL I’ve encountered the R-218 maintains the chameleon-like ability to disappear into the character of the left/right main speakers. One

way it does this is by matching the speed profile of the main speakers. The REL is quick to react to low fundamentals and then keeps pace with the unwinding harmonics rather than holding them back like the proverbial sonic boat anchor. During Warnes’ “The Ballad of the Runaway Horse,” there is a series of plucked chords from the cello. With the R-218 off, this cue sounded credible. Inserted back into the system, missing soundboard elements instantly resurfaced bringing with them a degree of warmth and resonance that was easy to overlook in the subs absence. This is what a good sub does; time and again it returns not only the music but the *venue* to a recording. It allows notes to hang in the air a bit longer, and the deepest notes and pulses to sustain and decay. It’s an almost subliminal calculation, but once the ear recalibrates to the spatiality that a subwoofer infuses in a recording. Its removal leaves the acoustic soundspace empty and the reverberant field weakened. Like the air being let out of a balloon, music no longer pushes against the boundaries of the venue.

The R-218 is easily one of the best small subs I’ve reviewed, but is it my favorite REL? Not quite, but only by a small margin. A few years ago I reviewed the somewhat larger, heavier, and more expensive Britannia B3 [Issue 163], a front-firing, ported configuration. The B3 disappeared as a source more completely than any subwoofer has in my room. It had a combination of heft, pitch stability, decay retrieval, and speed that made it seem as if it had anchor bolts driven into the very foundation of my home. In comparison the R-218 has a lighter signature and a less ominous character in the bottom octaves. But unlike the mightier B3, the R-218 is so physically small that

it can disappear in most rooms, a big plus for many of us.

The R-218 is another in a seeming continuous parade of REL performers. Without spectacle and with little-to-zero editorial comment, the REL subwoofers ply their trade. Historically, combining “small” and subwoofer is as frustrating as blending oil and water. And the result often ends up being more appetizer than entrée. The R-218 is one of a handful of small subwoofers that truly satisfies. In the world of the bottom octave, my friends, that is truly the bottom line. **tas**



### SPECS & PRICING

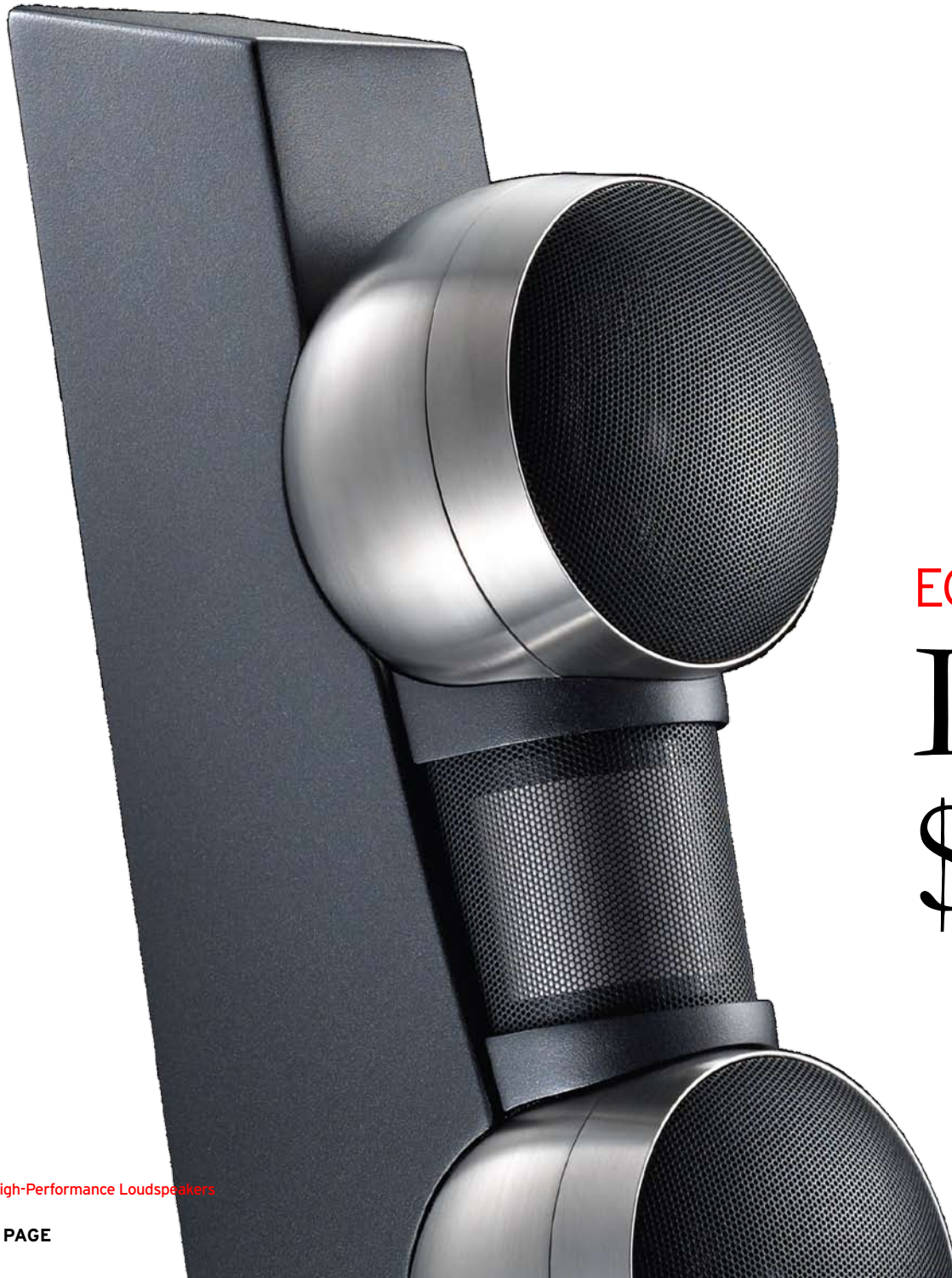
**Type:** Sealed-box, down-firing  
**Driver:** 10" long-throw steel-chassis  
**Integral amplifier power:** 250W Class D  
**Bass extension:** 25Hz (-6dB)  
**Connections:** High-level Neutrik Speakon, low-level single RCA, LFE RCA  
**Dimensions:** 12" x 13.6" x 12.5"  
**Weight:** 29 lbs.  
**Price:** \$1299

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EQUIPMENT REVIEWS

# Loudspeakers \$5k-\$10k



## Audience ClairAudient 2+2

### Speaking With One Voice

Dick Olsher

**I**t's safe to say that the BBC invented the mini-monitor speaker category in the 1970s with its design of the LS3/5A, which was intended for monitoring television broadcasts in mobile control rooms. It was the little box speaker that could! The design became commercially popular due to its tonal fidelity over the vocal bandwidth and its outstanding soundstaging and imaging performance. This two-way design was often imitated but not seriously outperformed, that is, prior to the introduction of the ClairAudient 2+2. The idea of chopping up the musical spectrum and feeding it to a set of specialized drivers may at first seem elegant from an engineering standpoint. However, the difficulty lies in the acoustical realm. The problem of trying to blend the output from drivers spread out on a baffle without significant interference effects is far from trivial. Multi-driver designs sacrifice coherence, an attribute which correlates highly with imaging excellence. The most coherent multi-driver design is, of course, a two-way, but nothing competes with a full-range driver.

## EQUIPMENT REVIEW - Audience ClairAudient 2+2

The 2+2 uses a total of four identical 3-inch full-range drivers connected in a parallel configuration. Models with driver configurations of 4, 8, 16, or 32 drivers are also available, though for small rooms the 2+2 is probably optimal. The cone is an aluminum/magnesium composite with a butyl rubber surround, and the magnet is neodymium (see sidebar for the technical details). There are no crossovers; the drivers are connected directly to the power amplifier. A driver's step response is always degraded by crossover networks, and as Audience's John McDonald will surely tell you, the best crossover is no crossover! He tells me that the 2+2 is the result of many years of development and perseverance to a long held dream. "The idea was... instead of working around conventional design limitations like disparate drivers and crossover networks... to not have those work-around problems in the first place. The vision was to have a highly resolving, highly coherent, highly dynamic low-distortion one-way loudspeaker. Over the years we tried a great many approaches. Approximately three years ago I threw in the towel thinking that it was not possible to achieve our goal. At the time we were using already available full-range drivers. However, those drivers could not do the entire job that we envisioned. We then set out to design a better loudspeaker driver."

It would be fair to characterize the 2+2 as two speakers in one. That is, two two-driver systems in one. Two of the four full-range drivers are mounted on the back baffle to produce a bipole radiator since the front and back drivers are radiating in-phase. McDonald acknowledges that a monopole 2-driver speaker is also a possibility and will likely be manufactured as well. To my

mind, however, the bipole configuration is most advantageous. If two-channel audio is to survive in a surround-sound world, dipole or bipole designs represent the best bet for creating a soundfield that approximates that of a live event. The most convincing illusion of being there cannot be created when the recording's ambient information is produced strictly in the plane of the speakers. That's pretty much the experience of listening inside an anechoic chamber. A uniform power response, at least in the critical midband, is essential to coupling ambient information into the listening room and more completely immersing the listener in the original soundfield. And a dipole or bipole midrange has a much better chance of achieving such a power response than does a midrange monopole.

The cabinets are manufactured in California of 13-layer Baltic Birch plywood. The interior is said to present no parallel surfaces to the back wave. This is a well-damped bass-reflex design with a box tuning of about 55Hz. A 6-inch passive radiator is used to eliminate port chuffing noise and potential pipe resonances. The front and rear plinths are said to be CNC machined from aircraft-quality aluminum for enhanced driver mounting rigidity. OFCC copper wire is used for all internal wiring and wire-harness solder joints are cryogenically treated. Finally, high-quality Cardas binding posts are used (my favorites).

Proper setup is essential for maximizing performance. The owner's manual recommends that the speakers be oriented so that the passive radiators face each other toward the inside, and that's exactly what I did. The manual also discusses toe-in options. One of the recommended options is pointing the speakers

directly at the listening seat, which worked best for me. Be sure to experiment in this regard as there is some beaming in the treble range above 12kHz. You may therefore find it desirable to intersect the speaker axes slightly in front of the listening seat, although the slight treble lift did not bother me with tube amplification. Listening height is also critical and stand height comes into play. The manual recommends a stand height of 28 inches, which ought to work well in most applications. Ideally, the ears should be located at a height that places them exactly between the two front drivers. That's the sweet spot. There is interference between the drivers above about 4kHz at listening positions that are *not* substantially equidistant from both drivers.

The impedance magnitude is quite flat over the frequency range 200Hz–20kHz, making the 2+2 eminently suitable for tube amplification. Due to its decent sensitivity, 30 to 40Wpc of tube power proved to be an adequate reserve for my medium-sized listening room. The marriage of tubes with the 2+2 was responsible for fully fleshing out the 2+2's imaging potential. Tubes also helped beef up the lower midrange, partially making up for the 2+2's slightly lean tonal balance, as well as imbuing the midrange with a sensuous feel for phrasing and emotion. The baffle-step effect is an issue for all mini-monitor designs, here the bipole design helps fill in the lower midrange, but I could have used 2 to 3dB more output in the upper bass range in the octave from 100 to 200Hz.

Don't let the 2+2's size fool you. In-room bass extension measured flat to about 55Hz, more than respectable for a mini-monitor. But it's not all about bass extension—the key is quality. Bass

lines were precise and well defined. Backed by a quality front end, bass detail others speakers fuzzed over was readily resolvable. The combination of a small well-damped enclosure and rigid cone drivers gave the impression of quick, tight bass, unobscured by the time signature of cabinet resonances. The lean balance mentioned above was most noticeable with the Pass Labs XA30.5 power amp. Instruments such as piano and organ, rich in sonority, were most affected. The sustain pedal lavishly used by Chopin was slightly emaciated.

The 2+2 consistently sounded coherent to the max, speaking as it does with one voice. The consequence was a magical soundstage, exceedingly wide and deep. In fact, I've yet to experience any better layering of depth perspective. Image solidity was nothing short of spectacular. In particular, the vocal range was projected palpably with a reach-out-and-touch-

### SPECS & PRICING

**Nominal impedance:** 4 ohms

**Sensitivity:** 87dB in free space and 90dB in-room

**Max RMS continuous power per speaker:** 100W

**Max RMS continuous output per pair:** 113dB

**Weight:** 16 lbs.

**Dimensions:** 8" x 14.5" x 10.25"

**Price:** \$5000/pr.

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## EQUIPMENT REVIEW - Audience ClairAudient 2+2

someone transparency. I'm convinced that this level of performance is partly a function of the bipole radiation pattern which helps generate a uniform power response over the vocal band from 200Hz to 4kHz. Even massed voices in a church acoustic were readily resolvable as was the reverberant signature of the recording venue. The 2+2 proved quick at the point of attack and transient decay was well controlled and easy to follow clear down to the noise floor of the recording.

Midrange textures were presented with a

### Technical Notes

The motor is a patented XBL2 design that originated with Dan Wiggins, now at Acoustic Development International. The objective is to create a flat BL curve over as wide a range of excursion as possible using two or more voice-coil gaps. I should note that BL denotes the force factor on the cone and is the product of the magnetic flux density and voice-coil wire length in the gap. This technology is said to combine the best attributes of both underhung and overhung voice-coil designs. Here the voice-coil winding is only 4.4mm long, yet the linear voice-coil travel (Xmax suspension limited) is 6.5mm one way. The end result is reduced inductance for wider bandwidth, lower moving mass (only 2.5 gram total) for increased efficiency, and reduced distortion over a wider dynamic range. Obviously, this technology is ideally suited for wide and full-range drivers.

low-distortion signature and were capable of assuming vivid colors and a natural sweetness approaching that of the real thing. And while the upper treble lacked the finesse of a ribbon tweeter, the lower treble was well behaved, blissfully without the gratuitous brightness and hyped-up detail that characterize so many dome tweeters. As a consequence, the timbre of female voice was reproduced with admirable realism. The dynamic range from soft to loud was quite persuasive with minimal compression in evidence even at moderate listening levels. This puppy can rock without fear of driver damage. Resolution of microdynamic nuances was excellent (8 out of 10) and responsible for retrieval of most of the music's emotional content. An essential attribute for music reproduction is rhythmic drive, and the 2+2 did its thing with an emphatic boogie factor. Musical lines were propelled forward with superb verve. It's a perceptual attribute that is impossible to measure but easy to discern.

The ClairAudient 2+2 is by far the most enjoyable, musically compelling mini-monitor I've auditioned to date. It crushes other mini-monitors at their own game, yet can play louder with lower distortion and power compression. There is little to complain about and much to rave about. In the mini-monitor genre it sits well above a crowded field. A sonic gem that demands a serious audition. Highly recommended! *tas*

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# Maggie 3.7 Speaker System

## Session One

Harry Pearson

**T**wo Magneplanar panels, the spanking new and sexy-looking 3.7s, arrived just after CES. And just as the FedEx guy was pulling away, who should arrive but Wendell Diller of Magneplan in the flesh—fresh, like the speakers, from the audio doings in Las Vegas.

Within 30 minutes, Diller had not only unpacked the speakers, but had them set up in Music Room Two, where, three decades or so ago, he had first installed the earliest Magneplanars, the Tympani I-Us, then being distributed by Audio Research Corporation (which arrived along with Bill Johnson, a complete set of ARC tubed electronics, and a full playback system, down to a Decca cartridge). The two Magneplanar panels of the day were divided into three sections six feet high per side, extending in width almost the entire room, itself a shoebox-shaped affair—ideal, as it turned out, for Maggies.

The original Magneplanars were horribly inefficient and had to be played very loud to achieve a real sense of life, which, in the lower midrange to midbass, they did in a fashion still unduplicated to this very day.

They were also rolled-off in the top octave

(not necessarily a disadvantage given the quite “bright” sounds back then), lacking airiness, dynamics, and harmonic extension into the atmosphere(s). They also had to be bi-amplified, and required an external crossover (from ARC, of course, since crossover design was not one of the strengths of the Magneplan products for many a year after).

In a day and age when almost no speaker, perhaps outside of the KLH Model Nine panels and original Quad electrostatic, could reproduce the critical harmonics of midbass fundamentals accurately, the Tympani’s were a revelation because, unlike the electrostats, the I-Us could reproduce the orchestral fundamentals, but also do so with a great deal of power, moving air much in the way air is moved in the concert hall. Thus, they were getting right what no one else could—the basis of music itself. To some, including



## EQUIPMENT REVIEW - Maggie 3.7

### Technology

Later on, in an e-mail, I got Diller to expand (somewhat) on the mysteries of the 3.7s.

“The drivers are purely resistive since they are like a straight wire. The crossovers are first-order which provides a gentle phase angle...” And the crossover to the tweeter “is very close to the same point.”

As for the quasi-ribbon: “The tweeter is a true ribbon. However, I am aware that these definitions have been a subject of debate. Our short version is that *any* deviation from a foil (usually aluminum) suspended in a magnetic gap is a ‘quasi-ribbon.’ And there have been a lot of creative variations of the true ribbon.”

And, to wit: “As I said earlier, the Tympani IVa bass is the Gold Standard we set as a goal and that is what we went after. The midbass is much fuller than the 3.6 which gives the subjective impression that the 3.7 is much more efficient. However, we are not making any claims for increased efficiency....The lowest frequency ‘achievable’ is the same as the 3.6, but, due to much better midbass ‘slam’ everyone is saying it goes deeper.”

And, to wit, a last thought: from HP. “When pressed for a more definitive technical explanation, Diller can still be frustratingly vague, at times, no change there. (Remember, I have known him since near TAS’s beginning days). So, what’s the big secret? Iranians aside. Maybe, from a marketing perspective, he thinks the review might be more interesting if he keeps me in the dark.”

this reviewer, they were a revelation even if, as revelations usually are, flawed.

Soon enough, all of Jim Winey’s planar designs were being sold and distributed under the Magnepan aegis. He set to work on refining the system, usually by lowering the mass of the *moving* parts of the system, a mass that had been quite high in the original Tympani, thus the lack of efficiency and slowness of response higher up in frequency. He devised a true ribbon for the upper frequencies, one widely admired (and illegally copied) with a “sparkle” and “airiness” new to his speakers, one whose inherent colorations (that “sparkle”) he in time tamed. (It is a little known fact that Winey’s first design, the one shown to ARC’s Johnson, was entirely a quasi-ribbon design, one that originally intrigued Johnson, but didn’t quite work out as a viable product.)

Heard in light of the succeeding models of Magnepan (or Maggies), the \$5500 3.7 is a hybrid fertilization of Winey’s true-ribbon design and the company’s more recent ventures into quasi-ribbon technology (as in the Model 1.7s), and it sounds unlike any of its ancestors. It is the culmination of Winey’s art. The technological ins and outs are things the company is trying to keep as secret as Iran its atomic research programs. (See the sidebar.) Maybe they fear being reverse-engineered.

In saying it doesn’t sound like its ancestors, I mean to suggest, before going into detail, that the 3.7s do not sound at all discontinuous as they have in the past, but rather as if cut from a whole cloth. Before this (and perhaps the same with the 1.7, which I haven’t heard), the perceptive listener could hear the differences between the ribbon tweeter, the midrange, and

the separate bass planar elements, and these differences were audible not only as difference in rise time, but also as a kind of characteristic texture. As Winey’s speaker designs evolved, there was greater continuity within the system, but still, one could pretty much guess where the crossover points were. No longer. With the 3.7 continuousness is so flawless that the speaker sounds as if there are *no* crossover points. And so, the first thing we heard this day was a *unified* field of sound.

And so for a moment, a bit of geography. The latest version of the ribbon is in its own panel, placed either on the outer (or inner) edge of the speaker, depending on how you choose to orient the speaker, with the separately mounted midrange and low-frequency quasi-ribbon strips comprising the guts of the system. Or, in Diller’s wording: “The midrange is a narrow, vertical, quasi-ribbon line-source, next to the true ribbon. The quasi-ribbon bass driver is adjacent to the midrange and runs the full length of the speaker; it is so wide that ‘strip’ doesn’t seem like the best word.”

*A few factoids:* The speaker’s impedance is 4 ohms. Its load is essentially a resistive one; therefore, driving it doesn’t pose the loading problems of electrostatics or many, many multi-driver designs. The 3.7 can handle massive amounts of power, in our case a 300-watt monoblock, the McIntosh 2301, and at CES, the 1000-watt monoblocks Magnepan used, the Briston 28B SST<sup>2</sup> [reviewed by me several issues ago]. The speakers together weigh 128 pounds (as shipped) and a single unit measures 24” wide, 71” high, and 1.625” deep.

*About the setup here:* The startlingly good VPI

Classic 3 (we call it “neo-Classic”) turntable/arm system, with the Benz LP S-MR cartridge; the LaSource Aero CD player from France; the new and more reasonably priced Nordost Tyr interconnects; the Veloce battery-operated linestage and phonostages; and the McIntosh amps. All fed into the dazzling Silver Circle Audio 5 isolation transformer—more on its effect on the sound in a while. (The LaSource and the Tyrs have not yet been reviewed; the other components in the system are our standing references at present.)

So, for the moment, let’s put aside the fact that the 3.7s are the best looking and, perhaps, best built of the Magnepan I have evaluated over the years, and get down to our first impressions.

Since Magnepan speakers have always performed at their best in Room Two, finding a close-to-right position for them at the outset was a snap. Diller had points he wanted to make. And these had to do with the positioning of the tweeter element. First, he toed the speakers (canted them) inward, with the tweeter strips near the center of the room. (I would, over the ensuing days, try them firing dead-on.)

I loaded up the Mercury CD of *The Composer and His Orchestra* and we listened through the introductory cut, where Hanson introduces the instruments and instrumental sections of the Eastman-Rochester orchestra. Hanson is placed dead center, in the empty hall, while the sections of the orchestra, recorded separately, were, placed as they would be in concert, arrayed around and behind the podium. The ensembles and individual instrumentalists were recorded with almost no compression, so the scaling in space and dynamics was close to what you



## EQUIPMENT REVIEW - Maggie 3.7

might hear in person, thus justifying the term “living presence.”

I immediately heard the acoustic *behind* Hanson, which I had not before. It was as if I could hear the distance to the back wall. And the air that filled that distance. It was as if the speakers had retrieved a third-dimensional space behind the conductor himself. Thus the 3.7s were delineating a virtual sonic portrait of the hall acoustic itself. All Magnepan speakers are dipolar in operation (by design), but no dipolar has captured this space in the same way before.

When the different ensembles (strings, reeds, brass, and percussion) played, individual instrumental details and overtones, formerly lost in a tangle of conflicting sounds in the louder passages, became, so to speak, separated and untangled, clarified, not hyped up. In *forte* passages, particularly of the strings and less so of the brass, instruments almost always tend to blur and lose some of their individual signatures. If you consider massed percussion, that effect becomes more odious since the transient attacks either blur or become veiled. The speed of the present-day ribbon and its increased dynamic capabilities are responsible, it would seem, for much of this clarity—attacks do not now lose their individual timbral distinctiveness. On the Hanson, the percussion section gets a muscle-building workout and each of the instruments used here (consider the tambourine and its “pop,” for example, or the “shimmer” of the cymbal) comes strikingly alive.

We observed a more subtle illustration of the interweaving of ambient space and the illusion of true dimensionality during playback of the Regent recording of Ralph Vaughan Williams’ *Fantasia*

*On Christmas Carols* [RegCD330], which opens with a rich and vibrant cello solo, played in the capacious Worcester Cathedral. Here we not only heard some of the promised midbass realism from Magnepan, but more strikingly we could hear around and behind the cello—the entire instrument, its body resonant—and the same held true for the baritone solo that followed, the voice clearly defined (down to his chest’s vibrations). This picture became more complexly fascinating as the male and female choristers entered and activated the vast interior spaces of the British cathedral.

Keep in mind that the speakers were fresh from a quite cold January morning. Out of the box, and on first play, they didn’t sound *cold*. The highs were dynamic and extended, without any trace of rawness or any apparent need for break-in—this was, in and of itself, a surprise, a first. Indeed, as the session progressed, it became clear to me that the highs from the ribbon tweeter sounded unlike those in preceding models of Winey’s ribbon. In the face of Diller’s silences on this point, I was left to surmise that the current version of the true ribbon had either been significantly improved or employed in a different configuration from the usual (perhaps without extending as far down the frequency scale). He said later that there was little variation in the ribbon’s application, leaving me to suppose that the present-day Maggie ribbon suddenly has acquired the dynamics and power-handling capability that eluded it in the past, and that it now produces a sound similar to that, say, of the current Raven ribbon designs.

After the first playback of the Hanson, Diller insisted that we swap the speakers so that the ribbon drivers were now near the walls of the

room, instead of nearer to its center. He said this would give the soundfield a wider field of coverage for listeners instead of the almost fixed position (for a single listener) that the near-central position did. Like, that is, unto the ideal spot in electrostatic playback. With the near-wall tweeter setup, the soundfield became smeared and somewhat diffuse, and so goodbye to the precision placement and the deep dimensionality of the ambient field. Hanson’s positioning became vague, individual instruments seem to float, as if barely in phase. Me? I thought this position undermined much of what the speaker could achieve. And the near-wall position was out.

One thing that struck both of us during the CD playback was the quality of the strings sound. Diller, from the Hanson onward, seemed particularly taken (he was not familiar with the titles I chose) with the 3.7s’ smoothness and open-ended airiness. Some of this I must attribute to the Silver Circle Audio 5.0 isolation transformer which, in its processing of RF interference and other induced high-frequency freak effects, actually smoothes out most digital glassiness, grit, and grain, thus bringing the much abused CD that much closer to analog. There were several dramatic examples of this, especially on the Vaughan Williams *Fantasia* when the chorus of high sopranos singing *forte* across the sonic stage did not break up, nor distort, nor do anything other than remind the heathen in me of angel voices.

The massed strings in the XRCd of Mehta’s reading of *The Planets* (“Saturn” and “Mercury” in particular) not only had an opulence that had hitherto eluded playback in Room 2, but showed the 3.7s were indeed different from past Magnepan, and closer, in fact, to the low

coloration breakthroughs recently achieved by Carl Marchisotto with the Micro-Grand Reference and Michael Borresen with the new Danish Raidho speakers, for instance. There were illustrations of the 3.7s’ potential, when they are fully warmed up, in the way—at the opening of “Saturn”—the growl and weight of the double-bass section, along with its resinous overtones, were captured, and during the climax of the section, when, over soft strings and an organ pedal point, chimes large and small provided a backdrop of contrasting attacks.

As much as I was impressed with this initial session, I wasn’t prepared for what I heard from LPs in the next one, which you will read about very soon. **tas**

### SPECS & PRICING

**Frequency response:** 35Hz-40kHz

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

**Impedance:** 4 ohms

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

**Price:** \$5495/pr.

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# Maggie 3.7 Speaker System

## Session Two

Harry Pearson

**T**he Maggie 3.7s are the best speaker system that Magnepan has produced in years, and of such excellence that they foreshadow future and more impressive designs from the company. Their arrival shows that the company, seemingly having lost its way for almost a decade, has found again its old fire and sense of purpose.

Yes, I am suggesting there is a larger and more revelatory design in its future, and, aside from some not-so-subtle hints, no one at the company will out-and-out confirm this speculation. For as good as the 3.7s are, and they are breathtakingly so, there is more to be done.

For one thing, the new Maggies do not plumb the very most depths of the bottom octave, though they are so cannily balanced you won't ordinarily miss the shuddering response of organ pedal points or massive bass drum whacks (or synthesizer pulses). The 3.7s go down, with careful setup, just maybe, to circa 40Hz, with a gentle roll-off that allows some of the harmonics of the basement frequencies to be audible further up.

From the midbass (which I define as 40 to 80Hz) upward, the response is seamless, continuous,

and extended into what some would call the heavenly region.

You won't hear a trace of any crossovers from the true ribbon tweeter at the top (on which Magnepan holds a patent) to its new quasi-ribbon midrange and quasi-ribbon low-frequency drivers. And, at the outset, you won't be listening for such arcanities, so convincing is the coherency and continuousness of the system. Indeed, with the best playback material, especially analog, there is an "aliveness," even a sort of electricity in the presentation of individual images upon the soundstage that can and does create an illusion of the real thing I've not heard from any Magnepan speaker before, or, for that matter, almost any speaker system. So convincing is the 3.7 in its almost "living presence" that you won't miss those last few bottom-end frequencies.

The other things you'll note immediately is the size of the soundfield that these (relatively) modest-sized speakers project. The ambient space itself is huge (as in life) and envelops the distance behind the speakers (dipoles), but, unlike earlier Maggies, the images within that field are anything but "huge." Indeed, they are proportionate to the way you would hear them in concert (or in relation to the way the recording itself has been miked). Stir in, metaphorically speaking, the real-world attack and decay these ribbons and quasi-ribbons delineate, i.e., the "presence," and the distance between you and a sense of the real thing is reduced in a way it simply isn't with other reproducers. It has, in the words of a talented listener who sat in for a long session with me, "not only amazing dynamic abilities, but offers a coherence in timing, the



## EQUIPMENT REVIEW - Maggie 3.7

### Explaining the 3.7

Later on, in an e-mail, I got Diller to expand (somewhat) on the mysteries of the 3.7s.

“The drivers are purely resistive since they are like a straight wire. The crossovers are first-order which provides a gentle phase angle...” And the crossover to the tweeter “is very close to the same point.”

As for the quasi-ribbon: “The tweeter is a true ribbon. However, I am aware that these definitions have been a subject of debate. Our short version is that *any* deviation from a foil (usually aluminum) suspended in a magnetic gap is a ‘quasi-ribbon.’ And there have been a lot of creative variations of the true ribbon.”

And, to wit: “As I said earlier, the Tympani IVa bass is the Gold Standard we set as a goal and

that is what we went after. The midbass is much fuller than the 3.6 which gives the subjective impression that the 3.7 is much more efficient. However, we are not making any claims for increased efficiency....The lowest frequency ‘achievable’ is the same as the 3.6, but, due to much better midbass ‘slam’ everyone is saying it goes deeper.”

And, to wit, a last thought: from HP. “When pressed for a more definitive technical explanation, Diller can still be frustratingly vague, at times, no change there. (Remember, I have known him since near TAS’s beginning days). So, what’s the big secret? Iranians aside. Maybe, from a marketing perspective, he thinks the review might be more interesting if he keeps me in the dark.”

arrival of all the frequencies in the proper relative time frame.” The gradations and shading of dynamics, from the micro to the macro, is one of the speaker’s greatest achievements, and this, I believe, is a function of the exceptional rendering of transients, both in attack and decay.

Now, obviously, you aren’t going to get such results if you do not use the best recordings and the associated equipment capable of sustaining dynamics on transients and the power to cleanly enforce and back up those transients. In the first sessions with the 3.7s, I used a CD player that, unbeknownst to me at first blush, compressed dynamics, but did other things

admirably, including an almost spooky rendering of the depth and dimensional aspects within the ambient space (*vide*, the Regent recording—available through Albany Records—of Ralph Vaughan Williams’ *Fantasia on Christmas Carols*, recorded in the Worcester Cathedral). It took the insertion of the EMM Labs XD player to restore the dynamics to realistic proportions. However, at the cost of the dimensionality and ambient retrieval I made note of in the first part of this essay. Even with the enhanced CD dynamics, analog recordings had even more dynamic life and “presence (thanks, I believe, to the Veloce battery-operated line and phonostages, whose

real *forte*—forgive the intended pun—is an extended range of dynamic capability). Which brings me around to an obvious point: Anything your associated equipment does wrong or inadequately you are going to hear through these Maggies, and so, in these sessions, clarity and neutrality of character and purity of tone were the first things I aimed to achieve. I don’t think I have yet succeeded in realizing the 3.7s’ capabilities in this regard. For example, at the very last moment before this particular deadline, the Nordost Tyr interconnects gave way to a Furutech system, which I haven’t had time to evaluate, but which is at least as good as the Nordost, and maybe even better.

You will not realize the full potential of the system if you don’t have the Maggies set up in a way that helps them lock into the acoustics of your listening room. I say start with what I called the Pearson Rule of Thirds, i.e., both speakers a third of the way into the listening room (itself preferably shoebox-shaped) and the combination a third of the way from the side walls (equidistant). I also found, despite some thoughts otherwise from Magnepan’s Wendell Diller, that the speakers imaged best and not in a locked-in optimal seating for one (call it the electrostatic beaming effect) with the ribbon tweeters near the room’s midpoint, not adjacent to the outside walls. With the ribbons next to the walls, there is a loss of the speaker’s superb focus and instrument placement, even the layering effect.

Some experimentation with the distance from the room’s rear walls is a necessity for achieving the flat 40Hz bass I know is possible, and, you’ll have to give the 3.7s a fairly long break-in to achieve the full mid and lower bass of which it

is capable. (Me? I used some organ recordings from the aforementioned Regent label and put the system into repeat play. It worked.) Don’t worry about the speakers’ ability to handle power. Magnepan drove them quite successfully with Bryston’s 1000-watt monoblocks (the 28Bs—next on my agenda for new sessions). And I have had no trouble with the 300-watts-per-channel output of the McIntosh 2301s.

What has to be said is that the 3.7s, per pair, go for \$5495, or \$2747 each, in my opinion, almost being given away. That too, along with their superb build, is in the Magnepan tradition. Magnepan is nothing if not fair to its customers. Don’t think it isn’t high end because the price isn’t. The opposite: You could say this is putting music into the hands of the people.

During the extended listening in Round Two, I dug out first the Cat Stevens album *Tea for the Tillerman*, and specifically focused on “Hard-Headed Woman” and “Wild World.” It so happened that the pre-Islamic Stevens, a Greek, used to play these cuts, decades ago, on earlier Maggies installed at Mike Kay’s Lyric Hi-Fi in New York, and so these are part and parcel of the elite among my Super Discs. I was specifically listening to hear if the midbass guitar notes were as superlatively rendered on the 3.7s as they had been on the old Tympani speakers, one of Magnepan’s design goals with the new speaker. The answer is no, the 3.7s don’t have that quality of “authority” the Tympani’s did, but Stevens did sound as if he were in the listening room with me; alive, dramatically alive was the vocal rendering. It was a shock to me since I thought I knew all there was to know about this recording’s quality. I am never quite sure how to describe an experience that changes your



## EQUIPMENT REVIEW - Maggie 3.7



perception of what can be done in the reproduction of recorded sound (“astonished,” “blown away,” “electrified,” “awe-stricken?”), but my reactions may have been all these. And this is a reference record (still in admirably clean shape), an original on the Island label (not a reference in its American pressings). It was, quite simply, as “there” and real as I’ve heard recorded sound. And it was not just the aliveness of Stevens’ voice, but also the definition of the instruments and the backup singers, clearly rendered as a smog-free day in the Rockies.

Of course, the first two movements of Prokofiev’s *Lt. Kije* (suite), by Reiner and the Chicago (on a 45-rpm pressing from Classic Records) was a must. The off-stage trumpet that opens the first movement really came from off the stage, the strings were layered so that you hear the spaces of air between some of the players, the bass drum was audible and its “attack” clearly rendered, but most striking of all was the expansion of the acoustic envelope surrounding the players and the shell of the stage, nicely differentiated from the different “sound” of the auditorium itself. And, lest we forget, the celesta in the second movement, in its own space, and perfectly suspended behind the left speakers, as its notes were hanging there in the corner of Room 2. Thinking about the added sweep and grandeur of the whole thing, I realize that words are, at this point, inadequate to describe what the ear *knows*.

(In each of these instances, and the ones to come, we had both cleaned the recordings, with the VPI Typhoon, and demagnetized them with the Furutech DeMag.)

A side note perhaps: If the record were not

cleaned, you could, through these speakers hear a slight grain, a grit and veiling. A test of this came with the 45-rpm Classic version of Louis Armstrong’s “St. James Infirmary” (taken from the old Audio Fidelity *Satchmo Plays King Oliver*). This disc, a single, was cut using the Clarity process (no magnetic particles). The reproduction was so clean you could hear the difference between the uncleaned and cleaned playings. More than this, you could also discern what was later confirmed, that the vinyl itself was not first-rate. (Little signs of wear even on the first playing.) Putting these nits aside, the recording on this system had an almost supernatural realism that made each person who heard it marvel. Satchmo sounded more like Satchmo himself than I have ever heard on disc—the backup musicians simply “there” and even against the very dark acoustic of the recording itself.

The acid test during these sessions came when the Decca Phase 4 recording of Bernard Herrmann’s *The Three Worlds of Gulliver*, a multi-miked spectacular with batteries of percussion instruments, themselves a delight to hear on a good speaker system, suddenly became “alive,” nay, make that resolved, illuminated. They had been so complexly and densely coloristically scored that their attacks, their steeper transient envelopes, had always been somewhat submerged. If you are a Herrmann fan (I am), you’ll get a three-dimensional rendering of his orchestrating genius.

I realize that it may “sound” as if I have gone over the top in some of these descriptions—and I could continue with notes from other LPs, even a few CDs (and will). But the speakers, as they are currently configured, sound as I am trying to

describe them, however inadequate the imagery I’ve used. I almost wish, given the impossibility of it, you could hear them with me. I believe every serious student of the art and the absolute sound itself owes it to himself to give these speakers an audition, understanding that, if they don’t almost knock you out, they are set up wrong or by the incompetent. Period. **HP**

# Reference 3A Episode

## Eminently Listenable

Dick Olsher

**T**he Episode, the latest addition to the Reference 3A speaker lineup, may be fairly summed up as the Grand Veena's smaller brother. Positioned between the Veena and Grand Veena it is said to offer an easier amplifier load and greater sensitivity. The Episode uses an 8" full-range version of the Grand Veena's 6.5" main driver, but the 1" tweeter, the Murata super-tweeter, and the Bybee Quantum Purifier are common to both.

To describe the Episode's design as a two-way box speaker with a super tweeter would be superficial at best. Its *raison d'être* is a wide-range driver featuring a flared woven-carbon-fiber cone similar in shape to that of an exponential horn, except that the degree of flare is even more extreme than that, and is denoted as "hyper-exponential" by the folks at Reference 3A. The rationale for the flare is to improve high-frequency response. The wide-range driver is operated wide open without a low-pass filter. Measured by *itself* on axis (by disconnecting the tweeters), its frequency response was reasonably flat to 5kHz with extension to about 10kHz without evidence of any significant breakup resonances. Beyond 10kHz, the response starts rolling off quickly and

exhibits a "last-gasp" breakup mode centered at around 14.5kHz. Wide response and no crossover network translate into uniform phase response and excellent time domain behavior. The fly in the ointment for any wide-range driver is treble dispersion. The phase plug helps some, but even so, moving the microphone to about 10 degrees off-axis produced a dramatically different frequency response with a gentle roll-off starting at around 2kHz.

Measured full-range, by reconnecting the tweeter and super tweeter, the Episode produced a surprisingly uniform response at 10 degrees—even better than that measured on the tweeter axis. While the on-axis response highlighted a slightly hot treble range, off-axis the response gelled,



## EQUIPMENT REVIEW - Reference 3A Episode

producing one of the most uniform response curves I've measured to date at my listening seat. Not surprisingly, the owner's manual recommends that the speakers "be positioned straight out to the general listening area with the tweeters on the outside and *no toe-in* to the listening position." This raised an eyebrow initially as I am accustomed to optimizing the soundstage by tweaking three parameters: distance to the rear wall, spacing between the speakers, and toe-in angle. In fact, the classic approach is to toe-in speakers so that the tweeter axes intersect in front of the listening seat. That worked very well with the Esoteric MG-20s, so naturally I felt that one of the available degrees of freedom was being taken away from me and I was determined to experiment in this regard anyway. What I discovered was that while a toe-in did help expand soundstage width and depth, the resultant sound wasn't as smooth and a bit too hot in the treble for my taste. Since the 1" tweeter rolls in around 3kHz (a first-order network), when listened to off-axis (e.g., 10 degrees), it contributes most of the upper midrange and presence region output at the listening seat. I think that this is preferable—cleaner-sounding relative to having the wide-range driver contribute much in the way of direct sound over these octaves. Conclusion: The folks at Reference 3A know what they're talking about. I suggest that you closely abide by their set-up recommendations.

The 1" tweeter features a silk dome and a copper Faraday ring. It is built to Reference 3A's specifications in Asia and is currently modified in-house for more controlled back-chamber pressure-release to minimize dome breakup modes. The Murata super-tweeter features a spherical piezoelectric diaphragm and is actually

advertised as a "harmonic enhancer." It presents a bit of an enigma in that it kicks in around 19kHz and its range extends to over 80kHz, well beyond the limits of human hearing. Precious few of us can hear anything above 15kHz, and with some program material (standard Red Book CD), there is absolutely nothing above 22kHz anyway. So it's fair to ask if there's a benefit to such a device. When I reviewed an earlier stand-alone version of this super-tweeter some years ago, I found its effect to be addictive. It helped bridge the gap between live and reproduced music. When I disconnected the super-tweeters, the effect was akin to turning off the lights—the presentation became darker and less present. It stands to reason that, in the context of the Episode, the Murata adds a dose of sonic Viagra to what otherwise would have been a soft and laid-back treble range.

The Episode benefits significantly from attention to detail, and I mean lots of little details. Reference 3A's Tash Goka reminded me of the famous quote that God is in the details, and added in jest that the details get so much attention probably because there is no crossover to play with. The main driver is mechanically grounded to the cabinet's spine brace. In addition, it is treated with Anti-Vibration Magic Fluid, which is applied much like paint in thin layers to the voice coil, cone, and shorting ring to dampen microscopic vibrational energy. Cabinet walls are constructed with different thickness of boards, ranging between 25 and 40mm, to minimize cabinet vibrational resonances. Highest-quality components are used, including Bybee Quantum Purifiers and Mundorf caps. Current production further benefits from several upgrades. Internal wiring is now PTFE-coated continuous-cast pure copper. Optimal wire thickness is used for each

driver: 0.6 mm for the tweeter and 0.8 mm for the wide range. Soft brass screws are used to fasten drivers for reduced driver/frame resonances. The floor pads and cones are now made of brass and the cones are larger and height adjustable. The binding posts and jumpers have been upgraded as well and I'm told that all connectors, internal wiring, and metal driver parts are now being cryogenically treated.

Note that a long break-in period is mandatory. With time, a slight veiling of the soundstage lifted much like the morning fog. And the midrange smooths out as well. A fair amount of effort was expended searching for an optimum amplifier match. I tried both the ModWright KWA 150 and the Pass Labs XA30.5 amps, and in both cases I admired the resultant bass reach and definition. Bass response in my room was flat to 40Hz, and I found it hard to believe that the Episode is in fact a bass-reflex design. But it is, with a box tuning of around 45Hz. Jazz basslines were tightly controlled with almost no added cabinet signature, making it possible to resolve pitch modulation to a degree rare in a box speaker. Yet I was still unhappy with soundstage dimensions and, mainly, my inability to connect with the music. The tonal balance deviated slightly from neutral with a perceived lightening up of the lower midrange and upper bass. For all these reasons it seemed logical to try a tube amp. In went the Audio Space Reference 3.1 (300B) power amp and you should have heard the resultant "whoosh" sound as I instantly got sucked into the performance. There is no doubt in my mind that the Episode needs and wants a tube amp to sound its best. OK, so bass control might suffer a bit, but it's a small price to pay for a truckload of sonic magic. Note that the impedance

magnitude over the frequency range of 150Hz to 20kHz is quite flat and tube-amp-friendly, lying within a narrow band of 5.5 to 8.5 ohms. Expect only a minor interaction with a tube amp's source impedance.

With tubes firmly in control I could report that image outlines were solidly anchored within the confines of the soundstage, and fleshed out in palpable fashion. Depth perspective was still diminished relative to what I was able to obtain with the more expensive Esoteric MG-20, which has raised the bar to new heights when it comes box-speaker soundstaging. The Episode sailed right through female vocals with excellent timbre

### SPECS & PRICING

#### Reference 3A Episode Loudspeaker

**Frequency response:** 38Hz-20kHz, +/-3dB (up to 100kHz with Murata super-tweeter)

**Sensitivity:** 91dB/1W

**Power handling:** 120W RMS

**Nominal Impedance:** 8 ohms

**Weight:** 55 lbs.

**Price:** \$5500/pr. in wood veneer; \$5995/pr in high-gloss piano black

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## EQUIPMENT REVIEW - Reference 3A Episode

accuracy and emotional expressiveness. Male voice was uncolored—a testament to a lack of resonances in the lower midrange. String tone was luscious, and harmonic colors were portrayed vividly. There was plenty of detail in evidence, yet at no time did I perceive the presentation to be hyper-detailed. The music boogied along naturally and scored high on the listenability scale.

I absolutely hate a comatose-sounding speaker, and let me make this perfectly clear, the Episode is far from zombie-like in its reproduction of dynamic contrasts. In fact, the dynamic range from soft to loud was reproduced with plenty of conviction. However, there was occasional trouble during loud program peaks, at which point the upper midrange and presence regions congested and turned hard and shouty. This was an issue with both analog and digital program material and with both the Audio Space and higher-power ModWright KWA 150 amplifiers. The upper midrange is the transition region where the 1" dome tweeter kicks in. I wondered if the tweeter was being sufficiently protected by a first-order network, which forces the tweeter to work harder with decreasing frequency. Obviously, it is working from a power-handling standpoint, but its distortion spectrum appeared to rise significantly whenever it was hit hard. If you're looking for a speaker to deploy in a large room, I suspect the Episode is not for you.

The demise of box speakers has been greatly exaggerated. You would think that, at least in the high end, high-tech speakers such as electrostatics and planar/ribbon magnetics would have displaced cone-driver technology. But electrodynamic speakers survived the challenge because they can be miniaturized to blend into a smallish domestic environment or be made large

enough to reach levels of bass extension and dynamics unattainable otherwise. In addition, many audiophiles prefer a box speaker's soundstaging with its pinpoint imaging precision. The Episode is a case in point. No, the midrange lacks electrostatic transparency, and neither does the dome tweeter approximate the performance of a ribbon transducer. When set up as recommended, there's much to cheer and not much to complain about. The Episode is a complete package, well-engineered and executed; it sounds coherent and musical—felicitous on female voice and in harmonic colors. And you don't get cheated at the frequency extremes. In particular, bass definition and extension are excellent—as good as they get at this price point. Then there's the Murata super-tweeter, which serves to animate the upper registers. When driven within its dynamic comfort zone, the overall presentation can best be characterized as eminently listenable—lively and engaging without being assertive. At its asking price, the Episode represents a superb deal for music lovers and audiophiles alike. **tas**





# Gallo Acoustics Nucleus Reference 3.5 Loudspeaker

Deeply Crafted Soundscapes

Neil Gader

Improving the breed is the imperative that drives high-end design. But few meld high concept and superior sonics into one as organically as Anthony Gallo of Gallo Acoustics. Defying box-speaker clichés, Gallo is known for its spherical loudspeaker creations for both home theater and high end, and has polished and popularized the orb-look to an out-of-this-world standard. Its flagship, the Gallo Acoustics Nucleus Reference 3.5, is a smart revision of the popular and critically well-received Reference 3.1. Like its forebear it's a four-driver, three-way floorstander that's virtually baffle-free. Though it takes a keen observer to note the evolutionary changes between Gallo's latest and the Ref 3.1, virtually every element has been honed and refined. The silhouette of the Ref 3.5 remains playfully interplanetary, a combination of Droid-like invention and college-level astronomy project. The construction of the Ref 3.5 appears deceptively simple. Lacking the traditional box cabinet it's almost skeletal in appearance, with its three uppermost transducers clinging near the top of a raked, black-powder-coated, aluminum spine which in turn merges along and around the sealed, side-firing, canister-loaded woofer directly above the bottom plinth.

## EQUIPMENT REVIEW - Gallo Acoustics Nucleus Reference 3.5

In terms of the driver array, the Ref 3.5 employs Gallo's patented CDT 3 piezoelectric tweeter—also known as a Cylindrical Diaphragm Tweeter. It covers the 3kHz-and-up range and is positioned between a pair of sealed, 4" carbon-fiber midranges that sport newly machined stainless-steel midrange bezels specially coated and optimized for vibration reduction. The cluster is fully time-aligned and like the original performs crossover-free above 125Hz. The largest improvement is its custom ceramic-coated aluminum-cone 10" woofer, which is lighter and faster and goes deeper. The Ref 3.5 is designed to be wired in two possible configurations—via standard single-wiring or, for the last word in bass extension, by using the second set of binding posts in concert with Gallo's S.A. subwoofer amplifier and integrated active crossover/bass EQ (\$1000). This setup

activates the woofer's secondary voice coil via a low-pass filter. Optimally it will add 10Hz more extension—good enough to expand response into the true-subwoofer 20–30 cycle range.

A brief word on the CDT. Unlike a conventional dome tweeter, this transducer doesn't operate via voice coil and magnets. Instead a matching transformer passes the signal across the conductive surface of the diaphragm—an aerospace plastic membrane known as Kynar that is polarized with a pure silver-coating. Its advantages are its very low mass and huge surface area and nearly 300 degrees of dispersion, compared with a typical soft dome.

As before, the aluminum chassis is filled with Gallo's S2 air-density treatment. Not just the commonplace fibrous damping material, S2 offers a volumetric efficiency that effectively encourages drivers to respond as if they're seeing a larger enclosure. The composition of the plinth has been modified, as well. It's made of Garolite, a resin-laminate that is both dense and inert, which Gallo reports further damps resonances. Rather than spikes or footers beneath the base, Gallo has added a viscoelastic gel material that also helps decouple the Reference 3.5 from the floor.

The system played contentedly on about 100Wpc, but eagerly gobbled up all the 200Wpc power the Audio Research DSi200 could throw at it. Sensitivity has been modestly improved and is listed at 88dB with a nominal impedance of 8 ohms, but the speaker doesn't seem quite that efficient in practice. Heavy-duty, long-throw woofers in small-volume enclosures need power to keep them chugging along, and the Ref 3.5 makes no bones about this fact. Bottom line—the more power the better.



### Open Door Policy

It may seem counterintuitive, but there's a surefire way to glean a great deal about the general tonal character of a loudspeaker—leave the room. That is, listen to it while doing other things elsewhere. It's a test I routinely enjoy, using a good piano or jazz quartet recording. More often than not if I hear a certain sense of liveliness, weight, and warmth, and get the subliminal feeling of phantom musicians playing in a nearby room, those very same impressions are reinforced when I actually sit down for a serious listen. Predictably, the Gallo with its wide-dispersion tweeter and open design excelled at this casual test. And what I heard was a speaker that plays with a full deck of sonic virtues. It conveyed classic yin-like performance where smoothness, warmth, and darker shadings prevailed. This was not a hot,

dry, or aggressive speaker on a tonal rampage to extract every ping, squeal, and snap from the margins of a recording.

Its tonal balance is relaxed and full-bodied, especially as it attends to the crucial lower mids and upper bass. These are the octaves where many speakers prune away dBs in order to elicit details, and manufacture a focus factor that's as momentarily tempting as it is ultimately regrettable. If you regard the sound of a concert grand piano as sacrosanct like I do, it's an untenable trade-off. Obviously someone at Gallo enjoys a concert grand or a strong baritone voice because the Ref 3.5 tonally nails them.

Bass response is uniform and tuneful, with good pitch and dynamics, and in my room it was rock-solid-flat into 40 Hertz region with copious usable response a bit further down. But the REF 3.5 is not a bone-rattler in the Magico V2 or KEF 203/2 sense of the word. The Ref 3.5 is not a massive speaker. It's designed to be compatible in reasonable settings, but even driven by a muscular integrated amplifier like the ARC it runs short of breath and dynamic energy wavers slightly—something I noted listening to the talking drum patterns rather too-sudden decay during Jennifer Warnes' "Way Down Deep."

Its ease with micro-dynamics, air, and dispersion are revelatory in this or any price range. Much of the credit is due to the CDT; its hemispherical dispersion and surface area convey a blissfully smooth and broad soundstage. As I listened to the complex multitracking, delicate acoustic guitar flourishes, and thunderous drum timbres sweeping across the deep soundstage during Dire Straits' "Private Investigations" from the newly remastered *Love Over Gold* LP

### SPECS & PRICING

**Drivers:** 3" CDT, two 4" mid, 10" woofer

**Frequency response:** 34Hz-20kHz ±3dB

**Nominal impedance:** 8 ohms

**Sensitivity:** 88dB

**Dimensions:** 35" x 8" x 16"

**Weight:** 47 lbs.

**Price:** \$5995/pr.

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## EQUIPMENT REVIEW - Gallo Acoustics Nucleus Reference 3.5

[Warner], I noted how the entire room seemed to energize and breathe as a single organic element, completely free of box enclosure colorations, baffle reflections, and inter-driver artifacts.

Spatial relationships define the Ref 3.5 like no other factor. It does not lock one's head into a single listening position. Actually it exhibits traits more commonly found with pure omni-radiators. It called to mind the MBL 121 I reviewed a few years ago. I loved that speaker, but had reservations about the omni-directional radiation pattern that I felt often added more information to the soundstage than could have existed in the recording itself. There is one crucial difference which to me improves the Ref 3.5 over that vaunted and frankly beloved German omni. The Gallo brilliantly balances a pair of competing imperatives. Namely image specificity and its more flighty twin, acoustic immersion. Jennifer Warnes' title track "The Hunter" is a perfect example of how it places the images of a string quartet, each instrument in its own orientation defined by distances fore and aft as well as side to side. The sense of the unwavering image as it relates to the immediate air and regional soundspace has never been bettered in my listening room. This can only occur when the loudspeaker is not singling itself out as a source. The result is a speaker that's easy to listen to for long stretches, graceful, full-bodied, with brilliant soundstaging, dimensionality, and musicality.

The new woofer may not be the fastest one I've heard of late, but its rich meaty bass response allows it to impart the full resonance and bloom of the skins of Russ Kunkel's drumkit during James Taylor's iconic track "Fire and Rain." However, at the same moment, if you listen

closely it will register that Kunkel is striking the snare with brushes not sticks—which back in 1969 was a technique reserved for jazz players not rock drummers. This is the sort of balancing act—low-level detail and dynamic energy—that time and again saw the Ref 3.5 scoring major musical points. As a personal aside, a thumbs up to this particular 180-gram reissue of *Sweet Baby James*. It was mastered from the original analog mastertapes and sounds superb, far better than the original U.S. Warner pressing. In many ways it's comparable to the fuller and more extended British orange-label pressing.

A couple of carps and cavils. On a cut like "The Finer Things" from Steve Winwood's 12" single on the Island label or Linda Ronstadt's "Blue Bayou" [Asylum], there's a small peak in the upper harmonic region of the vocals that accents articulation and adds traces of sibilance. Similarly, the cymbal crashes during the Winwood—a repetitive accent used throughout this track—sometimes lose their full residual bloom, as if reflecting too much leading-edge gleam and not enough fundamental timbre.

My other kvetch is the lowered acoustic ceiling when reproducing large acoustic venues like the Troy Savings Bank from Laurel Massé's *Feather and Bone*. True, the Ref 3.5 is not particularly tall but during symphonic performances it felt as if the shades had been drawn down slightly over the full musical landscape. Although much improved over the original Ref, I could still hear that height sensitivity remains a factor. Since I listen to speakers in a smaller room, it would be likely that this anomaly would be less of a factor if the Ref 3.5 were positioned at a greater distance. But this is also a characteristic of D'Appolito-

inspired groupings of mid-tweet-mid drivers—a configuration that tends to focus music along the listener's horizon, reducing ceiling and floor reflections by restricting vertical dispersion. On the one hand, it does focus vocals and movie dialogue, but, on the other, it weighs against achieving grand acoustic scale and ambience.

Like a mature vintage wine the Ref 3.5 walks in the footsteps of its predecessors and surpasses all of their achievements. Gallo-watchers will note, however, that the price has also increased significantly in the nearly five years since the 3.1 was introduced, placing the Reference 3.5 squarely in the sights of competitive efforts from Sonus faber, Revel, and Magnepan. But that doesn't diminish the level of achievement. The Reference 3.5 is a sure-footed, disciplined, and musically involving speaker that executed virtually all that I asked of it. Minor quibbles aside, the Ref 3.5 deserves an unhesitatingly high recommendation. And if deep, carefully crafted soundscapes really stir your imagination, then experiencing the Gallo is an absolute must. tas



# Joseph Audio Pulsar

## Small Speaker, Big Sound

Steven Stone

**C**ountry star Minnie Pearl always opened her performances with a big ol' "Howdy!" (Actually, it was more like "Howwdeeeeee," with the end of the phrase escalating in pitch when she hit the "d.") The Joseph Audio Pulsar deserves a similarly effusive welcome. When I asked Jeff Joseph why he created the Pulsar speaker he replied, "I've always wanted to make a really excellent mini-monitor speaker. The midrange/woofer I developed for the Pulsar was the missing link. Finally, I had all the parts." So, in essence, the new Pulsar is a mini-Pearl that fits into small spaces where the Pearl can't. It also costs only one-third the price.

### Pulsar Tech Tour

The Pulsar speakers look a lot like the top section of a Pearl, but with a slightly smaller enclosure. It employs the same tweeter as the Pearl, which has a special design using the HEXADYM magnet system. Instead of a big spheroid donut magnet behind the dome that reflects energy, there are six small yet powerful neodymium magnetic structures. Since they take up less space there's more room for absorptive material to damp the tweeter's rear wave. According to Jeff, "There's as much energy coming off the rear of a dome tweeter as off the front. The problem with most

tweeters is the large reflective surface of a magnet right behind the dome. With our tweeter we can adequately damp the tweeter's back wave."

All Joseph Audio speakers employ the Infinite Slope Crossover. Ex-McIntosh product designer, Richard Modafferi, patented it back in 1988. During the intervening years licensee Jeff Joseph has made substantial modifications to Modafferi's design. The Pulsar speaker includes Joseph's latest refinements.

As you might infer from its name, the Infinite Slope crossover has a much steeper slope than a conventional crossover. Conventional speakers



## EQUIPMENT REVIEW - Joseph Audio Pulsar

with regular crossovers are more likely to exhibit audible (off-axis) discontinuities between drivers because of the much wider area where the two driver's frequency ranges overlap. With the Infinite Slope crossover the hand-off from tweeter to midrange/woofer occurs over a much narrower span of frequency ranges.

A first-order crossover has a 6dB-per-octave roll-off between drivers. In comparison the Pulsar uses an extremely steep slope for the low pass and an 18dB-per-octave third-order slope for the tweeter's roll-off. Jeff told me, "The lowpass filter drops extremely fast until it hits about -41dB, at which point the attenuation tapers off. This is the benefit of the Infinite Slope technique—it has a very steep initial drop and reduces wave interference much more effectively than a standard 24dB-per-octave network does. It allows the two drivers to mesh in a more coherent fashion than a conventional crossover."

The original Infinite Crossover design was completely symmetrical, meaning that both the tweeter and the midrange driver had the same crossover slope. Jeff adds, "The Infinite Slope filter system we use now isn't like the one we started with eighteen years ago. Now we use a steeper slope on the woofer than we do on the tweeter. This gives us a more seamless crossover and improves the quickness of the entire system because the decay is cleaner."

Proponents of first-order crossovers often point to the more extreme phase shifts that accompany steeper crossovers as one of the reasons they prefer simpler crossover methodologies. The Infinite Slope crossover is actually "phase-matched" since it introduces a full 360-degree phase rotation in its crossover.

But since the actual frequency region of the crossover is so narrow and the 360-degree shift puts the two drivers back into phase coherence (except for the fact that the woofer is one full cycle behind the tweeter), the audible effect of this phase shift is less than you will hear on a conventional multi-driver first- or second-order crossover. According to Jeff, "When you use a 'wrapped phase' measurement like we do with the Infinite Slope, you overlay the phase shifts from both drivers so they can be adjusted to sum together nicely. The final result is the phase shift occurs over too narrow a frequency range to be audible."

Another advantage of an Infinite Slope crossover design is that the on and off-axis response curves of the speaker can be far more similar to each other than with conventional crossovers. Jeff explains, "When you listen to live acoustic music you aren't confined to a narrow and artificial window. You can move around and the sound doesn't change much. That's because the power response of live acoustic instruments in a room is more even, without the irritating artifacts and incoherencies of speakers with conventional crossover designs." In theory and practice the Pulsar behaves more like an acoustic instrument in a real-world space than most loudspeakers.

The Pulsar's midrange/woofer is a key part of the Pulsar's design. It uses a precision-cast magnesium cone, which retains its pistonic linearity through its entire range without adding additional midrange resonances. The driver was made with a special rubber surround material that reduces radial resonances and prevents surround breakup during large excursions. Two heavy copper rings, mounted above and below the T-shaped pole

piece, reduce non-linear and modulation distortion while increasing the driver's dynamic ability. The very cool-looking copper phase plug serves two sonic purposes—reducing thermal compression by acting as a heat sink and eliminating resonances in the cavity inside the voice-coil former. An extremely stiff and stable injection-molded zinc basket keeps all the critical components in perfect alignment. According to Jeff, "The Pulsar's woofer has an unusual motor system that is low in distortion, and has tremendous throw."

The Pulsar cabinet also draws many of its design ideas from its big brother. "We'd used this cabinet design successfully with the Pearl and Pearl2. Having those side panels on the larger side



surfaces of the cabinet makes for an acoustically dead and wonderfully quiet cabinet. We use the bevels around the tweeter to keep the baffle to a minimum, and instead of a straight edge we have a taper to further reduce diffraction effects." The cabinet's final dimensions and port size were optimized for the midrange/woofer. Jeff explains, "I considered the cabinet and the midrange/woofer to

be one unit, so they were designed together to be a single sonic entity."

As you would expect from a speaker at this price the Pulsars look "beautiful" as my aunt used to say. The sapeli pomele wood side panels on the review samples had a slightly burl grain, reddish tone, and lustrously smooth texture. The overall look is so suave that these speakers appear equally tidy with the grilles on or off. Available in natural cherry, rosewood, maple, sapeli pomele, and high-gloss piano-finish black, the Pulsars should look good in any environment.

On the back of the Pulsar, instead of the standard five-way binding posts, you'll find Cardas bi-wireable connectors. These connectors don't require any special tools to tighten to audiophile-approved tension. Big rubber-clad knobs allow any human with a decent set of opposable thumbs to cinch spade-lug-enabled speaker wire with just a couple of turns. The only disadvantage of the Cardas posts is they do not accept banana terminations, only spade lugs or bare wire. I had some adapters on hand that I used with a pair of AudioQuest Colorado speaker cables with banana terminations for a couple of weeks before switching to a set of Cardas Clear bi-wire speaker cables (this was the cable that Joseph Audio had used at its demonstrations at RMAF and CES).

I didn't remove any drivers to inspect the Pulsar's innards, because I don't do this with new speakers on loan, but from the Pulsar's weight I can tell that its cabinet is extensively braced. In fact I don't remember ever reviewing a small speaker that weighed quite as much as the Pulsar.

### Sound on the Desktop

All the small speakers I review start off in my



## EQUIPMENT REVIEW - Joseph Audio Pulsar

computer desktop system. This setup allows me to hear the speakers in a nearfield environment where the room has very little impact. While I would never suggest this is the only way to audition small speakers, it's a revealing first step in the process.

I set up the pair of Pulsars flanking my 26" NEC 290WUXi LCD monitor. They took up a sizeable amount of desktop real estate. Usually when speaker boxes get to be the size of the Pulsars, cabinet-induced diffraction prevents the speakers from disappearing as completely as smaller speakers do. But contrary to my prior experiences, the Pulsars did a vanishing act that equaled almost any speaker I've had on my desktop. Even the much smaller ATC SCM7 speakers don't disappear more completely. Rebecca Evans' soprano vocals on Gilbert and Sullivan's "Poor Wandering One" from *Pirates of*

*Penzance* performed by Sir Charles Mackerras and the Welsh National Opera [Telarc] was firmly centered in the soundstage with not the slightest bit of imaging confusion caused by the cabinets.

I usually use a subwoofer with desktop monitors. The Pulsars easily blended with an Earthquake Supernova Mk IV 10 subwoofer. Unlike many ported designs which often have a bass bump just above their cut-off point, the Pulsar's bass response was smooth and even, making it easy to add a subwoofer. On my desktop, with no room gain to augment their bass response, the Pulsars went down to around 45Hz. Test tones through the Pulsars showed a smooth and even power response.

The first thing I noticed about the Pulsars was their midrange purity and lack of grain. This particular pair of speakers came to me directly from the RMAF, where I picked them up at the end of the show. They were already broken in and ready to play, and play they did. I threw everything at them from delicate Bach lute music by Eduardo Equeu on MA Recordings to raucous Zappa by the Omnibus Wind Ensemble [Opus]. Regardless of the source, the Pulsars revealed subtleties that eluded many fine speakers I've had on my desktop. The Pulsars' midrange speed and clarity reminded me more of a planar or electrostatic speaker than a dynamic-driver-based transducer.

The Pulsars' upper frequencies walk the fine line between dark and light. This tweeter has a sweet character that portrays upper frequencies in a very natural and relaxing way. First violins and piccolos had sparkle and shimmer without sounding forward or metallic.

I listen to quite a bit of music with acoustic guitars. To properly reproduce the sound of a guitar

requires a speaker that has the ability to reproduce both dynamic weight and power in the lower midrange and upper bass. Given their size it's hard to believe that the Pulsars can pump out as much dynamic contrast in the lower midrange and upper bass as they do. Martin Simpson's guitar on Randy Newman's song "Louisiana 1927" from *Prodigal Son* [Compass Records] demonstrates the Pulsar's lower midrange dynamics nicely. Even when a cello and resonator guitar join Simpson's solo guitar, the micro-dynamic contrasts don't become compressed. All the subtleties of Simpson's right-hand technique come through with no loss of detail even following the addition of an extensive "string section."

Audiophiles often use the term "fast" to describe speakers that handle dynamic transients and contrasts well. If I were using this rather broad description, then the Pulsars are veritable light-sabers. Regardless of how complex the music the Pulsars made it easy to hear into the mix and also follow a particular part within the mix. I hesitate to call the Pulsars "musical or a "music-lover's speaker" because it implies a lack of resolution or dynamic verve, which is certainly not the case here, but the Pulsars offer a very special blend of sonic attributes that makes listening to music through them emotionally involving. It's hard to think about audio hardware once the Pulsars begin to strut their stuff.

Although the Pulsars have a benign impedance curve and can be driven by relatively low-power amplifiers, they require a high-current amplifier to bring out their optimum dynamic and harmonic abilities. Both the Peachtree Nova and a stock Dyna Stereo 70 proved to be less adept at maintaining control over the Pulsar's low frequencies

than either the Stello Ai500 and Edge Av-6 amplifiers. Even my venerable (but recently restored) Accuphase P-300 amplifier had no problem driving the Pulsars to their full dynamic capabilities, which leads me to speculate that any decent solid-state amplifier with over 100 watts of RMS power should be fine with the Pulsars.

### Pulsars in a Room

After they'd spent nearly a month in my desktop system I moved the Pulsars into a room system. I secured them to Anchor 24" stands with a double set of bright red (very sporty) bungee cords to make sure my cats didn't bump them off in the middle of the night. Final placement was close to where I place both the Genesis 6.1 and AV123 X-Static speakers.

The Pulsar's in-room bass extension measured very close to what I got when they were in my desktop system—flat to 45Hz. Everything the Pulsars did well in a nearfield translated to a room system. The only difference was that the Pulsars had a chance to open up and play at higher levels.

Of all the Pulsar's sonic attributes, the one that impressed me the most was the high level of discernability. What I mean by discernability is how easy it is to listen into the mix and pick out exactly which parts you want to concentrate on. The higher the level of discernability, the easier it is to do this. The Pulsars made it simple to recognize the essential banjoneer of a banjo on Paul Curreri's "Once Up Upon a Rooftop" [California Tin Angel Records]. Even when a harmonica is added to the mix, it's easy to tell where the banjo stops and the harmonica starts.

The Pulsar's intrinsically articulate nature works wonders with human voices. On Dowland's *First*

## SPECS & PRICING

**Design:** Two-driver, two-way mini-monitor

**Frequency response:** 38Hz-21kHz

**Impedance:** 8 ohms

**Crossover:** Asymmetrical Infinite Slope at 2kHz

**Dimensions:** 8.5" x 15" x 14"

**Weight:** 35 lbs.

**Price:** \$7000/pr.

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## EQUIPMENT REVIEW - Joseph Audio Pulsar

*Book of Songes* recorded by The Consort of Musike with Anthony Rooley, Emma Kirkby, John York Skinner, Morgan Hill, and David Thomas, every voice is delightfully grain-free with no audible additional electronic texture. I noticed this especially on Emma Kirkby's angelic soprano, which I've had the good fortune to hear live on several occasions. Through the Pulsars she sounded devastatingly right.

Even though I regularly use stereo subwoofers in this room, two JL Audio F112s, bass extension from the front right and left speakers is still important. The Pulsars were easy to blend with the JLs. The JL F112s were agile enough to keep up with the Pulsars, and the Pulsars were dynamically robust enough to keep up with the F112s. I love the Motown-influenced electric bass line on Taj Mahal's version of "The Cuckoo." When the kick drum comes in on top of the bass line, the added low-frequency dynamic push didn't stress the Pulsar/JL F112 combo one iota. The system handled the additional midbass energy without disrupting its heretofore well-controlled bass response.

The Pulsar's midbass response reminded me more of a sealed cabinet speaker than one with a port. I consider this lack of extra bass bloom a very good thing. I'm not fond of systems where the bass is augmented by the room. I purposely have my speakers and subwoofers situated so that room resonances and bass reinforcements are minimized. Once their relative volume levels were dialed in, it was very difficult to tell where the Pulsars stopped and the JL Audio F112s started.

Given their small size you would expect the Pulsars to image superbly, and they do. The overall image size and shape does differ slightly from the

open-baffle Genesis 6.1 system that often lives in this room. With the Pulsars the image has more substance and the edges of each instrument's location are more distinctly defined. In contrast the Genesis' soundstage was a bit larger, but the dimensions of each instrument weren't quite as well delineated. The Genesis (and also the AV123 X-Statik) generate a soundstage that has a bit more apparent depth but less dimensional substance. Somehow the Pulsars generate more concrete presence and a greater sense of reach-out-and-touch reality than these two open-baffle designs.

One particular performance area where the Genesis and X-Statiks proved superior to the Pulsars was how far off-center I could sit and still hear a convincing side-to-side image. With the Pulsars if I sat too far to one side, the speaker closer to me dominated and the side-to-side image collapsed. Open-baffle speakers may not image quite as precisely in the central "sweet spot," but they preserve the stereo illusion farther from the center listening position.

What's special and perhaps even unique about the Pulsars is their ability to combine all the best sonic characteristics of a superb mini-monitor with those of a larger speaker. With a level of midrange purity that equals ribbon and electrostatic designs and the dynamic weight of a bigger dynamic speaker, the Pulsar is the closest thing to that impossible dream of a small speaker that can generate the SPLs and excitement of a much larger transducer without sacrifices in inner detail or harmonic purity.

If I were forced to move into a smaller house, one with a modestly sized room for my system, the first and most likely last speaker I'd consider would be the Joseph Audio Pulsar. **tss**

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# DALI Helicon 400 Mk2

Danish Treat

Dick Olsher

**R**aising the performance bar that additional centimeter can be difficult in the case of a speaker that has already set a high standard, like the original DALI Helicon 400. Released some seven years ago, it garnered more than its share of accolades, including our own 2005 Mid-Priced Loudspeaker of the Year award. DALI's CEO and chief designer, Lars Worre, explained that because of the speaker's loyal following there was little incentive for a major update; only a few improvements have been made in the Mk2 version under review, chiefly the result of customer feedback. First, and most obvious, is what Lars refers to as a "facial" change—improved finish quality. And there's no question that the 400 MkII's lacquered-veneer finish and curvaceous cabinet will have high appeal. The 6.5" mid/woofers are manufactured to DALI's specs by Scan-Speak in Denmark. It's a natural partnership says Lars, as Scan-Speak is located less than 100 miles from DALI's headquarters. The Mk2 woofers feature slightly increased magnetic flux density for better bass damping and improved pole-piece saturation. The rest has to do with improved parts quality: a new binding-post terminal and a higher-grade capacitor in the woofer network for reduced distortion and enhanced clarity.



## EQUIPMENT REVIEW - DALI Helicon 400 Mk2

On the surface, this appears to be a conventional four-driver, three-way design. But, in fact, things are not quite what they seem to be. At its core this is a two-way design. The upper woofer is crossed over conventionally at around 3kHz to a 1" silk dome tweeter. However, the lower woofer rolls in gently below 700Hz, the Helicon's baffle-step frequency. This is where the radiation pattern transitions from half space to full space as the wavelength wraps around the front baffle. The expected or theoretical result would be a 6dB-per-octave roll-off, though that is counteracted to some extent by room gain. The lower woofer attempts to mirror-image the baffle step in order to maintain tonal neutrality through the lower midrange and upper bass.

Does this strategy succeed? Definitely, no doubt about it! Rarely have I failed to complain about tonal balance issues, specifically a lean lower midrange or an anemic upper bass—the octaves spanning the range of 120Hz to 440Hz. This is where the perception of full-bodied, big-toned sound originates. Vincent Salmon, as far back as 1947, may have been the first to offer a comprehensive set of descriptors, terms suggestive of the sensations experienced by a listener. For example, he hit the spot with the words “lean, thin, and tinny,” listed in order of increasing severity, to describe a balance deficiency in this region. A moderate excess, on the other hand, may be communicated by terms such as “punch, body, mellow, and thick.” These terms are not to be confused with “tubby and boomy,” which he reserved for the midbass.

Tonal balance is paramount on my list of priorities and helps explain why conventional mini-monitors don't cut it for me. They're terminally

neutered in the upper bass/lower midrange and can't even be fixed by the addition of a subwoofer. Even floorstanders haven't generally fared too well. That's why I was pleasantly surprised to discover that the Helicon fit my listening room like a glove, with a satisfying sense of body and punch. Now, that's what I call getting off to great start! I was even more ecstatic about its potential when I discovered that its in-room bass reached down to about 30Hz. Of course, it's not all about bass extension, a major consideration also being bass quality—especially in a bass-reflex design. And this is apparently a priority at DALI—to tune bass-reflex speakers to obtain bass quality approaching that of aperiodic or non-resonant systems. Still, as with other bass-reflex designs, you'll need a power amp with a decent damping factor to properly control the low end. I'm not suggesting that a solid-state amp with a damping factor of 100 is mandatory. On the contrary, I obtained very decent results even with Audio by Van Alstine's Ultravalve tube amp. So maybe a damping factor under 10 is O.K., too. Either way, bass lines were well delineated with excellent pitch definition and minimal intrusion from cabinet resonances.

At the other end of the frequency spectrum, the 1" silk dome is augmented at 13kHz by a quasi-ribbon tweeter (thin aluminum conductor over a polymer base). A total of six rod magnets are used to generate the magnetic flux density—three ferrite magnets in back of the diaphragm and three neodymium types in front. There's plenty of good engineering in evidence here. The ribbon is well protected by a third-order high-pass network, while the dome tweeter is crossed over two octaves above its free-air resonance.



## EQUIPMENT REVIEW - DALI Helicon 400 Mk2

Both tweeters are bolted to a die-cast aluminum faceplate, recessed on the back side at different depths to align the tweets' acoustic centers and minimize off-axis interference effects. An acoustic lens is used to improve the ribbon's horizontal dispersion.

Unfortunately, the overlap between the tweeters around 13kHz results in a peak of about +6dB (relative to the response at 1kHz) when measured (without the grilles) at one meter on the ribbon's axis. That's why I preferred not to

toe-in the cabinets toward the listening seat and ended up firing the tweeters straight ahead for the most natural treble balance. And sure enough, the owner's manual recommends not pointing the speakers directly at the listening seat. Even without any toe-in the treble emphasis did not disappear completely due to the Helicon's excellent horizontal dispersion; at the listening seat I still measured about a +3dB SPL peak relative to 1kHz. With proper setup, the residual treble bump is a minor effect, but one that is potentially audible as a slightly brittle character when reproducing cymbals and brass. Not surprisingly, the Helicon sounded its best when partnered with power amps lacking an assertive treble range.

Right out of the box, a touch of roughness and sibilance permeated the upper midrange. Since the mid/woofer is pushed well into the upper midrange, I was hoping that things would smooth out as the woofers broke in, and so they did. Like a fine wine, the Helicon continued to improve over the first couple of weeks of break-in, finally settling down to a satisfactory level of textural silkiness.

Goldilocks would be pleased. The Helicon's presentation consistently felt just right. It is the only speaker I've auditioned to date at this price point that I find suitable for realistic reproduction of orchestral music. It lays down a solid orchestral foundation without cheating the orchestral power range of 100Hz to 400Hz. Despite the modest woofer size, it was able to generate a reasonable sense of slam and satisfying levels of lower-midrange punch. And despite the array of drivers on the front baffle, there was plenty of imaging magic on display. The soundstage was

deep and spacious, populated by robust image outlines, though the speakers didn't disappear as completely as the Esoteric MG20 or the recently reviewed Salk Sound SongTower. Harmonic textures were plush and vivid, especially when the Helicon was driven by tube amplification.

Another major priority of mine is emotional expressiveness, the ability of a speaker to communicate music's drama and passion. I found the Helicon to be quite engaging emotionally. And there was plenty of detail to behold, including transient decay into the noise floor of the recording. But note that the Helicon is not an analytical-sounding speaker. I didn't feel inundated with low-level information, as I do sometimes when listening to an electrostatic midrange. OK, so it's not the most revealing or transparent speaker on the market, but it really hangs together well. It is quite capable of reproducing the gestalt of the musical experience, and to that extent it transcends the typical audiophile speaker.

While the Helicon's design does not attempt to nudge the state of the art forward, it aims high enough to create an exceptionally satisfying speaker. It's not the kind of speaker that will necessarily wow you during a quick audition. It lacks the sort of attention-grabbing hyped-up balance that some audiophiles are attracted to like moths to a flame. You know, like a response bump in the presence region, around 4-to-6kHz, that makes female vocals jump out of the mix with surreal clarity. The test of any great speaker is long-term satisfaction, being able to live with it, day in and day out, without any significant reservations. The Helicon is that sort of speaker.

Listening to the Helicon I have no worries about missing out on a particular aspect of the

reproduced sound. I just kick back and enjoy the music. You may have been seduced by various speakers over the years, had your fling, only to wake up the morning after with nagging doubts. The DALI Helicon 400 Mk 2 is a speaker you can "marry" for life. An enthusiastic two-thumbs-up recommendation! **tas**

### SPECS & PRICING

#### DALI Helicon 400 Mk2 Loudspeaker

**Frequency response:** 32Hz-27kHz +/-3dB

**Sensitivity (2.83V/1m):** 88dB

**Nominal impedance:** 4 ohm

**Maximum SPL:** 111dB

**Recommended amplifier power:** 50-300Wpc

**Crossover frequencies:** 700Hz/3kHz/13kHz

**Drivers:** 1mm x 10mm x 55mm ribbon, 1mm x 25mm soft textile dome, two 6 1/2" wood-fiber cone

**Enclosure type:** Bass-reflex

**Bass-reflex tuning frequency:** 32Hz

**Input connections:** Bi-wire

**Dimensions:** 40.6" x 10.6" x 19.9"

**Loudspeaker weight:** 70.5 lbs.

**Price:** \$7000/pr.

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# PMC Fact 3

Alan Sircom

**T**he Fact range represented PMC's first dedicated home loudspeaker project; previous models were domestic variants of the company's professional studio monitor systems. But, until recently, it wasn't much of a 'range', with just one floorstander in the line. The new Fact 3 standmount shows it wasn't just a one-off.

The first Fact speaker – the Fact 8 - is slim and elegant, and the new one continues the trend. It is designed to work with PMC's custom single-column bolt-in and mass loaded stand and the whole package is very 'now', design-wise. There aren't many speakers that would sit comfortably on the pages of arty-interior design magazine Wallpaper, but the Fact 3 gets closer than most.

Initially, PMC thought of the Fact 3 as being a separate entity from the stands; the two were priced separately and the idea was that people could pick and choose the right support for the job. Problem is, the thin form factor means it's easy to knock over unless the speaker is bonded to the stand, and Blu-tack and its kin can end up ripping veneer in some cases. The Fact 3 stand, by virtue of being bolted to the speaker with a single M8 sized thread, is going nowhere fast. You have to get the right amount of tension on the thread; too loose and you have a speaker that will spin around in a stiff breeze, too far in the other direction and you risk overtightening and threading, but the stand is simple and logical and a perfect match.

The Fact models retain a lot of what goes into the pro-am models, such as the small, high quality long-throw drive units and the ATL transmission line system. But it also includes things that draw audiophiles like moths to a flame, such as silver bi-wire terminals, magnetically applied grilles, high-quality components in the crossover and that lovely finish. It's a very different finish to the likes of the extreme high-end, though – which often draws more upon rich, glossy design, as befits the luxury car owner market such loudspeakers attract today. My take on this is that both reflect the kinds of modern homes these speakers are likely to go into. What is particularly attractive about the Fact models from an audiophile perspective is they manage to turn in a particularly fine sound and stay fashionable in the process. That's a 'you can have your cake and eat it' moment (a particularly odd maxim, unless there is an army of non-cake eating cake buyers out there).

In the Fact 3, we have a two-way, three driver design, featuring a pair of 140mm doped paper mid/woofers and a SEAS-sourced 19mm 'Sonomex' soft dome tweeter, in pretty much





## EQUIPMENT REVIEW - PMC Fact3

exactly the same configuration as the original Fact 8. The output of these can be tailored by judicious use of DIP switches on the back panel. The bass can be flat or cut by three or six decibels, while the treble can add or subtract two decibels overall away from the neutral. The idea behind this at the LF is to help compensate for room nodes or less than ideal surroundings, while the HF is there to help overcome heavily damped or extremely live surroundings. In a small London living room, I found a 3dB cut in the bass and no treble adjustment worked well, without making the sound too lean in the process.

Perhaps the biggest difference between PMC's pro-am range and the Facts is the latter's driveability. It's not too much of a reach to see why PMC distributes Bryston in the UK, when viewed through the pre-Fact range; they are speakers that need some muscle to drive them properly. The Fact 3 is a far less demanding load on your amplifier. While I don't envisage the speakers being used with flea-powered Class T or SET amps, and while the speaker seems almost exclusively comfortable with solid-state amp designs (I suspect those bass drivers need an amp with decent damping factor levels to come to life), it doesn't need arc-welder voltage or current levels to sing. The 89dB sensitivity and relatively benign eight ohm load show – at least at a surface level – that the speaker is not an amp-crusher, but I suspect some balance would be in order. So, no to partnering the Fact 3 with a 20W Class A design (unless you are listening in a very small room at polite levels), but also no to kilowatt power unless you want big boxes in the room. Moderation is key.

A standmount has a tough job to perform.

Larger floorstanders essentially pre-select room size, because few people are willing to put up with a big pair of speakers dominating a small room. Standmounts, however, end up in smaller rooms where their smaller form factor doesn't intrude. The trend seems to be swinging back to standmounts after years of tower speakers driving the market – and a good standmount needs to do the seemingly impossible; have enough bottom-end to energise a typical space, but not so much that it swamps smaller ones. PMC's bass contour helps, but in a big room the floorstander helps all the more.

That's kind of the key thing about the Fact 3; it's the Fact 8 for everyone else. Don't read that as faint praise; the Fact 8 was one of the most well-balanced, 'right-sounding' speakers we've heard in its class and the Fact 3 just opens that option up to a new set of listeners, while adding no downsides in the process (not an easy task). It has that same sense of musical poise and balance that the Fact 8 does so well, just in the sort of package that will attract a larger audience with a smaller room. There's a precision about the Fact sound. It's not as 'studio monitor' (detail and sound analysis uppermost) as PMCs pro-am designs, but it's not hard to hear the family resemblance. Those thin front faces make this a remarkably good speaker at key aspects of imaging, with a large soundstage projecting into the room really well. If you are looking for electrostatic-like image placement, this scores a 'good' rather than an 'excellent', but what it lacks in focus it more than makes up for in image width.

I've found PMC draws strong opinion from audiophiles. Most love the speakers for their

honesty and accuracy, but some dislike the sound, seemingly for exactly the same reasons. They seem to want fireworks, even when fireworks are not the order of the day. The Fact 3 doesn't do that; if there are fireworks on the recording, there are fireworks in the listening room, if there aren't, there aren't. It's that simple. Those determined to extract an exuberant experience from every track are going to want something with less control, less poise, less precision and ultimately less accuracy than the Fact range. For me though, honesty is the best policy.

In fact, this honesty is the Fact 3's winning hand. It does everything so well, but with an air of calm, level-headed restraint that never gets in the way of the music. In a way, it does this even better than the Fact 8 because the size of the speaker acts as a limiter. In the Fact 8, its biggest drawback is its inability to play at headbanger levels, but in the Fact 3, the chances are it will go into smaller rooms where the headbanger level demands are appreciably lower, so it's less likely to hit its end stops next to its bigger brother. This makes the Fact 3 a speaker that is always in its comfort zone and practically nothing is going to phase the design. Does that spell a speaker that never gets out of first gear? No, it's a speaker that has capabilities that far beyond its demands.

Where this becomes apparent is in moving from singer/songwriter material to full-scale orchestral or heavy rock. To say the Fact 3 took the change in its stride is understatement; everything I threw at it (and I do mean everything, when you start bringing out Oz Mutantes discs, you know you are on to something both special and pretty much invulnerable) was handled honestly, accurately, dynamically and with a large soundstage.

I'm personally surprised and happy that I made it the whole way through the review without recourse to 'that's a Fact' punning. Perhaps it's because this elegant standmount brings so much to the party, there's no need to reach for the joke book. Or perhaps it's because it's one of the most professional packages around, that off-hand quips seem cheap. But the fact remains that this speaker is going to remain a popular choice because of its excellent combination of designer-label looks and highly refined sound, and that's a fact. Oh damn! **tas**

### SPECS & PRICING

**Frequency Response:** 35Hz - 30kHz  
**Sensitivity:** 89dB 1w at 1m  
**Effective ATL (Advanced Transmission Line) Length:** 1.7m (5.6ft)  
**Impedance:** 8Ω  
**Drive Units:**  
**LF:** 2 x fact 140mm (5½") precision drivers  
**HF:** 1 x fact 19mm (0.75") high-res SONOMEX™ soft dome ferro-fluid cooled with 34mm wide surround  
**Crossover Frequency:** 1.7kHz  
**Input Connectors:** Two pairs, 4mm silver terminals  
**Dimensions (WxHxD):** 15.5x53.5x30cm  
**Weight:** 9.5kg. available in four finishes  
**Price** \$7950/pr. (including stands)

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# TEAC Esoteric MG-20

## Technology in the Service of Music

Dick Olsher

To coincide with its 20th anniversary, TEAC Esoteric expanded its product base during CES 2007 by adding a loudspeaker line. It was an appropriate moment to celebrate, and sharing a toast with corporate president Motomaki Ohmachi during the press function, I reflected on what turned out to be a most positive first impression. What is special about the MG-10 and MG-20 is that both feature an all-magnesium driver complement. The MG-20, a slim floor-standing tower, is outfitted with a pair of 6.5" cone woofers and a tweeter, while the bookshelf-sized MG-10 uses a single woofer. My first take on the MG-20 tower was extremely positive: wonderful clarity, but without the metallic aftertaste that often accompanies metal-diaphragm drivers. For the record, this speaker immediately rose to the top of my list of review priorities for 2007.

If you were an electronics-based manufacturer with speaker-design ambitions, how would you go about realizing a final product? Esoteric had the good sense to partner with Tannoy in the U.K. for the engineering and manufacturing functions. Tannoy offers over 75 years of experience and has gained a solid reputation as a leader in various sound-reproduction fields. Esoteric's system architecture called for a coherent and involving

soundstage, an open and naturally detailed midrange, an extended treble, and effortless dynamics. Alex Garner, Tannoy's technical director, nurtured these goals to maturation.

The path to success involved several critical ingredients. First, consider the MG-20's cabinet. It's fairly light, but much of its mass is made up of a 1"-thick front baffle. And that's where the rubber meets the road; it's the part that takes



## EQUIPMENT REVIEW - TEAC Esoteric MG-20

all the pounding from the woofer baskets. Each action generates a reaction in the front baffle, and the less flexing it undergoes the lower its sonic contribution to the music. Next, note the trapezoidal cabinet shape, which minimizes internal standing waves. The front baffle is joined to the body of the cabinet using solid cherrywood siderails. Comprehensive internal bracing stiffens the cabinet further. Finally, behold the drivers, which are, of course, the star attractions.

In the beginning there was paper. While not particularly stiff in sheet form, it gains considerable strength when shaped into a cone. Its low density, ease of molding, and good internal damping made it the industry standard in the 1930s, and paper woofers have remained in production to this day. The ability of a woofer to behave as an ideal piston over an extended bandwidth is related to two basic physical parameters: stiffness and the cone's sound velocity. Stiffness (as measured by Young's modulus) is, for example, at least a factor of 100 greater for titanium than for paper. But that's only part of the story. Cones and domes break up at a resonant frequency, which is proportional to the sound velocity of the cone material. For a given cone size, the higher the sound velocity, the higher the resonant frequency, giving the woofer a more extended range. Getting back to our example, titanium's sound velocity is about a factor of four greater than that of paper. This means that a paper cone will breakup much sooner than a titanium cone. (Ironically, plastic/polypropylene cones, which became popular in the 1970s, offer an even lower sound velocity than paper.) A 6.5" magnesium-alloy cone woofer probably starts breaking up above about 4kHz. However, whereas paper cones can work

fairly well in breakup mode, metal, being poorly damped, rings severely during breakup, which means that the working range of metallic woofers needs to be pushed about an octave below the onset of resonance. Still, in my experience, metal drivers are well worth it. Having worked in the past with some of the SEAS aluminum woofers, I was mightily impressed with their much greater piston-like precision relative to paper alternatives.

Esoteric feels that magnesium alloy (96% magnesium) provides better internal energy dissipation than aluminum or titanium. In addition, the woofer cone is corrugated and damped with two thin coatings (one of which is a ceramic layer) for enhanced resonance control. This diaphragm technology is said to have originated in Esoteric's sound engineering department and is manufactured jointly with Nippon Kinzoku Company, a major metals-manufacturer in Japan. Esoteric believes that these design features are essential to maximizing the sonic potential of magnesium alloy technology.

It is worth repeating that, unlike the much more common scenario where the driver complement is a mix of paper or plastic woofers and a metal dome tweeter, the MG-20 uses magnesium-alloy diaphragms in every driver. As a result, when the dynamic/harmonic envelope blooms and expands, the MG-20's character remains unchanged. The MG-20 was designed to speak with a consistent voice over its entire range. A soprano voice, for instance, may launch in the woofer's sweet spot and seamlessly continue its upper-register ascent courtesy of the tweeter, never changing diaphragm material. (Yes, it's true that cone materials *do* sound different, and for the same reasons that a violin or piano's timbre is

affected by the choice of woods and lacquers for the body of the instrument.)

The MG-20 is a three-driver, two-way design. Those of you familiar with loudspeaker design will readily identify the vertical layout (woofer, tweeter, woofer) as a D'Appolito configuration. Its advantages are a uniform vertical radiation pattern and an enhanced listening-seat sweet spot. Bass loading is the ubiquitous bass reflex with a front-firing vent. I would estimate the box tuning frequency at around 35Hz. (A low tuning frequency is beneficial in controlling driver excursions in the deep bass.) The crossover frequency is pushed down to 1.9kHz with a second-order (12dB/octave) low-pass network for the woofer. The tweeter is protected with a third-order (18dB/octave) high-pass network, which I think is a wise choice. All crossover components are said to be high-precision, low-loss types. The network is hard-wired and glued to the backside of the terminal cup—there are no printed circuit boards. The terminals are bi-wireable and feature an "earth" or grounding point for the driver chassis, which is said to minimize RF interference. Internal wiring is van den Hul silver-coated copper. The speaker's nominal impedance is rated honestly at 6 ohms. The minimum impedance is about 4 ohms, which together with a decent sensitivity rating, makes this an easy amplifier load.

In the British hi-fi tradition, Esoteric recommends a classic setup with the speakers toed in toward the listening seat. It is suggested that the driver axes for the left and right channels intersect about two to three feet in front of the listening seat. There is no question that this is an excellent recipe for obtaining as wide a soundstage as

possible, while enlarging the sweet spot, but I discovered that tonal balance also plays a role in dialing in the optimum toe-in

angle. My in-room on-axis measurements showed that the lower treble, the range from 8–12kHz, is rolled off gently relative to the midrange and then flattens out to beyond

20kHz. Listening off-axis further decreases output at 8kHz, slightly reducing treble air

and immediacy. On the other hand, aiming the speakers directly at the listening seat gave the treble a hint of assertiveness. The best overall compromise, in my listening room, between soundstage width and treble immediacy turned out to be a toe-in angle that *did* intersect the

### SPECS & PRICING

**Type:** Two-way floorstanding loudspeaker

**Drivers:** Two 6.5" magnesium cone woofers; one 1" magnesium tweeter

**Sensitivity:** 89dB/2.83V/1m

**Nominal impedance:** 6 ohms

**Frequency response** (-6dB): 38Hz–44kHz

**Recommended amplifier power:** 20–170W

**Dimensions:** 47.5" x 8.5" x 11.7"

**Weight:** 33 lbs. each

**Price:** \$8400/pr.

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## EQUIPMENT REVIEW - TEAC Esoteric MG-20

tweeter axes in front of the listening seat. Of course, you should experiment in this regard to obtain the sort of balance that agrees with your personal preferences. Optional aluminum isolation bases are available. They're rather expensive at \$1080/pair, but are probably a very good idea when positioning the speakers on a carpeted floor. Samples were not yet available for evaluation at the time of this review. A final word of caution: A lengthy (200-hour) break-in is required to fully smooth out this speaker. It's pretty good right out of the box, but keeps improving for the first few weeks.

The MG-20's most compelling attributes were instantly obvious: clarity and transparency to die for! It felt as if layers of veiling were lifted from the soundstage, making for a stronger connection to the original performance. It was a sensation similar to the experience of listening to a live microphone feed versus a mastertape. The microdynamic intensity, kinetic energy, and rhythmic drive of the music were that much more believable. Good grief, how can anyone return to the world of plastic and paper cones, after having sampled the "forbidden fruit"? As if a giant searchlight illuminated the soundstage, it was possible to make out its inner recesses. Now, that's transparency taken to the max! Reverberant information, decaying gossamer-like into the recording's noise floor, was faithfully reproduced—and to a degree even fine electrostatics would have difficulty duplicating. The MG-20's controlled midrange dispersion pattern relative to that of a dipole radiator gives it the edge in low-level resolution, as there is less reflected energy to interfere with the direct sound.



And just as important, there was absolutely no metallic sizzle in evidence. Sibilants were negotiated without exaggeration. Violin overtones, a severe test for any dome tweeter, especially a metal one, were reproduced with convincing sheen and luster. Vinyl surface-noise was not prominent, and in fact sounded a bit subdued—an added benefit of the way the upper octaves were equalized by the design team. This is not a bright-sounding speaker. Its detail resolution is earned the old-fashioned way through superior transduction of the input signal, rather than distortion of the tonal balance in favor of the presence or lower-treble regions. Sadly, too many audiophile speakers fall into the latter category. I've seen it with my own eyes: These are the speakers that receive the "oohs" and "aahs" at shows. They represent the antithesis of the concert hall experience, but bright speakers do turn heads.

I have to respect a speaker that does not impose its personality on the music. A colored speaker might be fun for a while, or even complimentary to a few recordings, but over the long haul I prefer a speaker such as the MG-20 that is faithful to the original recording. The payoff is incredible timbral accuracy. Listening to the *Lesley* double-LP, David Manley's 1992 recording on the Vital Sound label, was most telling. This recording of my wife Lesley, is of course, an album that I am intimately familiar with and enjoy often. I was present at the live-to-two-track recording session at Manley's studio in Chino, California (which was, I'm sad to report, dismantled a few years ago), and was privileged to hear the musicians, not only live, but also via the mike feed to the studio monitors. And, finally, auditioning the mastertape and vinyl lacquers, I have stored away in my memory banks a vivid impression of what the live sessions and transfers were all about. To be honest, very few speakers get this right. The MG-20 is one of the few that does. It

reproduced the essence of Lesley's timbre cleanly across its entire dynamic range.

The range from 300Hz to 20kHz (the upper limit of my measurement system) was very smooth with no observable response glitches through the crossover region. There was plenty of midbass energy and the upper bass was sufficiently solid to properly flesh out the power range of the orchestra. The surprisingly strong bass foundation was a pleasant surprise and made it possible to fully enjoy orchestral music. Deep bass extension was limited to about 45Hz in my room, which serves most music well enough. The piston-like precision of the magnesium cone woofers was very much in evidence. It translated into

exceptionally tight bass lines. Jazz bass boogied with what I can only describe as paranormal (for a speaker) pitch definition.

Generating an adequate impression of space is a challenge for a two-channel audio system. Planars, given sufficient breathing space, do a credible job of generating a concert hall perspective, while mini-monitors excel in maintaining tight image focus. When properly set up, the MG-20 imaged much like a mini-monitor. However, I have to give credit here to the Bybee Speaker Bullets, which caused image outlines to fully snap into tight and palpable focus. The soundstage unfolded as an organic whole, with excellent depth and width. Massed voices were distinct, allowing me to focus on a particular vocal line—and that's not easy, as many speakers blur closely spaced spatial outlines into a blob.

It takes more than cosmetics to compete in the high-end arena, and the MG-20 has what it takes. To paraphrase the opening voiceover of the *Star Trek* TV series: "Space, the final frontier. These are the voyages of the Esoteric MG-20...to boldly go where no speaker has gone before." Here is a superbly engineered product, which gives the magnesium-alloy diaphragm technology full scope of expression. Kudos to the Tannoy-Esoteric partnership for translating a promising technical concept into a winning loudspeaker. Let me make this perfectly clear: I'm intensely in-love with its sound. There are speakers out there that play louder or go lower, but to my ears, the MG-20 is the most musically compelling box speaker I've heard to date—a perfect illustration of technology in the service of music. **tas**

# Quad ESL-2805

Addictive

Jim Hannon

**H**ave you ever had a reference component in your system for years and sold it because you felt that something else just had to be better? Perhaps my biggest audio regret is selling my Crosby-modified Quad ESL-63s with their matching stands. The major Crosby modifications to the stock ESL-63—designed by Richard Lees and implemented by Jerry Crosby—included a much stiffer frame, far better internal wire, parts, and connectors, a thinner dust cover, a more transparent grille, and other improvements. Crosby's beautiful wood-finished floor-to-speaker stand raised the speaker about 18 inches off the floor, so the panels were at ear level, and the stands could be mass loaded with sand or shot. The full Crosby modifications vaulted the very good performance of the stock 63s to reference quality. Sure, I've lived with speakers since then that have moved

more air or were better in certain specific areas like macrodynamics, frequency response at both extremes, and bass authority, but in each case I sacrificed some of the musicality, coherence, transparency, and realism I had grown accustomed to with the Crosby Quads. Within their limits, both that speaker, as well as my latest pair of original (recently refurbished) Quads have given me more moments when I thought I was listening to the real thing than any other speakers I have owned . . . and perhaps that I have heard. Many thought the Crosby modifications were able to wring the last ounce of performance out of Peter Walker's brilliant design, but now comes a new version from Quad itself, the ESL-2805, that may very well execute the "old man's" design even better. To be sure, the ESL-2805 is far more than just a welcome cosmetic upgrade to the already excellent (and still available) ESL-988.



## EQUIPMENT REVIEW - QUAD ESL-2805

One of the pleasant surprises offered by the ESL-2805 is that it reduces the already low distortion of the ESL-63, yielding even better transparency, coherence, soundstaging, and transient quickness. Instruments and voices sound even more natural and lifelike. For example, the timbre and inner detail of the cello is absolutely striking on the Bach Suites for Unaccompanied Cello [Mercury/Speakers Corner], performed by Janos Starker. The cello is a very telling instrument for loudspeaker evaluation, and on the 2805, as Starker traverses its range, you'll notice there are none of the crossover distortions, suck-outs, or discontinuities between drivers that plague virtually all multi-driver designs to some degree. With this new Quad, the cello sounds like the real thing and so do guitars, trombones, voices, and pianos. You won't hear aberrations in timbre between drivers, or, in the Quad's case, between panels—just a stunning musical naturalness and realism.

While I did expect the 2805 to excel in the acknowledged areas of Quad's strengths, I was unprepared for the improvements in dynamic range, bass extension, control, and weight. The cello sounded even better on these speakers than on my beloved Crosbys, without any upper-bass leanness but with a natural richness one associates with that instrument. Stand-up bass on a wonderful jazz recording like Basie Jam [Pablo/Analogue Productions] is spot-on—full-sounding yet without any bloat or sluggishness. The low end of the piano benefits from added power and weight, providing a better foundation for that instrument, but one can still cause the panels to occasionally lose their composure on a fortissimo from something like the Beethoven

### Paul Seydor comments

Not long ago while evaluating another speaker, I deliberately didn't listen to my long-standing references, Quad 988s, for almost a month. When I hooked them back up, it took maybe about ten seconds of listening before I thought, "Man, this is really low coloration." That may help explain why I greet with apprehension, if not dread, any attempt to improve upon what I have elsewhere called Peter Walker's masterpiece—the ESL-63, of which the 988 is the direct, though much better built and thus superior, descendent. Can't they just leave well enough alone?

No, they couldn't, and I'm glad they didn't. In my opinion, the 2805 is the best Quad speaker ever made—this from somebody who owns, loves, and all but genuflects before the 63/988 and the 57. My principal worry proved groundless: the overall tonal balance—that is, the 63/988's neutrality and vanishingly low coloration—remain unchanged, as do its transparency and that legendary disappearing act. Indeed, the new model is even more transparent—subtly cleaner, clearer, and purer. (Quad's Dave Patching claims a reduction by half of the distortion from the 988, which already boasts figures more typical of amplifiers than speakers, i.e., 0.1%.) So what is different? Jim Hannon—with whose evaluation I concur in almost every particular—has already described how much heavier, more rigid, and more substantial the housing is. The sonic consequence is a noise floor lower than that of the 988, which itself

has one of the lowest around. Inasmuch as no speaker makes a sound if no signal is present, how can it have a noise floor as such? Because all speakers are made from materials that have resonant characteristics and other vibrational properties that once excited—in other words, every time the speaker attempts to reproduce a signal—muddy or otherwise contribute to the reproduction, usually to its detriment. This is why good designers pay so much attention to materials, cabinets, bracing, and mounting.

For structural strength and integrity, the housing of the 988 represented a welcome and substantial improvement over both previous Quad ESLs; that of the 2805 is by an order of magnitude superior still; reproduced sounds now emerge from a background of almost digital-like silence and blackness. I am not exaggerating. Almost every experienced listener, including the most jaded and cynical, who has heard these new speakers in my listening room has remarked upon this effect in one form or another with absolutely no urging from me.

Two other aspects of the 63/988 are also improved: bass response and ultimate loudness capability. The 2805 still cannot overwhelm a room with the kind of pressurized bass you get from woofers—no dipole planar can—but there is a noticeable increase in both bass extension and power that while not dramatic is not subtle, either. As for loudness, no, the 2805 is still not for headbangers, but if you've been tempted though never quite persuaded by past Quads

because they play almost loud enough, then you owe yourself an audition of this new one.

If you own and love the 63 or 988, let me reassure you that yours are still among the small handful of the finest loudspeakers ever made for home use, so I'm not about to suggest you replace them with this one: On most music the differences are quite small, the changeover cost large, even allowing for Quads' high resale value. But on an initial purchase—the 988 remains in the Quad lineup—go for the 2805 if you can at all manage the additional \$2350/pair.

To give you some idea of how special this speaker really is, one evening I put on *Belafonte at Carnegie Hall*. I've listened to cuts on this albums dozens, perhaps hundreds of times to check some aspect or other of equipment performance, but that night I wound up doing something I had not done in over fifteen or twenty years: listening to it all the way through for the sheer pleasure of it. And so it went with favorite CD after treasured LP.

Inasmuch as no one can truly say he or she has heard every product, even every plausible product, the phrase "the best" should be used strictly subjectively, as rhetorical strategy rather than literal claim. In that spirit, then, let me conclude by stating that for my money—no idle phrase here, as there is no way the 2805s are being returned—the best speaker of the twentieth century is now the best speaker of the twenty-first. These are henceforth my reference monitors.



## EQUIPMENT REVIEW - QUAD ESL-2805

### Design Elements

The inspiration for the 2805 came from several visits by Quad's David Patching to the legendary listening room of SME founder, the late Alistair Robertson-Aikman (also see last issue's Industry News), where two sets of nude ESL-63s were set up at right angles, their panels rigidly mounted on high-mass custom frames, and topped off by hundred-pound weights. (For more on this fascinating set up, see Ken Kessler's excellent ode to Quad, *Quad: The Closest Approach*.) Hearing what the panels were capable of when manufacturing constraints were removed, Patching asked the Quad engineers to come as close as possible to the structural integrity Aikman had achieved, but in a product that could be manufactured. The Quad team-effort significantly increased the mass of the frame and base, while adding a damped connecting brace from the top of the speaker to the base to tighten up and triangulate the structure. These changes not only keep the speaker from rocking back and forth, but also improve bass response and dynamic range while reducing distortion and smearing. Additionally, the mounting of the panels within the frame has been reinforced, a brace has been

added to the metal grille, and the grille apertures have been widened to reduce rear reflections from the back grille. Besides the rear brace, the most obvious external change is the speaker's new and greatly improved cosmetic appeal.

Quad has continued to improve the quality of its ESLs by bringing most of the component manufacturing and production in-house. For example, the delay lines used to be outsourced to a third party, but are now manufactured by Quad, improving reliability and preventing arcing of the panels. The panels themselves are now capable of higher excursions and sound pressure levels, and are now used in the 2805 and 2905, as well as in the latest versions of the 988 and 989.

Because the Quads are dipoles, you'll need to spend some additional time with placement and perhaps room treatment to realize the full potential of this speaker. I preferred the heavy-duty floor-coupling system, with its massive spiked feet that ground the speaker securely to the floor, to the flat feet that Quad also includes. You can also use the spiked feet to change the rake of the speaker to raise the height of the image. **JH**

Appassionata sonata [Harmonia Mundi], but at somewhat higher volume levels than with the 63 or Crosby. Microdynamics on these speakers are first-rate.

While Quads of all stripes get massed strings and voices right, an added bonus with the 2805 is that full orchestras sound not only richer but also

more powerful. Admittedly, a large horn system or great dynamic speaker like the Eben X-3 is even better at reproducing hard transients and macrodynamics than the 2805, but listening to Giulini conduct the "Dies Irae" of Verdi's Requiem [EMI] on the Quad is still quite thrilling, even if the sound is a bit dynamically compressed. The



welcomed higher dynamic ceiling of the 2805 makes it more suitable for a wider range of music beyond small-scale classical and jazz. I found myself pulling out rock albums that I typically keep in their jackets when I'm listening to Quads. Eric Clapton's guitar soared through the Quads on Cream's *Wheels of Fire* [Polydor/Simply Vinyl], and the 2805s even acquitted themselves quite well on electronica selections from the Barcode Brothers' *Swipe Me* [Universal], where the lightning-quick impact of the kick drum and percussion propel the music forward.

Image focus is another improvement over the

63, and it may even better the fine performance of the Crosby. Most large panels flap in the breeze a bit, which causes images to smear, reducing clarity and focus. The 2805 has a rear brace and stiffer frame that keep the panel firmly in its place (see sidebar). Just listen to the new reissue of the Shostakovich Symphony No. 9 [Everest/Classic Records], or many of the Lyrita recordings. The images are rock-solid and particularly on the Lyritas, the soundstages are breathtaking. This, too, is first-rate performance.

The most likely question for Quad aficionados is how the ESL-2805's midrange compares with

## EQUIPMENT REVIEW - QUAD ESL-2805

that of the original Quad (57). In many respects the ESL-57 is similar to an excellent SET amplifier, possessing phenomenal transparency and clarity in the midrange, but with limitations elsewhere. In terms of midrange performance alone, the stock ESL-63 was somewhat veiled compared with the stunningly beautiful and open ESL-57, whereas the Crosby Quad, particularly on its matching stand, was the original's equal. While the 2805 is superior to the ESL-57 in many other areas, it falls slightly short of the original's "reach-out-and-touch-you" midrange magic. Mind you, it's only in comparison with two of its brethren that the 2805 suffers, as it also has a wonderful midrange, and perhaps, without its grille cloth and raised on floor-to-speaker stands, like the Crosby, it would be their equal in the midrange. However, those hooked by the ESL-57's midrange may be

unwilling to give it up—even though the 2805 is a better overall speaker.

Perhaps the biggest compliment I can give any speaker is that the ESL-2805 made me lose track of time again and again. It sounds so "right" that I found myself drawn to the music, to the artistry of the performer, and to the essence of the composition. The natural timbre, coherence, clarity, and subtle details that one hears in a live performance kept me transfixed until my reverie was interrupted by the sound of the cartridge hitting the end of the record. Admittedly, if you are a headbanger, or must hear the deepest notes of a pipe organ or synth, or like to have your speaker system move so much air that it flaps the legs of your trousers, you should look elsewhere, or try the larger ESL-2905. Yes, you could add a subwoofer or two, but I was never completely successful doing this with the Crosby or the original, as even the very good subs I tried impinged on the Quad's purity.

The Quad ESL-2805 is a superior execution of Peter Walker's ground-breaking design and vaults the per-formance of the Quad even higher up in the reference category. The addition of mass, rigidity, and bracing to the frame, better parts, as well as improvements in the manufacture of the panels produce a result that is one of the most musically satisfying in high-end audio at any price. The dynamic ceiling and bass-performance envelope have been extended, so that the Quad may be a viable alternative to people who listen to more than small-scale works. Moreover, the 2805 produces music with a realism and naturalness that are compelling and addictive. Prepare to get sucked into the music—and into the soul of the performance. **tas**

### SPECS & PRICING

**Type:** Full-range electrostatic loudspeaker

**Frequency Response:** 37Hz-21KHz (-6dB)

**Impedance Variation:** 8 ohms nominal (range: 4-15 ohms)

**Sensitivity:** 86dB

**Dimensions:** 27.36" x 40.94" x 15.16"

**Weight:** 76.6 lbs.

**Price:** \$9000/pr.

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## EQUIPMENT REVIEWS

# Loudspeakers \$10k-\$20k





# Thiel CS3.7

## A New Standard of Musical Accuracy

Anthony H. Cordesman

**T**he more I review speakers, the more cautious I get about calling one a breakthrough. Speaker design has advanced to the point where dramatic qualitative differences are rare, where the personal taste of the audiophile is highly relevant, and where room-interaction problems can do as much to shape the sound as many aspects of engineering.

That said, the Thiel CS3.7 does more than demonstrate how good the current generation of speakers has become. It represents decades of effort by Jim Thiel, who has long been one of the world's top designers, and I do feel it is a breakthrough in sonic accuracy and resolution at its price of \$12,900. At a time when the high end seems to be drifting towards reference-quality speakers that cost as much as a good car, the CS3.7 delivers an extraordinarily advanced set of new driver technologies, integrated into what is about as close to a true “point source” as any full-range dynamic transducer. It is a remarkably coherent speaker in any halfway realistic listening position, and one that offers truly exceptional detail and resolution.

Don't misunderstand what I am saying: The Thiel CS3.7 does have many rivals in overall performance, and it is not a “no-holds-barred”

assault on the state of the art that ignores cost considerations. The race between dynamic, ribbon, planar, and electrostatic loudspeaker technology is still wide open, with excellent examples of each in the running. There is also no one “right” configuration for dynamic loudspeakers in driver type or in the choice between line-source or point-source arrays. You can find outstanding speakers regardless of the mix of technologies involved.

I have, however, found that development of integrated-tweeter-and-midrange drivers that provide coherent dispersion and imaging at a minimal cost in distortion and coloration is leading to major advances in speaker quality. I have heard such advances in KEF and TAD designs, and the Thiel CS3.7 pushes this aspect of the state of the art to new levels of sonic performance—particularly at anything like its price point. It

## EQUIPMENT REVIEW - Thiel CS3.7

may well represent the most accurate dynamic speaker now available at anything close to twice its price or more, at least from the lower midrange to beyond the range of human hearing.

### Rethinking Dynamic Driver Technology

I don't want to bore you with too much technobabble, and the Thiel Web site provides far more detail than I can fit into a review. At the same time, you cannot understand this product, how it achieves its sound quality, or why I can use the term "breakthrough" without knowing some key facts about its design.

The Thiel CS3.7 is the result of years of effort by Jim Thiel—one of the world's leading speaker designers—to make a major advance in the coherence of the treble and midrange signal and to reduce levels of distortion. I quote from the Web site:

"Thiel uses two techniques, singly or in combination, to achieve time coherence in all our products. One is to mount the drivers on a sloping baffle and adjust the angle of the slope and the driver spacing to achieve coherence. This can work well for floorstanding speakers, especially at lower frequencies. But it cannot work for non-floorstanding speakers where the location of the speaker is unknown, and in any case the accuracy of the results at high frequencies becomes somewhat dependent on the listener's position.

"For this reason, a better technique for time coherence at higher frequencies is to mount the tweeter coincidentally (both coaxially and coplanarly) with the midrange driver. Such mounting ensures that the sound from both drivers always reaches the listener at exactly the

same time, regardless of where the speaker is placed or where the listener is. Such mounting also completely eliminates any 'lobing' in the speaker's radiation pattern."

The CS3.7 also represents the result of a similar effort to develop a far more rigid midrange driver material that is breakup-free. Thiel states:

"The CS3.7 has a midrange diaphragm that is ten times as stiff per weight as [our] previous extremely stiff composite diaphragm while also being flat rather than cone-shaped. But these requirements work against each other. The flatter the diaphragm's shape the weaker it becomes... [so] an undulating, radially ribbed contour is used for the diaphragm which provides light weight and great stiffness in the radial direction while still maintaining a basically flat shape."

I should stress that the CS3.7 also makes important refinements in bass driver, crossover, and enclosure design. For example, all of the drivers in the CS3.7 use copper-stabilized, short-coil motor systems that Thiel claims produce only one-tenth the distortion of conventional motor systems and have a much larger magnet and much longer magnetic gap.

The crossover is a true first-order type that Thiel claims provides complete accuracy of amplitude, phase, time, and energy and, therefore, does not distort the musical waveform. The cabinet is carefully shaped to minimize standing-wave problem and interference with the radiation of the drivers, and its front baffle is machined from aluminum, which Thiel states is more than thirty times as strong as the usual MDF baffle, reduces unwanted vibrations, and provides a rigid mounting for the drivers so they cannot move, even a miniscule amount, as they recoil from the

forces they generate.

Dynamic loudspeakers may now be older than any living audiophile, but Thiel and other cutting-edge high-end manufacturers are showing that it is still possible to make technical advances that are at least as important as any I have seen in electrostatic, ribbon, and planar design, and to do so without plunging into the costs and problems associated with beryllium and diamond drivers.

### A Speaker You Can Actually Live With

The CS3.7 is also a practical speaker—at least by high-end standards. It does not require exotic amplifiers and a snake pit of expensive speaker cables. It does not require (and cannot use) bi-wiring. It has a relatively smooth impedance curve that does not dip below 2.8 ohms (it carries a 4-ohm nominal rating), and its sensitivity is rated at a relatively high 90dB.

Bass "speed" and detail do improve with amplifiers with high damping factors, and the CS3.7 has the dynamic range to benefit from amplifiers with high power. At the same time, even moderately priced tube amplifiers in the 50-watt-and-above range, such as from Cayin and PrimaLuna, provide enough control and power to produce very high sound quality; thus, choosing between the cost-benefits of tube and solid-state does not require a massive investment in either type of power amp.

No speaker is free of room-interaction effects, but the Thiel CS3.7 proved to be the easiest speaker to place I have encountered in several years for getting the proper balance of bass response and power relative to the rest of the sonic spectrum. If you read the instruction manual, and follow its recommendations—a principle

that Plato once gave the acronym "RTFM"—you can count on getting truly good sound from this speaker in any room large enough to minimize major sidewall reflections and that gives you enough space to produce a decent soundstage and avoid serious standing-wave problems.

The CS3.7's visual profile is curved and sculptured, not just a "big box"; its height is good in terms of vertical dispersion, and moving it does not involve a weight-lifting contest. (I am still waiting for a speaker to be called the "Hernia.") There is a low-profile outrigger that attaches to the bases of the enclosures and ensures excellent stability in spite of the CS3.7's small footprint. This is a speaker that you and your partner can easily live with, although I suspect most wives and design-sensitive roommates will want a finish a little less bland than the normal walnut.

### Sound Quality: The Strengths

The key strength of the Thiel CS3.7, however, is its sound quality. We all listen for different things and we all have our own personal image of what the absolute sound should be in reproduced music. This came through clearly when I started to evaluate the CS3.7.

Having read the technical literature, I initially listened to see if I could hear the level of midrange-to-treble clarity and coherence that Thiel promised. When I asked one of my sons to provide a "blind" comment on the speaker, however, he had no idea of the speaker's design goals or background. He didn't focus on transparency and coherence. Instead, he said that the CS3.7s provided the best soundstage he had ever heard from a stereo setup.

My other son focused on something different.

## EQUIPMENT REVIEW - Thiel CS3.7



He praised the quality of bass guitar and deep bass, and the CS3.7's ability to get deep room-exciting bass out of Jennifer Warnes staples like "Way Down Deep" [Private Music] and "The Well" [Musicforce], as well as its exceptional combination of deep bass energy and complex musical detail on the Ray Brown recording *Superbass* [Telarc].

My sons are more rock and pop oriented than I am, but they are also right. The soundstaging is

truly excellent with classical music, with a very realistic mix of imaging size, width, and depth. The illusion of a realistic soundstage is also reinforced by exceptional detail, transparency, and lifelike dynamics. For example, you can clearly hear the differences in both soundstaging and imaging when you compare two versions of Mozart's Clarinet Concerto in A Major—the Martin Frost/Amsterdam Sinfonietta version [BIS] and the Antony Michaelson/Michaelangelo version [MFS]. The CS3.7 reveals all too clearly that Frost is spotlighted in ways which make his clarinet seem incredibly large, while Antony Michaelson's instrument is recorded in ways that are far more realistic, as is the hall in which he plays. At the same time, no instrument on either recording had an unrealistic timbre, and the orchestra was remarkably clean and detailed even in comparison to excellent competing speakers.

This same mixture of excellent detail, dynamics, life, musically natural timbre, and realistic imaging comes through in a very demanding, all-Strad recording of Mendelssohn's Octet for Four Violins, Two Violas, and Two Violincellos [Sony]. Resolving inner detail on music this complex is not easy, and the music can sound slightly hard if the midrange and tweeter are not exceptionally transparent. This same high resolution, incidentally, was audible with the radically different music and mix of instruments on both the LP and CD of the Modern Jazz Quartet's *Blues at Carnegie Hall* [Mobile Fidelity]. I thought I had long listened this recording to death. The CS3.7 provided enough new insight to give it a new life.

The CS3.7 is not the kind of speaker that produces the "big" sound that large column or line-source configurations do, but its point-source

configuration does provide a very convincing rendition of orchestral, large-scale choral, and operatic works. Wagnerians will be more than happy with the imaging, detail, dynamics, and life of the better *Ring* recordings (and the rest of us will find it harder to nod off out of sheer boredom). Telarc's wide range of really good choral music recordings comes through with remarkable detail and realism.

Equally important, the CS3.7's combination of accurate timbre, low- and high-level dynamic contrasts, detail, and extended frequency response makes ordinary recordings more pleasant to listen to. The Eugene Ormandy, Philadelphia Orchestra rendition of Carl Orff's *Carmina Burana* is not a great recording, but it sounds far better when the male and female voices are reproduced in full detail and have more lifelike timbre and image size. You will find the same to be true with any good Mahler disc, particularly in complex orchestral and vocal passages. Close your eyes as you listen, and you may find it difficult to believe that the CS3.7 is not a far larger speaker.

In short, I soon realized from the reactions of other listeners that the CS3.7 does more than make advances in midrange and treble performance. It provides the best overall sound I have ever heard from a Thiel speaker—serious praise for a manufacturer with such an established history of success.

### Paying Attention to the Trade-Offs and Limits

Are there limits to the CS3.7's performance? Of course! This is not a "big" speaker with an enclosure so solid and vibration-free that it takes

ten men to move it into the house. It can play as loudly with rock, jazz, and symphonic music as I care to go, but I'm sure that its distortion rises with listening levels—the laws of physics almost ensure this—although this is not as apparent up to 100dB SPL as it is with other speakers in this price range. Push it to the levels that are likely to damage your hearing, however, and you will find that the bass is not equal to that of much larger and more expensive speakers.

This is not the ultimate speaker for the audiophile who likes sitting next to the Marshall stacks at rock concerts, whose idea of organ music is a half hour of 32Hz notes at extremely high volumes, or

## SPECS & PRICING

### Thiel CS3.7 Loudspeaker

**Driver complement:** One 10" woofer with wave-shaped aluminum diaphragm, one 10" wave-shaped passive diaphragm, one 4.5" midrange with wave-shaped aluminum diaphragm, one 1" aluminum dome tweeter coincidentally mounted with midrange

**Frequency response:** 33Hz-26kHz +/-2dB

**Sensitivity:** 90dB (2.8v/1m, true anechoic)

**Impedance:** 4 ohm (2.8 ohm min)

**Recommended power:** 100-600 watts

**Dimensions:** 45" x 12.5" x 21"

**Weight:** 91 lbs.

**Price:** \$12,900/pr.

### THIEL AUDIO

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## EQUIPMENT REVIEW - Thiel CS3.7

who won't go to a club where the sound levels don't constantly produced physical pain. Don't get me wrong: This is not a bass-shy transducer; it is easier to place than most speakers to get good bass, and it can produce furniture-vibrating deep bass you can clearly feel. *But* it is a speaker for demanding but *rational* listeners.

The "point source" character of the CS3.7 provides all of the soundstage merits that I have described, but its stage is not as big as that of columnar dynamic designs or tall ribbons and electrostatics. Some other speakers can be placed wider apart without centerfill problems, although at a cost in soundstage detail and, usually, depth. Every speaker ever made makes real sonic trade-offs in soundstage performance, and you may prefer a different mix of qualities.

The wide dispersion of the midrange and treble do produce potential reflections from an undamped floor, close-by untreated sidewalls, and a "live" or reflective area around the listening position that are much less problematical with a speaker with more focused dispersion like the Vandersteen 5A. You really do need to read the manual to place this speaker properly, use a carpet to damp the floor, avoid putting reflective objects between you and the CS3.7, and pay attention to room surfaces and reflections.

Most importantly, this speaker is unabashedly designed to meet Jim Thiel's definition of flat frequency response. His definition is scarcely unique, although I do not know of another manufacturer providing more demanding specifications and frequency-response data. The timbre of the CS3.7, however, is not in any sense romantic or forgiving, and there are no adjustments as to treble and midrange levels.

The end result is intensely realistic with good recordings, where there are no tell-tale signs of hardness or excessive upper-midrange energy on female voice, violin, flute, or woodwinds. But if you want forgiving or romantic frequency response, or a softer or warmer sound, the CS3.7 won't provide it.

Close-miked digital recordings can present problems, particularly classical recordings with



a great deal of upper-midrange energy. If you are into rock or jazz, you probably don't need to worry. The most you may hear with a female singer with poor breath control is how she aspirates into the microphone. The same is true for most pop music, although I was struck by how clearly the CS3.7s reproduced the hardness in the voice and sibilants on some poorly mastered Judy Collins recordings.

The story can be different, however, with spotlighted acoustic instruments where the recording engineer did not give a damn about natural timbre. The advantage of the CS3.7 is that its exceptional clean and detailed midrange and treble do not add to the hardness of such recordings or their peculiar "where the hell could the musician be standing if this were a live performance" quality. At the same time, you will hear the hardness and excessive upper-octave energy that is actually present on far too many classical recordings of piano, flute, clarinet, violin, etc. You will hear the bad moments on recordings of tenor and, particularly, soprano voice. Accuracy has its costs, especially in an era where tone controls, equalization, and any form of correction in the preamp can get you publicly burned at the stake by large segments of the high-end cult in the U.S. and Europe.

This is not the speaker for hard front ends, electronics, interconnects, and speaker cables. It works fine with a wide range of equally accurate solid-state electronics—Boulder, Pass Labs, Parasound, Mark Levinson, etc. It also worked very well with my reference Kimber and Audioquest interconnects and speaker cables, and older Straightwire, Transparent Audio, and Discovery Cable designs. But you do need to

show some caution in blending the CS3.7 into a system.

### Summing Up

No speaker is all things to all men and women. The CS3.7 has clear sonic limits, and accuracy sometimes comes at a price, given the problems in far too many modern recordings. This is more than a truly good speaker, however; it is an important one. It makes advances in coherence, transparency, and sonic detail, and in providing the advantages of true point-source soundstaging. I have not heard anything like it at its price.

You may well prefer other sonic qualities in your search for the absolute sound, but you owe it yourself to audition this speaker with your music and learn just what it can do. Highly recommended and a real challenge to other designers and manufacturers. **tas**

# Focal Diablo Utopia

Future Perfect...

Chris Thomas

I recently realised that I have reviewed no fewer than six Focal speakers for Hi-Fi+ over the years, so I can't hide my general admiration for them. For me the most interesting have always been those designated Be, as that suffix denotes the speakers that use their famous Beryllium tweeter, first seen in the second generation Utopia collection more than six years ago. To my ears this inverse-domed unit not only instantly set a new standard but also made many other speakers sound dull and dated. Initially it was only seen in the flagship Utopia models, but variations were soon available in the more affordable Electra range. The unit's high frequency extension has never been in doubt, but in more recent versions, Focal has extended its working range downward, further into that territory usually covered in two-way stand mounts by the bass/mid driver. There was a lucidity and tonal illumination to the balance of those new speaker models; one that I felt sure would soon carry over into a new Utopia range, as and when it appeared.

The Micro-Utopia Be has been my personal loudspeaker choice for several years, employed in countless reviews. It is a testament to Focal that, until recently, I hadn't found any other stand-mount speaker that could match its unique balance of attributes. I have heard other superb HF units of course. The ribbon in the Eben C1, the twin-ribbon in the JAS Orsa, Piega's extraordinary magnetostatic mid/hf driver in the TC 10X and the Scanspeak ring radiator in the Wilson Duette are

all excellent in themselves, but it is their design implementation that really counts. Both the Wilson and the Eben are so successful because they are superbly integrated with their respective cabinets – and with the very different bass/mid drivers they sit above.

Fast-forward to summer 2008, thirteen years after the very first Utopia series appeared and the rumours that Focal have been working on the third generation range are confirmed as the



## EQUIPMENT REVIEW - Focal Diablo Utopia

### Running-in and a reader health warning...

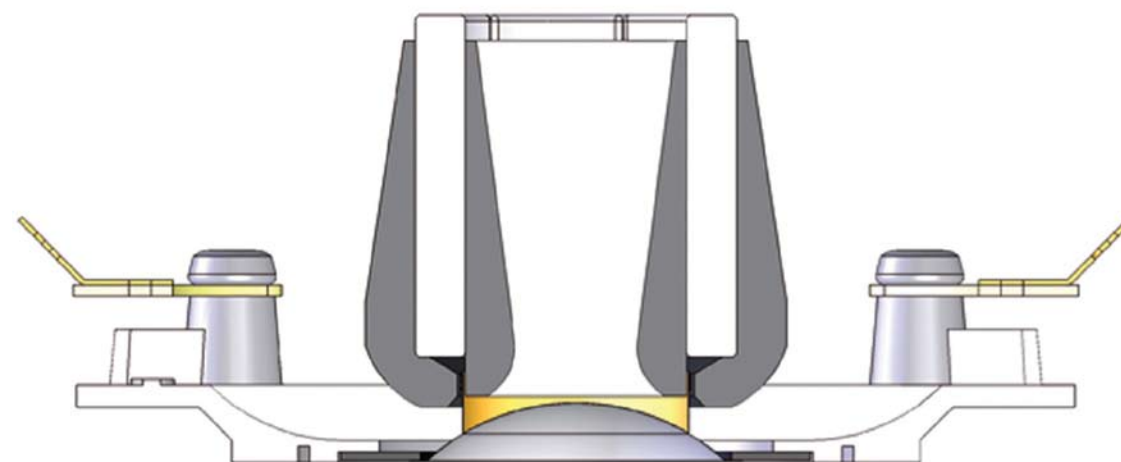
The rather striking pair of red Diablos you see in the photographs were not the actual pair I reviewed. Due to schedules, logistics and RG's (thankful) insistence that I was supplied with a fully run-in speaker, I used a black pair for the listening. These, as I understand it, had been soundly and continuously thrashed for some considerable time, so they would be ready to go when I first plugged them in. As you see from the review, I loved them. But then I took delivery of the red ones and heard just how bad a pair of brand new Diablos can really sound. The difference between the two versions was simply staggering. So, on no account audition a pair of these speakers that have not already had extensive use, because if you do then you will certainly wonder what all the fuss is about and that would be a real shame.

Grande EM, Scala and Diablo are announced. Focal's design team believe that they have a tremendous advantage over most of their competitors, in that they manufacture just about the whole loudspeaker in-house. Apart from a driver's chassis and magnets they control every other facet of production, allowing them to start at the top by designing the flagship model and then incorporate what they have learned through their

extensive research into the models lower down the range. Having spent a couple of days recently being shown around both the driver manufacturing facility and the separate cabinet workshop, I must say that the whole set-up is enormously impressive. As well as retaining control over all aspects of production, a situation that frees them from reliance on sub-contractors, this level of integrated manufacturing also allows them to react quickly and decisively to changes in technology or the market. For example, few manufacturers these days actually build their own cabinets and many high-profile speaker brands out-source the work. Which approach is best depends on the individual business concerned – and the technology and materials involved. The investment in machinery required to create the boat-backed, multi-ply cabinets used by B&W (amongst others) would clearly be beyond a single speaker company, the manufacturer in this instance off-setting the cost across multiple markets, products and customers. But more traditional methods don't require such heavy investment, and there is also the cultural aspect to be considered, something that I believe is very important to Focal.

#### The Cabinet

The cabinets are made in the Burgundy region of France, at Bourbon-Lancy in a factory that looks and smells like the studio of an instrument maker, though MDF and interesting veneers are their materials of choice, as opposed to exotic hardwoods. The whiff of wood, glue and lacquers permeates the various sections of this old artisan shop that started life building fine furniture in 1939. I watched the cabinets for the Diablo take shape and pass through complex cutting, gluing,



sealing and sanding stations before finally being ready for painting and final finishing, prior to being shipped two hours south to St Etienne for driver installation. Focal's design goal is to ensure that all of the magnet's power should drive the cone rather than moving the cabinet. Where the first Utopia range featured lead-lined cabinets to add mass, the second series saw the lead removed in favour of what they call Gamma construction. This aimed at providing enough stiffness to resist internal vibration by using massive cabinet walls. The third generation though, takes these concepts much further. Now the whole structure has been re-thought with the aid of resonance analysis



and vibration cartography that shows a three dimensional representation of the cabinet's movement under load. Take a closer look at that bass enclosure and you will see that the Diablo has a far more complex, tapering shape than the Micro. Sheer mass though is not the only answer, despite having a 50mm baffle. The cartography data analysis also allowed them to strategically locate internal bracing to keep the cabinet walls as inert as possible without having to resort to panels of absurd thicknesses. The result is a significantly more effective and an altogether more elegant solution. The reflex system survives but has moved and is now a laminar slot port on the front of the cabinet,



## EQUIPMENT REVIEW - Focal Diablo Utopia

beneath the larger driver rather than between it and the tweeter.

### The Drivers

The W-sandwich driver was one of the key elements of the original Utopia line. This laminate cone is based around a foam core, of varying thickness according to application, and ultra-thin glass coats layered front and rear, from one to three deep. In this way Focal can shape the response curves of the drivers and choose the damping levels, whether it is to be used as a midrange or bass driver. The new Utopia range still employ this construction but, critically, the cone edge is now precision laser cut with the exact edge profile required, before being glued to the roll surround. This is a key factor in improving driver performance and consistency, as the accuracy of this join is absolutely crucial to the driver's behaviour and Focal are extremely keen to point out the huge performance gains this expensive procedure has bought about. The arrangement of Power Flower magnets on the rear of the Diablo's 165mm woofer remain, but these have also been modified, along with the chassis, spider and voice-coil, aimed at reducing magnetic leakage and increasing driver efficiency.

The Electra Be range was the first time Focal introduced the IAL (Infinite Acoustic Loading) tweeter. The objective was to operate the driver loaded in a tuned cavity. For the IAL 2nd generation, installed throughout the new Utopia line, the concept has been further developed. This necessitated opening the rear of the tweeter by redesigning the whole magnetic assembly and shifting it from the back to the sides of the unit. The inverted Beryllium dome enabled them to maintain



an extremely low moving mass (Beryllium is two and a half times lighter and seven times more rigid than Titanium for the same mass) and push the response down to achieve both low frequency extension and reduce the resonant frequency. By operating the rear of the driver into free air Focal's approach seems to be conceptually similar to Eben, who went to enormous lengths to remove the magnet system and general superstructure from the rear of their bass/mid driver, to startling effect. The lack of reflected energy and thermal compression are just as obvious here. The Neodymium magnet arrangement is now a five-section encased design, looking rather like a jet engine, extending lengthways backward from the dome circumference. The dome size itself has increased slightly to 27mm and the new Poron surround is also considered by Focal to be vital to the unit's stellar performance. The range now covered by the tweeter is from 2.2kHz to 40 kHz and this means that the critical area between 2 and 5kHz is now handled by an ultra responsive light dome rather than a bigger, midrange driver and therein lies one of the key reasons why the Diablo does what it does to such startling effect. The tweeter sits in its own enclosure with the same profile as the bass cabinet, the cavity behind the unit tuned to act as a Helmholtz Resonator at the resonant frequency of the tweeter itself, thus damping the impedance peak. Damping this resonance with the Helmholtz reduces distortion considerably and its effect is felt throughout the bandwidth.

The build quality and finish is exemplary. The Diablo bolts directly onto the steel top-plate of what is unquestionably the best stand that Focal have ever supplied. It's solid 40mm MDF base

mirrors the shape of the speaker cabinet as does the sand-filled aluminium pedestal and the angle of the speaker's time-aligned baffle is continued through the rake of the stand. If you have a wooden floor I would suggest that you use the heavy-duty spikes provided, with floor protectors, as the alternative of rubber inserts softens the speaker's remarkable leading edge clarity. When it comes to positioning, room layout will obviously be a consideration, but generally the advice must be to operate them in as much free air as space affords to allow them room to breathe and certainly keep

## SPECS & PRICING

### The Focal Diablo Utopia

**Type:** Two-way, stand-mount reflex-loaded speaker

**Drivers:** 1x 165mm "W" Cone Power Flower Woofer  
1x 27mm IAL 2 inverted Beryllium dome Tweeter

**Bandwidth:** 44Hz-40kHz +3dB

**Sensitivity:** 89dB

**Nominal impedance:** 8 Ohms

**Minimal impedance:** 4 Ohms

**Crossover Frequency:** 2.2kHz

**Dimensions (WxHxD):** 258 x 431x 427mm

**Weight:** 20kg

**Lacquered Finishes:** Warm Grey, Piano Black, Imperial Red

**Price:** \$13,990/pr. (with stands)

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## EQUIPMENT REVIEW - Focal Diablo Utopia

them as far from sidewalls as possible.

Like all high quality speakers, the Diablo puts a magnifying glass to the rest of the system that comes before it and believe me, this particular speaker throws things into pin sharp focus as it is as revealing as a stand mount gets. It can't really be looked upon as a Micro Utopia Be replacement as about the only thing they share is the single pair of WBT connectors. Cabinet, drivers, crossover, stand and price are all way too different to make any comparison meaningful. But the Micro can certainly serve as a point of reference. System requirements are simple because the Diablo has so much potential that it will respond to the very best your audio electronics have to offer. There is no performance wall to come up against. If you have a large room and want more bandwidth and scale, then look at the Scala. If you have a massive room with bottomless pockets to match, then the Grande has to be on your list, but for small to mid-sized rooms the Diablo is a perfect fit. The system requirements though are essentially the same. I have always been intrigued by ultra high quality electronics and cables driving the simple purity of the best two-way stand-mount speakers and the Diablo fits that particular bill perfectly. So, I used two systems.

First I employed a Burmester CD 001 CD player and a Vitus SS-010 integrated 25 Watt, Class A amplifier with a full loom of Vitus cables. The second and more expensive was an Esoteric P-03/D-03 SACD player and DAC feeding either an Ayre KX-R or a Lyra Connoisseur 4.2L SE line stage, driving a pair of Ayre MX-R mono-bloc power amplifiers. All the electronics, for both systems, were sat on a Stillpoints ESS rack with Level-3 shelving, including both Thor and

Quantum Qx4 power conditioners, while this time the cabling was Nordost Valhalla mains leads and Odin interconnects and speaker cables. The Vitus system is a beautifully integrated, free-flowing set-up that is subtle, sweet and open in nature. It is a real music-lovers system (with less boxes). The second set up is certainly a no-compromise, musically powerful, super high-resolution package, but the Diablo has all the potential to make an entirely viable system. This Utopia is absolutely not one of those speakers where you should consider what is the least in accompanying electronics that you can get away with. It's not that it is particularly difficult to drive. It just cries out for and deserves real quality. Get it wrong and it will sound tilted toward the treble because that tweeter installation will provide a forensic examination of everything that goes before it.

As a long term Micro UtopiaBe user, I was very aware of their particular qualities when I sat to listen to the Diablo for the first time. I know their strengths and weaknesses as well as any speaker, but it only took about 30 seconds for me to realise just how different the new baby Utopia is. Through the bass, the feeling of control and fluid movement combines with a speed and pitch clarity that is infectious. Where the Micro was growing vague and soft around the edges, the Diablo is sharply focussed with more efficient use of bass energy and that opens the ear to a world of expression and technique. There is no bunching or sense that articulation begins to suffer as the frequency drops. It has power and weight, but it is supremely agile and never holds the flow and musical progression back. Like all good speakers the Diablo only shows you its real bass extension when the music calls for it and it is often surprising just how low it can



reach. Focal have been cute too, I think, by not trying to extract the last ounce of bass from that cabinet. It doesn't have that compressive punch that can fool you into overestimating a speaker's true ability, but it is still taut and at ease under rigorous pressure. With a solo upright acoustic bass or a couple of bowed cellos to deal with, it is clean, explicit and tonally superb. Whether the strings are being picked or bowed, the Diablo is comfortable. This is of course, in no small way, a reflection of the system electronics but the message is that if you give it some serious low frequency work to do, it will show you just how much grip it really has. You can hear that the cabinet is not storing energy when you ask it to show you the transient power of a kick-drum or the intricacies of a slapped bass riff. Even so, I can still imagine some people complaining that there isn't enough bass, so I'll disagree before they even say it and suggest that they improve the signal quality and listen again.

I was struck by how beautifully balanced and poised the music remained up through the broad mid-band. But the thing that really grabs you (and never lets go) is just how bright the instruments are. When I use the term bright, I don't mean it in any way detrimentally or as a comment on the speaker's overall balance. That new tweeter's influence is really being felt here and it increases driver coherence enormously. I spend a lot of my time around real instruments, played by people who know their way around them and I understand just how much high frequency information they produce. Even an electric bass guitar has a brightness and energy about it that comes from the playing action and pickups. Most audio systems have a tendency to damp and mute

## EQUIPMENT REVIEW - Focal Diablo Utopia

everything that passes through and resolve them as loose representations of instruments that you could never really mistake for reality, if you know just how raw the real thing actually sounds. This is where the Diablo absolutely excels. That tweeter reaches down into areas where big, damped cones usually operate and shows how it should be done, simply by articulating the voices, speed, delicacy and tonal character of each instrument more accurately. Its life, subtlety and textural range are remarkable and makes the bitter, squeezed astringency of many other hf units sound like sucking a lemon through a tennis racket. So, everything sounds brighter and crisper and this has repercussions in terms of pure note control. Leading edge articulation is fantastic. From the high impact of the first energy input, there is no compression and no sense that the speaker is muting the development at that single point in time and it carries on right through the note and into the longest and purest decay that I have heard. But it is also a speaker with remarkable density and the glowing luminescence it throws onto the instruments is not remotely thin or diluted as a result. The difference this makes to the stability of piano alone is enormous. It has a quite striking transparency in its presentation and a sense that you can reach out and touch the music and is equally at home on simple recordings as it is on the most complex of multi-track mixes. Closely miked vocals can sound spellbindingly real, as does the range of colourful harmonics that you hear in cymbals. It's as if you can see the whole thing from front to back shimmering with metallic energy, like the cymbal itself is operating in free air in front of you and this high frequency dynamic detailing is so clear and uncompressed that when a drummer

is really working the top end of his kit you have complete focus on every explosive, resonating element with no smearing, or harshness. A drummer friend even told me he could identify different makes of cymbal through the Diablo. As I mentioned before, this speaker has a sense of reality that is extremely rare and it is also loose and supple when it comes to rhythm. Any time signature is opened up with superb control and this gives insights into phrasing and timing within that framework that is the equal of any speaker I have heard. The way they are totally responsive to rhythmic emphasis and ultra sensitive to "pushes" where the tempo gets an accentuation of the beat means that their portrayal of the subtleties of movement within a piece is also totally addictive.

The Diablo creates a soundstage that is so broad and deep that you can practically walk in and look around, reflecting the their transparency and "see-through" character. This is not a conservatively voiced speaker. When you are listening in the near-field, as I do, the mid-band and high-end is a little forward, but I wouldn't change a decibel of it because it's intimacy, immediacy and stunning clarity draw you deeper and deeper, delivering a very close physical relationship to the musicians and their performance. With this tweeter installation in their armoury it would have been so easy for Focal to have come up with a speaker, full of resolution and micro detail, that was in some way clinical or even academic to listen to, but they haven't. What they have made is unquestionably one of the great high-end stand mount speakers available today. Some will think it is the best, but I have heard some of the competition and they too are very good, underlining just how meaningless the notion of "best" really is. There are always considerations of

personal taste and system electronics, individual demands and circumstances. I love listening to music through the Diablo because its musical potential is virtually unlimited. It works equally well with all musical styles and genres and I believe that, at its price, it is a bit of a steal. Achieving all of these things means that it is certainly demanding when it comes to matching electronics and it will absolutely reward the sort of care taken in system building and installation that RG and I have been writing about for a while now. But the payback is pure musical involvement and enjoyment and there is no substitute for that, regardless of cost. ~~tas~~





# Nola Micro Grand Reference

## At the Heart of a State-of-the-Art System

Harry Pearson

**I**t isn't often that a component comes along that genuinely electrifies a seasoned reviewer, but thanks to Nola's new Micro Grand Reference, now, for the first time in a long, long while, it has. And that reviewer is me.

This speaker system is compact in size [9.5" x 24" x 9.5"] and contains only four quite small drivers: a single true-ribbon, one cone-type midrange, and two circular four-inch woofers. It is only marginally larger than many a so-called "monitor" speaker. But the first sonic impression it makes is of anything but small sound. It has a capacious soundstage, a kind of sonic purity, and the ability to unravel dense and complex orchestral textures. It can easily cull the sheep from the herd, losing neither sight nor context of either.

At first, I had decided to use these, the Micros, to take a listen to some tube-type gear I hadn't seriously auditioned, knowing full well that designer Carl Marchisotto of Nola speaker has long been enamored of ARC tubed gear (not to mention Alnico magnets in speaker drivers). And found, to perhaps my surprise, that the essential character of some of these electronics romantically Technicolored in a way I hadn't appreciated before. There were several units, an early Lars amp, and an older Hurricane unit from Antique Sound Labs that had more musical honesty than I'd suspected. And the Veloce battery-operated tubed linestage brought

the Micros to life in a startling way, one that even took Marchisotto himself by surprise during our initial setup session. Why not, thought I, see just how far we can push the speakers in terms of sonic revelations? And so, over the next little while, out came the McIntosh basic monoblocks, the best-sounding McIntosh tube-based amp in years, new cables from Nordost, the less expensive, but still impressive Tyr units, as well as the new Neo-Classic table from VPI, along with a couple of standing reference units, the EMM Labs XD player and the Benz LP S-MR moving-coil cartridge.

The frequency response of the speakers, priced at \$14,000 the pair, is said to extend from 38Hz up past 40kHz. (Their custom-designed stand is priced at \$1200.) What we discovered was that the two Micros, set up in Room 2, had the capaciousness of a much, much larger system, and that from about 40Hz on up. Eyes closed, you'd never guess these were anything less than a big multi-speaker system, which is one of the most startling things about their performance. The one thing that was troubling, given the apparent flatness of the overall response, was a warmer-than-life sound from

about 60Hz down to the speaker's lower limit—and this we managed to eliminate by inserting an isolation transformer, made by Silver Circle Audio (the Pure Power One 5.0), into the system—it is itself such a heavy-duty beast it could also handle the high-power of the Mac amps, not to mention everything else in the system. With the Silver Circle, the midbass became as pure and uncolored as the frequencies above it. This was a bit surprising to me. When I asked Marchisotto about it, he said that the alternating current from the outside power line did its worst damage at 60Hz and below and what I had been hearing was garbage, not the speaker. This sure made sense to me.

I began to wonder whether the larger Metro-References, just introduced (they are about the size of two Micros atop each other) could sound significantly better than the speaker I was so surprised by, and just how much better the Baby Grands, the first system in Marchisotto's new line of breakthrough designs, themselves reviewed in a previous issue by Jonathan Valin (who was quite taken with them, as have been many of those in Audioland who've sampled their delectabilities).

## EQUIPMENT REVIEW - The Nola Micro Grand Reference

I hadn't and haven't heard either. More on these speculations in a moment, or so.

I said breakthrough in Marchisotto's design work. As many of you may know, Carl did his apprenticeship under Jon Dahlquist, and later branched out on his own, founding Alon, later to become Nola, which is Alon spelled backward. Up until the reference line, every Marchisotto design I've heard (and I've heard most of them) sounded suspiciously and remarkably like music, with nary a sonic misfire in the bunch, from the Thunderbolt woofers to the four-speaker assault on the state of the art, the Reference. I now think that part of his secret in the early design work lay in his skill at working around the non-linearities and colorations in the materials he had to work with. With the new reference systems, he has, based on what I am hearing with the Micros, eliminated, and to a substantial degree, the forgiving characteristics of his previous work, and left us, the listeners, with a higher truth, a far closer approximation of the music itself. The euphonic colorations have become so vanishingly low they seem to have disappeared, leaving in their place more of the music itself.

What we get in addition to the much lower coloration, or perhaps because of that, is increased resolution in those subtle cues of overtone structures, the subtle harmonics that let you tell one instrument from another, as well as an uncanny ability to differentiate dynamics, particularly the lowest pianissimos in the microdynamic scale. And such is achieved without the "etched" plastic-like credit-card sound of too many of the so-called high-resolution systems. With the Micros you can hear more of what's going on with and in your source material. As we shall see in Part II of this essay, the Micros are capable of defining the most

elusive nuances of the best equipment preceding them in the chain, the more "alive" and uncolored is that sound.

Some thoughts on the speaker's innards and their cost. First, the cost: \$14,000 the pair, eminently fair given the performance and the attention to detail evident in the construction of every pair. And, *nota bene*, you will want the stand (\$1200) designed by Marchisotto's daughter, Kristen, which is open, elegant, and svelte in appearance, enhancing the performance of the Micros. Marchisotto calls the Micros "a three-and-a-half-way design, like that of the Baby Grand." To wit, as noted, there are two bass drivers—tiny little things—a cone midrange, and the best single-element true ribbons I've heard, the expensive and beautifully assembled Raven—this unit specially designed to Marchisotto's specifications by the California-based company. "This new driver," Marchisotto writes, in a note to me, "now has twice the magnetic force from its neodymium magnet system, with twice the acceleration and better control of the ribbon itself." The crossover is set at 3.5kHz.

Of the two woofers, the lower one is rolled off around 200Hz, and the upper continues up to 400Hz, where it crosses to the midrange driver. Marchisotto lists the frequency response as extended from 38Hz to 46kHz. To enhance the bass, he has an open port in the rear of the speaker tuned to about 45Hz, and you may well hear a thickening of the sound in that region, unless you luck out and do what we were able to do, caused by incoming garbage from the AC lines centered about 60Hz. (See Part II.) More. Says Marchisotto: "All the crossover slopes are gradual, for good phase and transient response, between six and 12 dB and *not* a classical design... the twin bass drivers use cones of magnesium...


the midrange uses a tri-laminate cone with a pulp base for low mass driven by a specially design Alnico magnet system, the Columnmax III." You want more still? "The magnesium cone drivers used in the Micro have a first resonant break-up mode at 10kHz, but they are used only to 400Hz, making them non-resonant true pistons over their entire operating range. Moreover, the advantage of magnesium is that when it does break up, it does so with a single frequency mode instead of multiple frequencies as with other rigid cones...." One more thing: Marchisotto places ball-bearings in a platform under the speaker (and above its stand) to provide even further isolation from vibration-induced noise and colorations.

I detail these because I think each and every aspect of the system design contributes to the sound of the Micro. This is the work of an artisan, who has through experience (and he has one of the most critical ears in the business, and does not suffer fools) turned what has been his trade into an art.

I can't say that I can yet describe the speaker in a descriptive language. I am still working to get there. And this troubles me—I don't like saying you have to hear it to believe it. And that is why I am, at the point, only halfway (if that) into the assessment.

For my part, I think that the Raven tweeter and its careful matching to/with the other drivers in the system is the key to the speaker's impact and overall success. Perhaps I underestimate the tonal neutrality of the other drivers in the system. I do not yet have their full measure yet, but I do know the speakers are as good as I'm suggesting here. I'm just not able to say all the things that make them so very good—that is, what these speakers can do, at least in the department of

retrieval of the fine details usually, if not entirely, inaudible on lesser designs. What I do know and did from the start was: These are the best small speakers I've heard. They don't sound small. Nor hard, nor congested nor congealed on very loud passages when the Macs are chugging it out. And I, with increasing experience, have seen more in my reference CDs and LPs, which I feel as if I'm discovering all other, again.

What I get instead with my many reference recordings, both CDs and LPs, is this: There is, to put it more directly, less in the way, less between the music and me. And this would not have been the case if the speakers weren't what they are. I call this quality "translucence," not in the usual sense of that word, but in the sense of the original Latin, that of letting the light come through, the music is the light (and a gift to all of us). The point of high-end audio, as far as I'm concerned, ought to be removing a sense of the equipment from the reproducing chain, and allow us to get through to the truth of the absolute, that is, music. The equipment is an avenue to the music, and should not, as it is all too often these days, treated as an end in itself. 

### SPECS & PRICING

**Frequency Range:** 38 Hz to 45 kHz  
**Sensitivity:** 86 dB  
**Impedance:** 8 ohm nominal/ 4 ohm minimum  
**Dimensions:** 24" H x 9.5" W x 9.5" D (speakers)  
**Weight:** 35 lbs. per speaker

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# Von Schweikert UniField Three

## First-Class One-Way Ticket

Jonathan Valin

**A**s I said in my review of the Magico M5s (in Issue 196), the first obligation of a loudspeaker—or, for that matter, any piece of audio gear—is to vanish as a sound source. Thanks to its heroic aluminum-and-birch enclosures, its ultra-low-distortion NanoTec carbon-fiber-sandwich drivers, and its extraordinary (and extraordinarily expensive) elliptical symmetry crossovers, the \$89k M5 does just that better than any large multiway dynamic loudspeaker I've heard.

Of course, there are all sorts of ways to make a loudspeaker disappear. For instance, rather than trying to force five or six cones and five or six crossovers housed in a large expensive cabinet to pull a Houdini, why not greatly reduce the number of drivers and crossovers and shrink the size of the cabinet? Magico did this very thing with its two-way stand-mount Mini and Mini II—the speakers that made the company's reputation. With the UniField Model Three, venerable speaker designer Albert von Schweikert has (quite literally) tried to go Magico and his other two-way competition one better.

Although each Model Three looks like a miniaturized WATT/Puppy-style three-way, the UniField is what Von Schweikert calls an “augmented” one-way loudspeaker—“augmented” below 100Hz by a 7" woofer housed in its own compact, tapered, quasi-transmission-line enclosure and above 8kHz by a 3" ribbon that shares a tiny, separate, tapered cabinet with the UniField's midrange cone. To reproduce everything between woofer and tweet, from 100Hz through 8kHz—a

range of 6+ octaves that encompasses the fundamentals and most of the harmonics from nearly the lowest note of a basso (G2) to well above the highest note of a piccolo (D8)—the Model Three depends entirely on a “hand-built” 5" driver, an impregnated paper cone coated with a layer of salt-crystal-sized ceramic spheres and synthetic dampeners. As fans of planar and electrostatic loudspeakers can attest, one of the chief ways of making a loudspeaker disappear is *not* to cut the audio bandwidth up into little slices reproduced by different cones but to reproduce the entire gamut via a single, extremely low-distortion, extremely high-resolution, crossoverless driver. Throughout most of the musical spectrum, the UniField Three does precisely that.

Of course, the trouble with any single-driver dynamic speaker, even one as extraordinarily full-range as the UniField Three's marvelous 5" cone, has always been the low bass and top treble. Generally, with a one-way there isn't enough of either. Without the bottom octaves, larger-scale



## EQUIPMENT REVIEW - Von Schweikert UniField Three

### Setting up the UniField Model Threes

The Model Three isn't particularly difficult to set up. The tiny midrange/tweeter cabinet sits on top of the woofer cabinet at a distance from the woofer's front baffle that ensures correct time and phase alignment. (The instruction pamphlet explains how to determine this distance.) The woofer cabinet rests on a supplied, short, spiked, T-shaped stand. There is no attachment between the woofer enclosure and this stand, and the stand itself is a bit flimsy, IMO (especially for a \$15k speaker). Be sure that the crossbar of the T is facing toward the listening seat when you mount the woofers, or the whole thing can be tipped over. Depending on your room and your seating distance from the speakers, the Model Threes may need a little toe-in. The Threes must be

bi-wired. Von Schweikert Audio makes two very good sets of dedicated bi-wire cables for the UniField, although their price (\$2.5k and \$5k) is steep. The speaker comes with extra stuffing for the transmission line, which you can use (or remove) to tailor the bass to room size and speaker placement. I tried the Model Threes with a variety of amps in two different listening spaces and at various distances from backwalls. At shows, Von Schweikert demonstrates the Model Threes with tubes, perhaps because their slightly brighter, livelier treble complements the Model Threes slightly recessive upper-midrange/lower treble. I liked the treble marginally better with tubes, and I liked the bass marginally better with solid-state. **JV**

music unquestionably lacks foundation; without treble, music lacks sparkle and life. This is where Von Schweikert's "augmentation" comes in. In the mid-to-low bass, the UniField's transmission-line-loaded, long-throw, magnesium-coned woofer gives the speaker low end that no one-way I know of, and few two- or three-ways, can rival. (The UniField's 7" transmission-line woofer is claimed to achieve 20Hz extension, down 6dB at 25Hz in free-field measurements. My own measurements—which we will come to—show it to be down about 12dB at 20Hz referenced to 1kHz, which is quite a bit better than respectable bottom-octave performance for a 7" driver in a 22" high, 10" wide, 14" deep enclosure!) On top,

the UniField's 3" aluminum-foil ribbon extends treble performance well past 50kHz.

Playing music back primarily through a single driver augmented by a deep-reaching woofer and high-flying tweeter at crossover points so low and high they are virtually "inaudible" isn't the only disappearing trick that the Model Three has up its sleeve. Von Schweikert claims that his UniField design also has a carefully controlled dispersion pattern, said to be restricted to +/-30 degrees horizontally in the midband and treble. Achieved by "driver selection, crossover topology, and other proprietary methods," the UniField's narrower dispersion reduces the boundary effects of typical wide-dispersion loudspeakers, making the

Model Three ideal for smaller rooms in which wall reflections tend to color timbres and play havoc with imaging. (The UniField's controlled dispersion does not make it suitable for smaller rooms only, BTW; it does just swell in medium-sized ones like mine and, according to Von S, in larger ones too, although its smallish drivers may ultimately limit its ability to "fill" really large spaces at loud levels.) With its front-ported transmission-line bass driver (the damping of which is user-adjustable), the Three can also be placed much closer to back walls than conventional wide-dispersion speakers, including most stand-mounted monitors.

All right. We've got a virtual single driver speaker, and we've made provisions to take the imaging-and-timbre-degrading early reflections of that driver out of the question; now how about the enclosure it is housed in? As you may recall from my M5 review, building a neutral enclosure involves artfully juggling three parameters: stiffness (to push the box's resonant frequency as high as possible), mass (to damp this high-frequency resonance and reduce its Q), and damping (to further reduce the amplitude of the resonance and kill or, in the case of a transmission line, filter the backwave of the drivers). Wolf chose to build a sealed system with an aluminum baffle (which boasts extremely high stiffness) coupled to an airtight birch-ply box (which boasts extremely high mass and damping). But Von Schweikert feels that aluminum or Corian or other "hard" materials are precisely the wrong stuff to use for speaker baffles and boxes because, says he, the drivers will ring against such hard surfaces. Instead, he builds the walls of his boxes using a tri-laminate constrained-layer sandwich of molded resin-impregnated MDF (for stiffness),

artificial stone (for mass), and sheets of viscous material (for damping), bracing them internally with a "honeycomb" of MDF and more viscous damping, and stuffing them with three different kinds of absorptive materials to eliminate cavity resonances (what Von S calls Gradient Density Damping). Where Magico uses an ingenious tension-coupling mechanism to ensure that the cones are the only parts of the drivers that vibrate, Von Schweikert employs a gasket of the same synthetic clay used to damp the hulls of nuclear submarines to keep his driver frames from rattling against baffles and resonating against cabinet walls. He claims that his constrained layer, honeycomb-braced, gradient-density-damped boxes with clay-damped driver-frames reduce enclosure vibration by 300% in comparison to "conventional" enclosures, while the cabinets' small size and tapered shape ensure low levels of diffraction and reflection.

Before we discuss the UniField's sound, let's look at one other direct challenge to Magico and Wilson—the Three's hybrid transmission-line bass. According to Von Schweikert (and he's certainly not alone in saying this), acoustic-suspension bass sounds "strangled" due to the high, energy-robbing pressures and huge impedance peaks of sealed enclosures, while ported bass sounds "slow," "chesty," and "one-note" due to the resonances of their hollow ported boxes, the ringing of their under-damped cones, and the mistuning of the ports themselves. His solution is a transmission line—a tunnel of four, stuffed (with Dacron), interconnected chambers, each tuned to a different frequency, which, together, spread and smooth out the bass-range resonances of the woofer's backwave. There is nothing new

# EQUIPMENT REVIEW - Von Schweikert UniField Three

about transmission-line bass—IMF and KEF were using it back in the sixties and seventies. But Von Schweikert has spiffed it up with Chebyshev alignment and that nifty magnesium driver.

So...how does Albert Von Schweikert's challenge to the Magico Mini II and Wilson Sophia 2 and YG Acoustics Kipod Studio sound? Well, the short answer is "lovely," just as it did at the RMAF and CES shows where Robert Harley and I initially heard it. Indeed, on the very first cuts I played through the UniField Three—Alison Krauss and Union Station's live recording of "Forget About It" (on MoFi vinyl) I was immediately struck by how realistically the Model Three reproduced Krauss' lead soprano and Dan Tyminski's baritone backup. Both voices were wonderfully well focused (though not at all miniaturized), completely "freed-up" from the little midrange driver and its tiny enclosure, extremely well resolved in color and texture (Krauss's slight characteristic tremolo was as audible through the UniFields as it was through the Magico M5s or those paragons of low-level resolution, the MartinLogan CLXes), and quite persuasively "there" in the room with me. Violin, guitar, and dobro were also extraordinarily free from driver/enclosure coloration as if, like the two voices, they weren't being projected from a loudspeaker but hanging mobile-like in open air, although each was hanging a little further back in the soundfield than what I was used to hearing through other transducers and, while sweet as sugar in timbre, each was a bit less present and brilliant than it usually sounds. It wasn't until the electric bass came in midway through the number that I began to feel like I was hearing a driver in a box. Though deep-reaching and shockingly well-defined in the bottom octave, the

UniField's transmission line was adding a bit of woolliness to the midbass, making certain notes of the Fender sound slightly louder, less crisply defined, and more forward in the mix. The effect wasn't unpleasant or unnatural—the bass still sounded like a bass, but the instrument was a tad louder and plummier than it sounded through the M5s or the CLXes or other systems on which I've auditioned this LP. On the tiptop, cymbals were every bit as clear and sweet and delicately detailed as guitars and dobro but, like both, a little recessed in perspective, softened in dynamic, and less scintillant in texture.

After listening to several other cuts—like Reiner Bredemeyer's cantata for voice and percussion *Synchronisiert:Asynchron* [Nova], the Prokofiev First Violin Sonata with Nadia Salerno-Sonnenberg and Sondra Rivers [Music Masters], and a variety of larger-scale music—I began to form a clear picture of the UniField's sound, which stayed remarkably consistent on every LP or CD: A little

dark in overall balance (rather like the beautiful, liquid-sounding BAlabo electronics), with a gorgeous, boxless, natural midrange, superb midrange transient response, great soundstaging and imaging (as good as it gets, in fact), excellent very deep bass (at moderate to moderately loud playback levels), but a little thicker, louder, and boxier in the midbass than in the midband, and a little softer, less brilliant, and more laidback in the upper mids and treble than in either the midband or the bass. Where it was playing, that single 5" driver in Von Schweikert's enclosure was superb. The trouble (if you want to call it that) was that I could clearly hear where it stopped playing—in the midbass and the upper mids/lower treble—and where the "augmenting" drivers were picking up the baton.

At this point I decided to do an RTA (a series of them, actually) and, sure enough, the speakers measured exactly the way they sounded—very slightly humped up in the midbass and very

slightly sucked out in the presence/brilliance range (see below).

This is actually excellent frequency response for a quasi-"one-way" loudspeaker—exceptionally flat in the heart of the midrange, from 100Hz to 2kHz where it appears as if the 5" driver begins to slowly roll off. I imagine that Von Schweikert could have brought the tweeter in at a slightly lower frequency to fill up this slight dip in the presence and brilliance range, but didn't want to risk drawing attention to the ribbon, as so many ribbon/cone hybrid speakers do, by lading excess top-end

## SPECS & PRICING

### Von Schweikert Audio UniField Model Three Loudspeaker

**Frequency Range:** 32Hz to 40kHz (-3dB down points are 25Hz and 50kHz)

**Sensitivity:** 88dB @ one watt/one meter in anechoic conditions, 91dB in-room

**Distortion:** Less than 0.8% at normal listening level (5 watts)

**Impedance:** 8 ohms nominal (4 ohms minimum)

**Power Rating:** 300 watts peak, 100 watts RMS (minimum of 20 watts)

**Weight:** 190 lbs./pr. (including stands)

**Dimension:** 10" x 40" x 14"

**Price:** \$15,000/pr. (including stands)

### VON SCHWEIKERT AUDIO

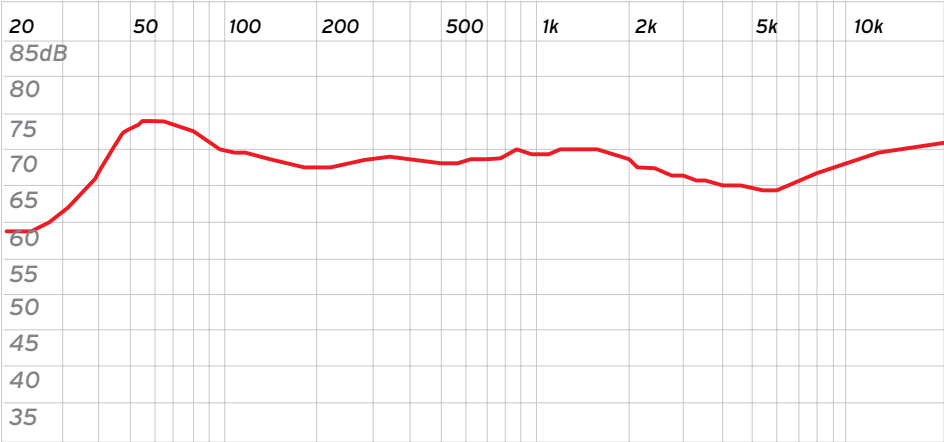
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Loudspeaker Frequency Response



## EQUIPMENT REVIEW - Von Schweikert UniField Three

energy onto his smooth-as-silk “one-way” sound. So he settled quite sensibly on this highly musical compromise. It isn’t much of a compromise in the listening. Instruments that reach up this high are just a little more laid-back in the soundstage, totally devoid of sibilance or aggressiveness (even when they are sibilant or aggressive), and a bit less naturally brilliant, airy, and harmonically complex. Oh, their harmonics are still there, but they’re being resolved at a slightly lower volume level that makes the overtones of high-pitched instruments sound very sweet but a little concentrated, like the taste of condensed milk.

The smallish hump in the midbass, where the woofer takes over from the 5" driver, is also relatively benign. As noted, you hear it as a bit more loudness and prominence on kettle or bass drum (where it very attractively accentuates the resonant bodies of the instruments) or on certain notes in ostinatos of piano, doublebass, and bass guitar—like the effects of a minor room resonance. It doesn’t greatly change the pitches or colors of the notes themselves, just amplifies and thickens them a little, slightly reducing their crispness of definition. Until you play the UniField Threes very loud—and the whole soundfield begins to compress and congest—this little midbass hump certainly doesn’t obscure the upper bass or the bottom bass, which, as noted, is shockingly deep and articulate for such a tiny driver in such a tiny enclosure, adding genuinely lifelike “finish” to truly deep bass notes. (The uncanny clarity the UniField Threes bring to the deep bullroarer rumble of the bowed bass drums in Cage’s *Third Construction* [New World], not to mention the phenomenally large, wide, freed-up-from-drivers-and-enclosures soundstage they throw

on this cut and so many others, has to be heard to be believed from such a small transducer and cabinet.)

Albert Von Schweikert set out to produce a tiny, full-range, single-voiced speaker for small rooms that, unlike so many speakers for small rooms, would not rob you of the deep bass, imaging precision, and dynamic scale of big speakers. The design he settled on is very nearly unique—an “augmented” one-way. That you can occasionally hear the augmentation (or its effects) doesn’t change the fact that throughout most of its range the UniField really does speak with one beautiful and persuasively lifelike voice. Though the Three is not a speaker for really big spaces or for rock concerts played back at stadium levels and at \$15k the pair has a good deal of serious competition, it certainly fills a niche for apartment and condo dwellers who hanker for full-range sound in a small svelte package. Though I wouldn’t call the UniField a completely neutral loudspeaker—it has, by design, a voice of its own that is robust but meltingly beautiful, superbly focused but never edgy, supremely quick but never aggressive, highly detailed but highly forgiving—it is a constant pleasure to listen to and never less than musically convincing. **tas**



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# B&W 802 Diamond

## A Music Lover's Best Friend

Robert Harley

**W**e're in the midst of an unprecedented period of advancement in dynamic loudspeaker design. After two decades of slow but steady improvements, the last five years have brought forth an explosion of innovative techniques that have made dynamic loudspeakers more transparent and resolving, with vastly lower levels of tonal and dynamic colorations. Today's best "cones-in-boxes" now approach planar loudspeakers in some areas where planars had been untouchable, a notion unthinkable just ten years ago.

This trend is self-perpetuating. When one loudspeaker manufacturer ups the ante, its competitors are compelled to respond with even better designs. Before you know it the entire playing field has shifted upward, with the consumer reaping the rewards of this sonic "arms race."

I've been following this trend for a few years, but the product that fully confirmed it for me is the new B&W 802 Diamond. The 802D is a relatively affordable (\$15,000 per pair), relatively mainstream high-end loudspeaker that has many of the sonic qualities of six-figure models from tweaky esoteric companies of a decade ago. The 802D's refinement, transparency, low coloration, and soundstaging are nothing short of amazing at this price.

Before we consider the 802D's sonic qualities in detail, let's look at the loudspeaker itself. The 802D is the second model down in B&W's line, and looks nearly identical to the model it replaces. Although superficially similar to the previous generation, this new 800 Series incorporates some significant improvements, notably the inclusion of diamond tweeters throughout the line (including in the \$5000-per-pair 805D—review forthcoming). The benefits of diamond-diaphragm dome tweeters were so compelling that B&W found a way to include them in each model in the 800 Series. Diamond reportedly has the ideal properties for a driver diaphragm of high stiffness and low mass.

Although B&W has offered diamond tweeters in the past,

## EQUIPMENT REVIEW - B&W 802 Diamond

the inclusion of this expensive technology in a speakerline that starts at \$5000 is unprecedented. Moreover, the new tweeter is considerably improved over the previous generation. The magnet structure has been redesigned, with additional magnets positioned at the rear of the back plate, on top of the top plate, and on top of the center pole. This configuration increases the magnetic field strength in the gap, resulting in greater efficiency and cooler operation. By running cooler, the tweeter's dynamic range is increased and its dynamic compression is reduced. (Dynamic compression is a change in a loudspeaker's tonal balance and dynamic abilities as a function of playback level. That is, at high listening levels the treble sounds rolled off on musical peaks, and the treble dynamics are muted in relation to the rest of the spectrum. This phenomenon is caused by heat in a driver's voice coil raising the coil's resistance, which reduces current flow and thus acoustic output. This is one reason why extremely high-sensitivity horn loudspeakers can have such lifelike midrange and treble dynamics—the drivers are never run anywhere near their dynamic-compression threshold. In addition, cooler operation confers greater reliability.)

The 802D's tweeter also benefits from a new surround material that improves the phase relationship between the sound emanating from the diaphragm and the sound emanating from the surround. The dispersion is wider and more uniform than in the previous tweeter, which aids in image focus and precision. The tweeter diaphragm itself is created by vapor deposition of diamond on a substrate that is later removed. The ultra-thin diaphragm is then precision cut

with a laser and protective-coated with platinum. The dome itself is extremely fragile, which is why it is covered with a magnetically attached mesh grille. The grille can be removed for a listening session, resulting in a slightly more open sound. The tweeter is mounted in a Nautilus tube, the long tapered structure at the top of the cabinet. B&W's Nautilus technology channels the tweeter's rear wave down the tapered tube where it is dissipated rather than reflected back to the dome.

In addition to the new tweeter, B&W introduced some other design changes for this sixth-generation of the 802D (which had not been updated since 2004). The bass driver, crossover, and input terminals are all new within the core platform of the 800 Series.

The 802D's two 8" woofers feature Rohacell cones (as in the previous generation) driven by a new dual-magnet structure. The new magnet material (neodymium), along with the symmetrical dual-magnet arrangement, creates a greater (and more uniform) field strength in the gap for increased linearity and lower distortion.

The increasing use of exotic capacitors has been one of the driving forces behind the recent improvements in dynamic loudspeakers. Once reserved for ultra-expensive products from tweeky manufacturers, these capacitors have found their way into a much wider range of products as designers increasingly recognize the role of capacitor quality. The 802D, and in fact the entire 800D Series, now features Mundorf silver/gold/oil capacitors in all sections of the high-frequency network. These capacitors, which can cost \$300 each, were chosen after extensive listening comparisons. Switching to the Mundorf



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caps resulted in a “dramatic increase in sound quality” according to B&W. The crossover is minimalist, with first-order slopes in the high-frequency section. Crossover frequencies are 350Hz and 4kHz. As a final touch to the crossover redesign, the custom input terminals are now made from oxygen-free, high-purity copper rather than brass.

That’s what’s new in the 802D, but it’s worth recapping the core technologies and platform on which these innovations are based. First, the enclosure features B&W’s Matrix technology, a three-dimensional honeycomb structure

that braces the cabinet and reduces enclosure resonances. This technique has long been used by B&W; the Matrix 801 was introduced in 1986. The enclosure is raised off the base, providing an air gap for the massive, flared, downward-firing port. The port is dimpled like a golf ball, a B&W-developed technique called Flowport that reduces port turbulence and noise.

The 800 Series’ most distinctive visual feature is the spherical head that houses the midrange driver and also supports the tweeter’s Nautilus tapered tube. The spherical structure, which is molded from a synthetic mineral-filled resin called Marlan, presents a diffraction-free platform for the midrange driver, as well as dissipates the midrange-driver’s rear wave. The Kevlar midrange driver is also unusual in that the surround is extremely narrow—almost invisible, in fact. B&W calls this technique FST, for Fixed Suspension Transducer. The FST is a narrow ring of foamed polymer that radiates very little sound of its own, and also reflects less energy back into the cone.

Other refinements for the new series include magnetically attached grilles, bright trim rings, and the addition of piano black lacquer finish in addition to rosenut and cherrywood. The cabinets are made in B&W’s new cabinet factory in England.

After unpacking the 802Ds, but before listening to them, it struck me just how much you get physically for \$15,000 a pair. Aside from the diamond tweeter, Nautilus loading, Matrix enclosure, and other technologies, the 802D is beautifully built and visually stunning; it seems like it should cost much more than \$15,000. The spikes, for example, are large, elaborate devices

that are cleverly designed and nicely finished. In fact, they are the beefiest, best-designed, and easiest to install and adjust of any spike I’ve encountered. Moreover, the 802D comes out of the box on rollers in place of the spikes, allowing easy movement and fine-tuning before spike installation. The black lacquer of the review samples was gorgeous; the spherical midrange enclosure is polished by hand and is sprayed with seven coats of lacquer.

### Listening

I installed the B&W 802 after about two months with the Vandersteen Model 7, a speaker that costs exactly three times the price of the 802D. I drove the 802D with what have become my reference electronics, the stunning BAlabo BC-1 Mk.II preamplifier and BAlabo BP-1 Mk.II power amplifier, as well as with a more real-world amplifier of a cost likely to be used with the B&Ws—the \$8000 Simaudio i600 integrated amplifier. I also spent some time with the 802Ds when I had the Audio Research Anniversary Reference preamplifier in my system.

I had heard the 802D at this last CES under fairly relaxed conditions and was taken aback by its transparency, low coloration, and ability to involve me in the musical performance. In fact, our Alan Taffel, with whom I listened to the 802D, called it the “Best Bargain” at the show in his report in Issue 202.

In my room, the 802D exhibited even more of the qualities that made it a standout at CES. The 802D was obviously a considerable step up from any previous B&W product. This new iteration vaults the 802D into the territory occupied by loudspeakers with esoteric marques, most of

which are priced considerably higher.

The 802D was transformed into such a strong contender by its extremely low levels of midrange and treble coloration and vastly improved dynamics and resolution, all of which made it less present as a sound source and more of a transparent window on the musical performance.

Starting with the overall tonal balance, the 802D had warm, full, rich bass and midbass, and a relaxed midrange and treble. This is a very easy loudspeaker to enjoy music through by virtue of its

## SPECS & PRICING

**Type:** Floorstanding three-way dynamic loudspeaker  
**Driver complement:** two 8" woofers, one 6" Kevlar midrange, one 1" diamond tweeter  
**Woofer loading:** Ported  
**Sensitivity:** 90dB, 2.83V/1m  
**Impedance:** 8 ohms nominal, 3.5 ohms minimum  
**Frequency response:** 34Hz-28kHz +/-3dB  
**Crossover frequencies:** 350Hz, 4kHz  
**Recommended amplifier power:** 50Wpc to 500Wpc unclipped  
**Dimensions:** 14.5" x 44.7" x 22.2" (not including spikes)  
**Weight:** 159 lbs. each, net  
**Finishes:** Piano black gloss, rosenut, cherrywood  
**Price:** \$15,000/pr.

### B&W GROUP NORTH AMERICA

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lack of treble forwardness or etch, warmish tonal balance, and midrange liquidity. Despite an overall balance that was smooth and unaggressive, the 802D had remarkable treble resolution. This new B&W had the very pleasant quality of sounding easygoing, but maintaining alongside that sense of ease a very fine rendering of low-level detail. The 802 presented a wealth of information to the listener, but in a way that didn't call attention to itself. That's the best kind of resolution—the kind where you're not aware of more “detail” *per se*, but nonetheless hear the musical effect of more detail in your increased involvement with the music and greater appreciation of the musicians' expressiveness. A significant contributing factor to the treble resolution was the lack of etch, grain, and glare, along with the ability to portray extremely fine transient information. The 802D reproduced low-level transient detail such as brushes on

cymbals with great finesse and refinement. B&W's claims for the new tweeter, specifically that it is more dynamic and less prone to dynamic compression, seem positively conservative in the face of the driver's fabulous performance. This high-frequency transducer was astonishingly clean, dynamic, and free from tizziness even when pushed very hard. For example, I was listening to the cleverly named “Horn of Puente” (a tribute to Tito Puente) on the disc *XXL* from Gordon Goodwin's Big Phat Band at a realistic level for an 18-piece big band. The number features an extended and exuberant trumpet solo, much of it played in the instrument's upper registers at full tilt. Most tweeters would wither trying to reproduce so much high-frequency energy at this playback level, but the 802D sailed through with no hint of strain. The trumpet's sound was completely lacking in glare, grain, hardness, or other artifacts. Most

loudspeakers have you reaching to turn down the volume during such passages; not the 802. Moreover, the 802D conveyed a full measure of the trumpet's life and verve. It's a delicate balancing act to reproduce a trumpet with a full measure of upper-midrange and treble energy without making it sound strident. Significantly, the soundstage didn't congeal when the speaker was pushed; the trumpet stayed focused, soaring over the sections behind it. The wonderful arrangement remained clean and precise rather than degenerating into a smeared blur, even at extremely high listening levels. The 802D's tweeter is spectacular by any measure.

The midrange was smooth, well integrated with the treble, and had much greater transparency than any previous B&W models. The 802D was transparent enough to easily resolve changes in upstream components, AC power cords, and tweaks. For example, I replaced my music server's stock breakout cable from the Lynx AES16 card (it has a “D” connector on one end and XLR on the other) with one from Straight Wire and immediately heard exactly what the Straight Wire was doing. (At \$250, the Straight Wire Info-Link HD 26 to Male XLR is an essential upgrade if you use the Lynx card.) The 802D also let me hear how the Audio Research Anniversary Reference preamplifier became more broken-in during my brief time with it, conveying the ARC's improving sense of ease, relaxation, and bloom. The 802D was extremely open and transparent, giving me the distinct impression of hearing through the playback

system back to the original musical event. On the Analogue Productions LP reissue of *Way Out West*, Rollins' sax had a tremendous sense of presence, bloom, air, and liquidity of timbre. The B&W didn't match the three-times-the-price Vandersteen Model 7 in this regard, but it came a lot closer than one would expect considering the price differential.

The bass leaned toward the warm, full, and rich side rather than sounding overly controlled or pinched. Acoustic bass was rendered with a sense of weight, with a little more emphasis on the instrument's resonant body than on the attack of the strings. Despite the generous bass weight, the bottom end was clean and articulate. The wonderful, uplifting bass lines on Paul Simon's *Graceland*, for example, were lively and upbeat, and rendered with excellent pitch definition. Bottom-end extension was fully satisfying; even on organ pedal points, I never heard the port “chuffing” or contributing a sound of its own. This is only the second loudspeaker I've had in my new room, and the first (the Vandersteen) had adjustable bass, so it's hard to know yet how much of this warmth was the loudspeaker and how much was my room.

With a sensitivity of 90dB, a minimum impedance of 3.5 ohms, and the minimalist crossover, the 802D was very easy to drive. (The 90dB sensitivity rating is truthful, in that it is measured with a drive signal of 2.83V across 8 ohms, which dissipates 1W of power. Sensitivity specs are often exaggerated by applying a drive signal of 2.83V across a nominal 4-ohm loudspeaker, which doubles the power dissipated, making the loudspeaker appear 3dB

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more sensitive than it actually is. The 802D's highish 90dB rating is even more impressive than it appears when compared with other sensitivity ratings.) The 150Wpc Simaudio i600 integrated amplifier had more than enough power, even when reproducing the massive dynamic contrasts of Reference Recordings 176.4kHz/24-bit HRx files from my music server. Some loudspeakers benefit from a really big amplifier (the Vandersteen 7s, for example) but I got the impression that the 802Ds left nothing on the table when driven by 150Wpc.

In soundstaging, the 802Ds hit it out of the park. The pair of loudspeakers threw a wide, deep, seamless panorama in front of me with absolutely no trace of the sound being attached to the two enclosures. The stage extended well beyond the loudspeaker boundaries, and had tremendous depth. In addition, the soundstage had amazing precision and focus, with instruments firmly anchored in specific locations. Image outlines were razor sharp and delineated with surgical precision, qualities that heightened the sense of realism. The 802Ds beautifully resolved bloom and air around instrumental outlines, along with a holographic dimensionality, particularly with the Audio Research Anniversary Reference preamplifier in the system. To their credit, the 802Ds easily resolved the spatial differences between source components, amplification, and cables. Moreover, the B&Ws didn't overlay every recording with a similar spatial perspective, instead changing dramatically depending on how the recording was made.

Several experienced high-end manufacturers visited me while I had the 802Ds and all expressed amazement not just at how good the 802Ds

sounded, but also that any \$15,000 speaker could deliver such performance. Of course, \$15,000 is a significant investment, but these industry veterans are accustomed to hearing six-figure mega-systems.

### Conclusion

B&W's new 802D sounds significantly better than any previous B&W loudspeaker I've heard, particularly in transparency, resolution, and the beautiful combination of treble ease with detail. This isn't a slight improvement over previous designs, but a major step up.

Even in today's highly competitive loudspeaker market, the 802D stands out for its sound quality and exceptional value. It delivers many of the qualities we associate with esoteric designs from small, tweaky manufacturers, but in a relatively mainstream product. In addition, the build and finish quality are exemplary, and far nicer than you find in similarly priced products from companies who lack the economy-of-scale manufacturing enjoyed by B&W. Make no mistake; this is a lot of speaker for the money.

If you're in the market for a loudspeaker anywhere near this price range, you must audition the B&W 802D. I think that you'll be pleasantly surprised by just how much performance your loudspeaker dollar will buy.



# YG Acoustics Carmel

## Stand and Deliver

Chris Martens

**M**y first encounter with YG Acoustics came several years ago when I spied the firm's audacious marketing slogan—"The Best Loudspeakers on Earth. Period."—on a signboard outside a demonstration room at an audio show. "That," I thought to myself, "is one of those taglines that will either turn out to have self-evident validity or else wind up making the manufacturer look silly." And to be perfectly candid, on the basis of the first few YG demos I heard, I really couldn't determine which might actually be the case. For whatever

reason, the first demos I heard of YG's larger speakers, the Anat and the Kipod, seemed almost perversely calculated to make them sound at once promising and *obnoxious* (picture potentially fine loudspeakers demonstrated in overly large rooms, and then overdriven to levels that made the speakers seem to be shrieking at the listener, and you've got the general idea). But at CES 2010 things took a dramatic turn for the better as I got my first chance to sample YG's smallest and least expensive speaker, the Carmel, priced at \$18,000 per pair.





## EQUIPMENT REVIEW - YG Acoustics Carmel

To my surprise and delight, the Carmels produced an immediately gripping, revealing, musically engaging, and unashamedly beautiful sound—a sound that made the company’s provocative slogan start to make perfect sense. What also impressed me was that the Carmels also seemed willing to stand and deliver their top-shelf sonic goods without petulantly demanding “unobtainium-class” electronics or source components. As I listened to the Carmels at CES, I experienced one of those rare moments where I felt as if the audio “spheres” were coming into alignment before my eyes and ears. I vowed then and there to ask Editor-in-Chief Robert Harley if I might be allowed to review the Carmels for *The Absolute Sound*.

Fascinating though the design and construction details of the Carmel may be (for which, see my technical sidebar “Inside the Carmels”), the real story here involves the Carmel’s sound. Let me just come right out and say it: The YG Carmel is, hands down, the most accomplished loudspeaker I’ve ever had in my home, and it is among the ten best I’ve ever heard at any price (others on my personal top ten list would include the Avalon Time, the Magico Mini II, the MartinLogan CLX, the MBL 101 E, the Wilson MAXX 3 and Alexandria X2, the Quad 2905, the Revel Ultima Salon 2, and the Usher Be-20). With your kind indulgence, I’m going to take some extra time to discuss the various sonic characteristics of the Carmel, because I think it does a great job of combining certain sonic virtues that don’t always travel easily together, which is a big part of what makes this speaker so special.

First, let me start by saying that, by design, the Carmel manages to combine the benefits



of great two-way stand-mount speakers (e.g., the Magico Mini II) with those of fine mid-sized floorstanders (e.g., the Magico V2 or V3). On the one hand, the Carmel serves up the qualities of focus, purity, effortless imaging, and—above all—coherency that are the acknowledged strengths of great two-way monitors. On the other hand, the speaker delivers much (though perhaps not quite all) of the low frequency extension of a larger floorstanding speaker, and with it the kind of highly realistic bottom-end weight, scale, and dynamic expansiveness for which floorstanders are known.

Many two-way stand-mount monitors provide bass that cuts off at, or even well above, the 40Hz mark, which can leave certain types of “power music” sounding somewhat “cut off at the ankles.” In contrast, the Carmels offer bass that extends comfortably down to the mid-30Hz range—a numerically small difference, true, but one that causes the speaker to register on most listeners as being a full-range (or at least a “near-full-range”) design. As a result, the Carmels can happily wade into powerful orchestral or bass-and-drum recordings that typically might not sound sufficiently full-bodied on smaller monitor

speakers (not even the great ones, like the Mini II).

For a good example of this, try listening to bassist Dean Peer and percussionist Bret Mann’s terrific jazz duet, *Airborne* [ILS Records]. Peer is both a consummate bass virtuoso and a bit of an iconoclastic sonic explorer, and on *Airborne* he plays a five-string electric bass whose signal gets routed through an elaborate chain of custom-tweaked, audiophile-grade effects-boxes. The result is that listeners get to enjoy both the clean pure sound of the bass overlaid with effects that stretch and expand the instrument’s natural voice, taking it in strangely beautiful new directions. Mann, in turn, plays a gorgeous old-school German Sonor drum kit that is equipped with a broad though by no means ostentatious mix of very high-quality cymbals. Just days before writing this review I had the privilege of attending a concert given by Peer and Mann in a small, intimate, theater-in-the-round setting in Austin. At the concert, Peer and Mann performed much of the material from *Airborne*, so later on I was able to go home to the Carmels to do a sort of time-delayed live vs. recorded comparison. The results were eye-opening.

Heard live, Peer’s bass and effects chain have tremendous depth, presence, and impact, though the absolute quality of the sound is, naturally, dependent upon the quality of the sound reinforcement speakers used in the performance venue. I would say the Carmels easily matched the depth and impact of Peer’s live bass sound, but that they exhibited far greater transient snap and textural subtlety, plus a more tonally balanced sound than the theater speakers were able to deliver. I found this both interesting and

## EQUIPMENT REVIEW - YG Acoustics Carmel

### Inside the Carmels

The Carmel is a relatively compact, 41-inch tall, two-way, floorstanding loudspeaker whose acoustic-suspension enclosure is CNC-milled from solid slabs of 6061-T651 heat-treated aircraft aluminum. Build-quality is stupendous; indeed, the quality and precision of YG's machining reminded me of the look and feel of internal parts found in high-quality mechanical flight instruments used in military aircraft (back in pre-CAD/CAM days, I helped pay my way through college by working as a draftsman for an aircraft instrument manufacturer—an experience that forever redefined my notion of what “precision manufacturing” really means).

The top section of the Carmel's enclosure houses a highly modified Scan-Speak ring-radiator-type tweeter mounted in the throat of a waveguide that is milled from a separate piece of aluminum and then mounted in the speaker's thick aluminum baffle. Eagle-eyed enthusiasts will note that the tweeter uses the bullet-shaped pole piece commonly seen in comparatively low-cost Vifa tweeters, rather than the needle-nosed pole piece use in Scan-Speak Revelators, but make no mistake; the unit is a Scan-Speak driver through and through, albeit with a fair amount of YG's own “special sauce” thrown in.

Down below, and positioned in a separate sealed chamber, is a modified Scan-Speak 7-inch mid/bass driver. The lower section of the enclosure looks deceptively simple at first glance, but a closer look reveals that it is tapered in two axes—side-to-side and front-

to-back—to help break up internal reflections. Interestingly, the main volume of the mid/bass driver enclosure uses no stuffing material at all, and according to YG none is needed. Down near the bottom of the enclosure, however, there is an internally vented, metal-walled chamber loaded with precise quantities of a proprietary damping material. YG's larger speakers—the Anat and Kipod models—also use conceptually similar dedicated internal damping chambers, albeit ones that are implemented somewhat differently in the bigger speakers.

Dick Diamond, YG's head of sales and marketing, told me that firm's founder and chief designer Yoav Geva is absolutely fanatical about making his speaker cabinets as rigid, inert, and vibration-free as possible. To this end the Carmel's cabinet surfaces were extensively tested with high-precision accelerometers to check for unwanted vibration or panel resonances, and the design adjusted accordingly. Thus, the mid/bass driver enclosure is internally reinforced by thick, solid aircraft aluminum bulkhead panels along with solid metal component mounting blocks that are strategically positioned with an eye toward making the cabinet stiffer and more vibration resistant. The entire enclosure, which is nearly triangular in cross-section when viewed from above, rests upon a beefy metal floorplate and is supported by three massive floor spikes, the front two of which are designed to rest upon thick Delrin pucks (as I'll explain below, there's a

reason why just two instead of three pucks are used).

The crossover board is a work of art, featuring superb and quite costly Mundorf capacitors and other hyper-premium components throughout the signal path, and it is in the crossover that the influence of Yoav Geva's design expertise becomes most apparent. Whereas many designers of ultra-high-end speakers are middle-aged individuals who have spent decades perfecting their craft, the Israeli-trained Geva is by contrast a relatively young man who is, by many accounts, something of a technological wunderkind. Geva's distinct contribution to the art and science of speaker design involves the fact that he has created a proprietary CAD (computer-aided design) program that can optimize both the frequency response and phase response characteristics of a loudspeaker at the same time (a speaker designer's “Holy Grail” if ever there was one). As a result, the Carmel boasts—as do all of Geva's designs—very tight frequency response and phase response specifications (frequency response of 35Hz to > 40 kHz, ± 2dB in the audible band; phase response maintains ± 10° relative phase “throughout the entire overlap” between the mid/bass and high-frequency drivers).

Diamond explained that nothing in the Carmel's design is left to chance; even the smallest details of the design are verified both by empirical measurements and by listening tests. For example, when I asked Diamond why

the aforementioned Delrin pucks were used only under the Carmel's front two floor spikes (and not under all three spikes, as one might expect), he immediately replied, “Oh, Yoav measured and listened to the speaker both ways, but we settled on the two-puck approach because it gives slightly better cabinet vibration test results, and—in most installations—better sound.” Sure enough, when Diamond and I tried the Carmels both with and without the pucks during initial setup in my listening room, they really did sound better with the pucks in place.

Similarly, the quest for superior resonance and vibration control performance is an ongoing task at YG. Late in the review process, for instance, Diamond informed me that Geva had come up with an extremely subtle revision to the Carmel's enclosure interior that yields ever so slightly better vibration-control measurements (though the changes in audible performance are said to be vanishingly small). Small though its benefits might be, the change will be implemented on future pairs of Carmels “just because”—meaning that the samples you might audition could potentially sound a hair better than the units I auditioned for this review. **CM**

## EQUIPMENT REVIEW - YG Acoustics Carmel



encouraging, since many high-end loudspeakers simply wilt when asked to reproduce the depth and dynamics of electric bass guitars heard live (remember, the fundamental of the low B string of a five-string bass falls in that critically important mid-30Hz range). To my pleasant surprise the Carmels didn't flinch one bit; they just cleared their little throats and sang with the kind of authority you might not think possible for a compact speaker equipped with a single 7"

mid/bass driver.

But the comparison between the Carmel's sound and that of Mann's drum and cymbal kit was even more impressive. Mann's beautiful Sonor drum kit produces the sort of sound that would make most recording engineers weep for joy—a taut, punchy, ultra-well-defined sound full of subtle textures, yet not prone in any way to overhang or boominess. Add to this Mann's deft control of dynamics—and especially of subtle variances in dynamic emphasis, plus his ability to summon harmonically rich and at times explosive sounds from his cymbals and you've got all the makings of a rare percussion feast.

In my impromptu live vs. recorded comparisons, I found the Carmels did an unexpectedly great job of recreating the sound of Mann's drum kit—especially in nailing down the incisive, high-impact snap of his snare drum, the potent pop of his tom-toms, and the delicate yet also expansive and room-filling shimmer of his cymbals. The only place where the Carmels came up short (and then only a little short) was on capturing the sheer dynamic impact of Mann's most vigorous kick drum “thwacks” as heard from just a few feet away (the Carmels did well, but could not quite capture the chest-slapping impact of the biggest kick drum notes). That said, however, I should probably point out that the only speakers I've heard get the sound of Mann's kick drum spot on are the very costly Wilson MAXX 3s (though in the upper mids and highs, I felt the little Carmel's more than held their own versus the big Wilsons).

The point I hope to make here is that, when used in the small-to-mid-sized listening rooms for which they are intended, the Carmels offer near-

full-range frequency response and unexpectedly powerful and expressive dynamics. While the Carmels might not, for obvious reasons, be quite the ideal solution for those who listen to a steady diet of pipe organ music or who want to listen to Mahler at front-row volume levels, they will do nicely for most other applications (assuming you don't plan on listening at punishing, full-on-rock-concert levels—though why anyone would sign for up for self-imposed hearing damage is frankly beyond me).

Having established that the Carmels can “play big” despite their size, let's now focus on the other side of the sonic coin, which is that the Carmels also provide *all* the key benefits of great two-way stand-mount designs. When you get right down to it, two-ways speaker offer inherent architectural simplicity, which I would argue is very much its own reward. In the past, both Jonathan Valin and Wayne Garcia have written with insight and conviction about the benefits of two-way loudspeakers, and I would second their notion that the best two-way speakers offer—among other things—a certain ineffable sonic purity and overall coherency of presentation.

In the Carmel's case, this sense of purity and coherency is further enhanced by the speaker's ability to deliver accurate phase and frequency response at the same time. While there may be some debate as to when (or even if) the effects of accurate phase response are audible, my observation is that proper phase response can, at least on some recordings, help a loudspeaker to confer a difficult-to-describe quality of focus, wholeness, and completeness that makes images lock into place with terrific solidity, while also making hall sounds (subtle echoes,

reverberations, and the like) seem more self-consistent and believable.

To hear what I mean by this comment, try playing the Bill Evans Trio's *Sunday at the Village Vanguard* [Fantasy/Riverside LP] through the Carmels. *Sunday at the Village Vanguard* is surely one of the most lifelike live jazz recordings ever made, and it typically sounds very good through most high-quality speaker systems, but through the Carmels the record comes alive in an extraordinary way. First, they present the trio's members—Bill Evans on piano, Paul Motian on drums, and Scott LaFaro on bass—at precise, stable, and believable locations on

### SPECS & PRICING

- Type:** 2-way, floorstander, acoustic suspension enclosure
- Driver complement:** Modified Scan-Speak ring-radiator-type tweeter, modified Scan-Speak 7" mid/bass driver
- Frequency response:** 35Hz→40kHz, +2dB
- Sensitivity:** 87dB/2.83 V/1m, 2@ anechoic
- Impedance:** 8 ohms nominal, minimum below 4 ohms @4 kHz
- Dimensions (HxWxD):** 41" x 11" x 15"
- Weight:** 66 lbs., each (unpacked), 177 lbs. /pr. (in shipping crate)
- Price:** \$18,000/pr.

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## EQUIPMENT REVIEW - YG Acoustics Carmel

stage, and more importantly place them within the unmistakable interior of a jazz club whose patrons are listening attentively and appreciatively to the trio. The sense of place, of actually *being present* at the moment of the performance, is so convincingly rendered through the Carmels that you may feel almost as though you've stepped into a musical time machine and been transported back to June 25, 1961 (the date on which the recording was made). A large part of this has to do with the uncanny realism with which the YG's reproduce the signature sounds of the performance venue itself—the sounds of glassware on tables, of hushed snippets of whispered comments exchanged between patrons during the performance, of the almost subliminal sense of give-and-take between the listeners and the musicians, and of the intimate acoustics of the space. No sonic detail is too small to escape the Carmels, and yet what really wins you over is the way the YG's weave those details together to form a consistent, coherent tapestry.

Next there are the sounds of the instruments, themselves, which the Carmels present with such disarming and natural purity that they seem almost to deflect analysis, instead inviting a more direct and emotional connection. Through the Carmels, then, you can't help but notice how Evan's piano sounds more incisive, engaging, outgoing, and alive in the club setting than it would in a studio environment. Similarly, as Paul Motian works his drum kit, the YG's help you discern that the percussionist is making very small, subtle, on-the-fly adjustments to the rhythm and feel of each song, presumably in response to unspoken communications with his

fellow players. And when LaFaro improvises on his bass, the Carmels show you how a certain just barely discernible hush comes over the crowd—apparently an almost involuntary group reaction to the sheer inventive genius of LaFaro's musical lines (and to the breathtaking, virtuoso chops with which he brings those lines to life). My point is that the Carmels reach beyond the usual catalog of audiophile virtues, instead pushing toward a point where all of the science in the speaker is doing its level best to stand aside in order to let the music come through.

Let me try and zoom in on the Carmels' characteristics of focus and coherency for a moment. What the Carmels' design does particularly well is to present the fundamentals and harmonics of instrumental and human voices so that they sound as if they belong together, and are originating from the same physical points within the acoustic space. This stands in sharp contrast to speakers that successfully attempt to delineate various elements of a given instrument's voice, but in the process somehow deconstruct those elements in a way that makes them sound like disparate and disjointed sonic entities (which is just plain wrong). The desirable qualities of wholeness, completeness, and self-consistency are things we instinctively expect to hear when listening to live music, and they are qualities the Carmels effortlessly and consistently deliver.

Perhaps for this very reason, the Carmels are spectacularly good imagers—actually much better than in this regard than most of the top-tier small monitors I've heard that claim to image well. I found the Carmels produced *much* wider and deeper soundstages than any speaker I've yet had in my listening room, though I found that



their ability to render depth information properly is, as you might expect, governed to an extent by the overall quality (and resolution capabilities) of other elements in the signal path. (Once you get the Carmels to throw really deep, holographic soundstages, you'll know you've got your system setup well dialed in.) Be aware, though, that unlike some speakers that create an alluring but false sense of soundstage depth no matter what material you play, the Carmels cannot and do not "synthesize" depth information that's not actually present in the recordings, or that other components may have left out.

This brings me to one very important point. The Carmels are revealing with a capital "R."

Tweak the azimuth adjustment on your phono cartridge and the Carmels will immediately tell you whether your efforts were beneficial or not. Try out a new vibration-damping device under a source component and the Carmels will tell you whether it works or not. Make a cabling change in your system—*any* cabling change at all—and the Carmels will instantly give you a detailed report on the sonic pros and cons of the change. Swap out a power conditioner, and through the Carmels you may find that the entire character of the system's sound changes. My point is that the Carmels will show you the results of any system changes, no matter how small or inconsequential they might seem to be (which, of course, makes the Carmels a powerful tool for use in equipment reviewing).

But let me underscore one equally important point. Although the Carmels are undeniably revealing, they are not "*ruthlessly* revealing." Understand, then, that the fundamental spirit of the Carmel is to be honest in its presentation, but without being punitive to the listener. On the contrary, the Carmel just wants to get the sonic facts straight, while exploiting whatever is good and right about the records you play or the equipment you own. As you would expect, the speaker can and does reveal even very small sonic flaws, but somehow—and frankly I am not quite sure how YG has pulled this off—it does so without ever browbeating the listener with whatever deficiencies it encounters. This is perhaps a roundabout way of saying that, despite its unwavering accuracy and formidable resolving power, the Carmel tends in some sense to accentuate the positive. By comparison, certain other loudspeakers, such as the MartinLogan CLX, may push the resolution

## EQUIPMENT REVIEW - YG Acoustics Carmel

envelope even harder than the Carmel does, but they do so at the expense of becoming painfully fussy at times—shining a harsh, bright, hyper-critical light on problems elsewhere in the signal path. For music lovers, I think the Carmel's delicate balance of honesty and forgiveness offers a highly satisfying compromise.

Yet another compelling aspect of the Carmel design is that it will, as I mentioned at the start of this review, deliver most of its sonic gifts when used with excellent—but *not* necessarily hyper-expensive—amplifiers and source components. During my listening tests, I mostly drove the Carmels with Rega's superb Osiris integrated amplifier (\$8995), and the results easily surpassed those of many high-end systems I've heard that were driven by amps costing two or three times as much, or even more. I raise this point because it seems to me that some competing speakers (Magico's Mini II comes immediately to mind) seem to be considerably more finicky than the Carmels about the ancillary components with which they are used. Does this mean the Carmels are perhaps less revealing than those competitors? I don't think that it does, because the YG's proved extremely sensitive to even the smallest changes I made in my system. Rather, I think it suggests that the Carmels are comparatively easy to drive, so that—even when driven with mid-tier components—they deliver an unusually high baseline level of performance. But beware: When assessing ancillary gear, the YG's can and do show you exactly what makes great components great, which can potentially lead to upgrade addiction.

For listeners with small to mid-sized listening spaces, the YG Carmel is an extraordinary loudspeaker—one that marries the virtues of

mid-size, near full-range floorstanders with those of classic, two-way stand-mount monitors. But the speaker's true worth lies in its ability to let the music—*all* of the music—through to communicate with you, unfettered, unadulterated, evocative, and alive. Let me provide a brief anecdote that will illustrate this point.

One day during the review process, I played the classic Elvis Presley recording of "Fever" [*The Essential Elvis Presley*, Sony Legacy] through the Carmels for my musician wife to hear, just to get her reactions. She sat transfixed, drinking in the smooth, sharply focused croon of Elvis' sultry voice, the purity of the instruments in the backing band, the deep snap of the drums used to punctuate key phrases, and especially the vivid reverberations that give this track its rich, dark, sumptuous feel.

After the song ended I asked, "What do you think?"

"I think," said my wife, who is not prone to audio hyperbole of any kind, "that's the most amazing thing I ever heard from any hi-fi system."

"I take it you think the Carmels will be of interest for the TAS readers," I said.

"Oh, not just for them," she replied, "I think these speakers offer something that *everybody* should get a chance to hear." I can only second that assessment. Go forth and listen. *tas*





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[sony.com/AR1](http://sony.com/AR1)

# Wilson Audio Specialties Sasha W/P

It's Good to be King

Alan Sircom

**T**he king is dead, long live the king! Wilson Audio's introductory tag-line to its new Sasha (technically, Sasha W/P) loudspeaker could be viewed as supreme arrogance or high hubris. One problem though, it happens to be true.

The Sasha is the replacement to the Wilson WATT/Puppy, a product that — above all others — has earned the right to be called 'king' among audiophile loudspeakers. First sold back in 1986, the Wilson Audio Tiny Tot (soon joined by its woofin' Puppy partner) went on to become the most successful \$10,000+ loudspeaker in history, and became a fixed point in the audiophile firmament. It set the tone for other Wilson designs, bigger and smaller. Recently though, the direction-finder in Wilson Audio sound came from elsewhere in the range. Each successive change made the W/P sound more integrated and lively and brought it more in line with the sort of sound made by other Wilsons, but the bright star of the Wilson line cannot spend its life playing catch-up to products like the Sophia or the MAXX.

In the Sasha, what could have been just another iteration of the WATT/Puppy concept (it would have been 'System 9') has undergone a root-and-

branch reworking. The human brain's ability to form associations and patterns is a remarkable thing, but it can be prone to failure (optical illusions are a perfect example of this). A quick glance at the Sasha in isolation will see similarities between this new speaker and the WATT/Puppy products it replaces and we will naturally make associations between the two that simply aren't there. Because there are so many changes between the Sasha and what went before, it's almost easier to point out the bits that aren't changed rather than list what's been swapped: the cones in the bass drivers, the range of 'Wilsongloss' finishes (our ones were finished in an almost black midnight blue) and — I think — the rear port and spikes are held over from what went before. Pretty much everything else is a new speaker.

A fair chunk of Sasha — the 25.4mm inverted titanium-foil dome tweeter and the proprietary 178mm paper/carbon-fibre composite cone

midrange driver, for example — are a direct 'lift' from Wilson's MAXX 3. These new units were chosen after a moment of audio epiphany at the Musikverein Concert Hall in Vienna by David Wilson. Other parts are total newcomers, such as the cabinet. Not only is it made from a new kind of material, developed out of the X (cellulose/phenolic composite) and M (wood fibres in phenolic resin) materials found in previous Wilson speakers. The new cabinet material doesn't have a capital letter name, but features as yet undefined natural fibres set in a phenolic resin laminate. This is suggested to make for a low coloration cabinet material with a particularly good midrange.

The new material has allowed Wilson to completely redesign the chassis, making for increased volume in both cabinets and a head unit with more nonparallel lines. Inside, there's a new bracing design. All of which helps aid rigidity and minimise resonance and standing waves. Those



## EQUIPMENT REVIEW - Wilson Audio Specialties Sasha W/P

surviving woofer cones are backed up by a new motor and magnet arrangement, which basically means more magnet for the same cone mass.

The crossover has been moved from inside the mid/treble head unit to a rear panel at the top of the bass unit. The panel allows components in the crossover to be altered to suit specific rooms, and also gives the midrange driver more legroom,

and supposedly more midrange clarity. One legacy point that is missing from both the Sasha is the grab-handle at the back of the WATT. This marks the end of the WATT's vestigial standalone monitor role; the new head unit is adjustable to better integrate the speaker with the room and the listening position, but it's got nothing to do with being used as a solo speaker.

Because your attention is focused elsewhere, like on the dynamic range, the solidity, or the sheer exuberance of the sound, that reference-class imaging passes almost unnoticed.



On paper at least, the end result of all this change is just 2Hz more in the bass. The relatively high sensitivity (91dB/W/m) is tempered somewhat by the impedance plot. Although nominally a four-ohm load, the Sasha is claimed to dip to 1.8ohm minimum impedance at 92Hz. In practice, this means the Sasha is not a friend of the Single-Ended Triode brigade and does place a limit on the choice of amplifiers used with this speaker, but the sort of amplifier one would normally consider a comfy partner for a speaker costing nigh on £28,000 will have no problems handling the Sasha. And when used with a pair of Krell Evolution 900 monoblocs, which deliver upwards of 900W per channel, you have nothing to worry about, except losing hearing. The rest of the system in this case was a four-box Krell Evolution Two twin mono preamp and a Metronome Kallista CD transport and C2A digital converter. Heady, bank account draining stuff indeed. It was playing into a room about 18x24x9, with the main listening position about 10' into the room. The speakers were about four feet from the rear wall, but only two-and-a-half feet from the sides and had about a 20° toe-in.

The Evo 900s demonstrated one of the joys of the Sasha; no limits imposed. With nigh on a Krellowatt being pushed up its speaker terminals, the Sasha has the throat needed to roar, but does so with subtlety as well as gusto. you can play at the sort of levels that cause rimshots and massed choirs to leave your hearing relaxing between notes and yet allows you to hear the springs beneath the snare resonating and lets you pick out individual singers in the mix. Normally, this is an either/or situation; either you get the full-blast sound, or you get the subtlety.

Here, you get both.

It's also a bigger speakers squeezed into a Sasha-sized box. Those who know their way around the Wilson portfolio are in for a surprise here. "Hey, where did you hide the MAXX'es?" will likely be the stock question. It's got most of the bass dynamics, bass depth, almost physical solidity and power of the MAXX models — as well as its utterly transparent midrange and soaring top end — but in a smaller package. You get more from the MAXX, but the gap has closed considerably with the launch of the Sasha. In fairness, much of this is based on exposure to the MAXX 2; I'm

### SPECS & PRICING

#### The Wilson Audio Sasha loudspeaker

**Type:** Three-way, two cabinet floorstanding loudspeaker

**Drivers:** 2.54mm titanium-foil inverted dome tweeter; 178mm paper/carbon-fibre composite cone midrange 2x 203mm poly-coated woofers

**Frequency Response:** 20Hz-22kHz +3dB

**Sensitivity:** 91 dB/w/m at 1kHz

**Impedance:** 4 ohms nominal, 1.8 ohms minimum at 92 Hz

**Minimum Amplifier Power:** 20 watts per channel

**Dimensions (WxHxD):** 356 x 1118 x 539mm

**System Weight:** 89.36 kg

**Price:** \$26,900/pr.

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## EQUIPMENT REVIEW - Wilson Audio Specialties Sasha W/P

pretty far from instrument rated on the new model.

Recently, I highlighted a step-change in audio, that I called the difference between ‘Hummers’ (big and bling) and ‘Humblers’ (forget the speakers, the music impresses first and foremost). The Sasha is very much on the Humbler side of the equation. It scales beautifully — swap a Big Band sound for a fey girl-with-guitar and the soundstage accommodates accordingly. Now move from breathy songstress to full-on dub reggae then to large-scale orchestral work, a jazz trio, live rock at full tilt and all points in between and the Sasha adapts beautifully. You don’t get eight-foot tall singers or an inch-high second violin... everything played has an appropriate sense of scale. Wilson has been moving the W/P design further from the enlarged sound of the footie score models (WATT 3/Puppy 2, Caledonians vs Queen of the South...match abandoned due to catastrophic pie failure) for some time.

A lot of this comes from the work done (both in the cabinet and the use of that MAXX driver) to improve the midrange. The W/P always had a good, clean and extended treble (it’s got better, cleaner and possibly more extended in the Sasha, but the improvement is more like a developmental progression than a jump) and has been well-respected for its big, powerful bass (once again, a developmental improvement), but the midrange was always a big part of the Wilson character. And the move to the Sasha brings the Wilson midrange in line with the MAXX above and the Sophia below. It gives the Sasha something of an electrostatic-like transparency to the midrange.

That beacon for audiophiles — imaging — is excellent, but curiously it will take you some time to notice this. Because your attention is focused elsewhere, like on the dynamic range, the solidity, or even the sheer exuberance of the sound, that reference-class imaging passes almost unnoticed. Part of this is because the overall performance is so very, very natural — the ‘holographic’ cliché doesn’t apply here, because the sounds are too controlled and solid for that.

We’ve supposedly been ticking off all the boxes for superlative loudspeakers for some years now, and the Wilson WATT/Puppy ticked them all a long time ago. What’s left on offer and what makes this one so much better than what went before? Along with the bigger speaker in a smaller box and the more open than ever midrange, the Sasha does something very, very few loudspeakers can do, irrespective of price. It manages to reconcile the world of the audiophile with that of real people. Audiophiles choose — and design — products in adherence to Harry Pearson’s benchmark of the sound of live, unamplified music occurring in real space. However, there are people (a lot of people) who do not possess a single piece of live, unamplified music and typically find systems designed for audiophiles to sound ‘boring’. Products — especially loudspeakers — that reconcile the two are extremely rare. The Sasha is one of the very few exceptions.

The reconciliation process is not perfect — play a compressed or badly-mastered recording and the Sasha keeps it distinctly in the sow’s ear region. But what it does well is exactly what the predecessor was praised for, only more so. The studio sound that Wilson tried for with the WATT/Puppy is here in full effect. Play the Sashas and you are in the control room, listening to the sort of sound the producer and engineer always wanted you to hear.

Although the Sasha changes are not necessarily driven by increased competition, the days of Wilson Audio having this market more or less to itself are long gone. And the new speaker gives us a perfect opportunity to remap the high-end landscape, to see just where products like the Sasha fit in. Of course, there’s no easy way to compare large, top-grade loudspeakers. This is because it’s almost impossible to compare them side-by-side; it can take as much as five days just to install, set-up, fine-tune, bed in and repackage a pair of speakers like these, and often the best place in the room for one pair of speakers is the same place for another. But, we can draw parallels and this reasserts Wilson’s place at the acme of speaker design at this price. It was never really

*You are here* →



## EQUIPMENT REVIEW - Wilson Audio Specialties Sasha W/P

in doubt.

Broadly speaking, there are four equally valid 'sounds' at this price level; there's 'music as art', 'music as magic', 'music as science project' and 'music free from influence' loudspeakers. Wilson has always been firmly in the last camp, and with the Sasha it digs its heels in still further. The Sasha is not a magical window on the composer's soul, a talisman to make all music wonderful or a product that lays music bare. It does all these things, but it's principally the studio monitor we all wish every studio used, because they'd make better music in the process. It will expose weaknesses in the recording, in the performance and in the audio system with stark clarity, but curiously these don't detract from the enjoyment, any more than the surface noise on a good LP played through a top turntable stops you from enjoying the music.

Sasha highlights a difficult admission for reviewers. We are apt to look at incremental changes in designs as dirty great changes in sound. It comes from many of us getting our degree in Reviewology from the Centre for the Easily Impressed. The problem arises when we actually happen across a genuine large-scale change in sound and we end up like the (middle-aged, beer gutted) boy who cried wolf. And Sasha is a dirty great big change in the right direction for the W/P system. In fairness, previous W/P designs did offer distinct improvements over earlier models; however some — like System 6 — were bigger and more significant than others. Sasha is the biggest change of them all.

So, should you turn in your WATT/Puppy system for the Sasha? Not necessarily; the W/P remains one of the few legends in high-end and that reputation is still richly deserved. Just one

thing though; if you aren't planning to upgrade soon, you might want to steer clear of hearing the Sasha. Even the briefest exposure may make you change your mind about upgrading.

*Le Roi est mort, vive le Roi!* +



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# Sony SS-AR1

Robert E. Greene

**A**s the co-inventor of CD and SACD, Sony stands astride the audio world like a colossus. Thus it is a bit surprising that Sony's presence in the upper echelons of speaker design has been rather limited. There have been occasional Sony speakers of distinction, the ES SS-M9ED from not too long ago, for example. The AR1 is the latest of Sony's serious attempts, and it is distinguished from the ES SS-M9ED in that it is a design straight from Sony of Japan, not an external design built by Sony.

A corporation like Sony has resources that no small company could muster, and Yoshiyuki Kaku, the designer of the AR1, was given an extraordinary opportunity to spend many years studying the most refined aspects of perfecting speaker sound. The AR1 is the flagship of a line that will bring the benefits of all this research to lower -priced speakers as well. A medium-sized, three-way floorstander with two 8" woofers, a 5" midrange, and a 1" dome tweeter, it looks fairly conventional, though the elegance of the craftsmanship is immediately apparent as is the distinctive shape of the enclosure. But there is much about the AR1 that is anything but business-as-usual in speaker design. And the sonic results are truly extraordinary.

If a speaker can be a work of art, then a work

of art the AR1 is indeed, in its extreme attention to subtleties. Aspects of its sound that, at least in Sony's description and to my ears in reality, seem to be altogether outside the realm of more ordinary designs have been carefully optimized. Some of these aspects seem more akin to the making of musical instruments than the manufacturing of speakers, notably the use of specifically chosen natural woods, maple for the front, birch for the sides and back, with the maple harvested from the forests of Hokkaido in November only, that being the month in which the wood has maximum hardness, and the birch being imported from Finland. One thinks of Stradivari, according to legend, going into the forests and listening to the sound of the trees as they were felled to select those he would dry and age to use in his violins.





## EQUIPMENT REVIEW - Sony SS-AR1

As expected from a company with the effectively unlimited technical resources of Sony, the design is very sophisticated technically, but some of the technical choices are unusual. For example, the speaker uses what are called multi-slope crossovers, with second-order high and low pass on the midrange but third-order low pass on the woofer and third-order high pass on the tweeter. (Crossover points are 400Hz and 4kHz.) The perceived balance of the speaker is slightly idiosyncratic, whether for this reason or otherwise (more on this later). But other aspects of the design go far beyond matters of ordinary measurements or technical descriptions. Art the AR1 is indeed.

Before going further into the details of the speaker in physical terms, let me say something about the sound itself upon first impression. U.S. business manager Michael McCole and Sony product manager Motoyuki Sugiura were so kind as to visit and help to set up the speaker optimally. But the speakers themselves arrived a day earlier, and I could not resist just plopping them down and having a preliminary listen. This was in a position chosen for momentary convenience, with other speakers still lying around, with a low-power amplifier that happened to be handy to drive it, and with no acoustic treatment installed. But even in this preliminary listen under less than optimal circumstances, the speakers showed extraordinary sonic qualities.

As it happened, the first thing I listened to was the BIS recording of Freddy Kempf playing Rachmaninoff's arrangement of Kreisler's "Liebesleid." This recording contains a great deal of the fine structure and complexity of piano sound. And the music runs repeatedly

over the keyboard from bottom to top. The AR1s revealed the fine structure superbly well, and to a surprising extent maintained the transparency of the sound all the way down to the bottom notes. The top end of the piano sounded a little different from what I was accustomed to, but the overall sense of piano sound, especially in the lower frequencies was excellent. There was none of what happens all too often when the upper mids and highs are clean and clear but, as the music descends in frequency, a certain kind of muddle arises. Here with the AR1s, when the music descended to the lower parts of the piano, the sense of hearing everything that was going on remained intact. And yet there was no sense of this precision being attained at the expense of the appropriate warmth and fullness, no idea at all of the lower-frequency clarity being purchased at the mini-monitor price of attenuating the lower frequencies. Indeed, the speakers effortlessly covered the lower frequency range with full strength.

Optimization of placement, removal of the other speakers that had been still standing around, putting in a high-powered amplifier (I used the remarkable Sanders Magtech, a reference amplifier if ever was one), and the installation of some foam padding over some nearby small windows naturally improved things in various directions. Even from that quick start setup, it had been clear that the AR1s were an unusual accomplishment in speaker design. But with everything optimized, the sound took on true excellence. The coherence of the sound and its top-to-bottom transparency even on the most complex orchestral material were of a most extraordinary kind. And moreover, the sound



had a kind of naturalness that is not easy to formalize.

Naturally, I tried to figure out why. That is, after all, part of the reviewing job. An undifferentiated "wow" may be enough to arouse interest. But a review should go further, if only to provide signposts on the listening path when you encounter the speakers yourself.

One aspect of the sound is easy to describe. These speakers, though not enormous, are truly full range. With the nominal -3dB lower limit being 28Hz and the upper limit a surprising 60kHz, nothing is missing. Perhaps someone wishing

to hear the very bottom of the pipe organ at enormous volume (16Hz for the lowest notes) in very large rooms might consider a subwoofer, but for any other music at rational volumes, the AR1s have the bass completely there in extension and unrestrained dynamically.

Moreover, the speakers interact with the room very well indeed, with none of the floor cancellation problems almost endemic to floorstanders. Any reasonable attention to Allison Effect matters will result in a lower midrange (and upper bass) of surprising smoothness, much superior to what commonly occurs. Placement

## EQUIPMENT REVIEW - Sony SS-AR1

for good smoothness in this critical and often problematical region was remarkably easy and effective. Presumably this is related to the double woofers and their no doubt carefully chosen position relative to the floor. But in any case, in my room, this is a speaker that attains on its own essentially the kind of smoothness in the boundary-influenced region (below 300 Hz) that is usually obtainable only by DSP manipulation. As noted, and in good part consequently, the lower ranges of the piano sound more like a real piano than with almost any other speaker.

On the best listening axis, the sound is the proverbial silky smooth with transitions between drivers seamless. Moreover, the careful attention to the driver's material nature has resulted in a speaker with no apparent coloration from materials of the drivers. The drivers, made by Scanspeak to Sony's design, are stiff aluminum woofers, slightly more flexible treated-paper midrange, and fabric-dome tweeter. (The midrange is sliced and re-glued in a pattern designed to reduce resonances.) The idea is that as the frequencies go up, the driver character changes in a way to give consistent sound over the whole range. This somewhat unusual approach actually works. The character of the sound changes really not at all over the frequency range in terms of materials coloration—or in this case the absence of it. This may run contrary to the everything-should-be-rigid viewpoint. But it works as intended, and the kind of hardness of the sound that can and almost always does arise from hyper-rigid drivers (those often-painful ceramics) is most gratifyingly not present.

And yet there is no loss of perceived or actual resolution. Everything is most satisfactorily

unraveled in even the extremely complex music. Richard Strauss would have loved this—the listener can hear everything he was up to with his high-density orchestrations. Micro-detail is revealed in a fashion equal to electrostatics, but with a power, when power is called for, that no electrostatic could dream of. Strauss' orchestrations were made clear and transparent on the Telarc *Don Juan* (Vienna Philharmonic). And John Eargle's masterpiece recording of the Dvorak *New World* for Delos (New Jersey Symphony) was exquisitely clear and resolved yet still full and powerful. The third movement, especially its remarkable opening, Dvorak's homage to Beethoven's Ninth in his own ninth, was positively hypnotic—it was hard to stop playing it over and over just to hear everything that was going on going on as it should.

But perhaps most striking of all the orchestral music I tried was Kubelik's recording with the Danish Radio Symphony of Nielsen's Fifth Symphony [EMI], recorded live in Copenhagen's Radihuset in 1983. When I was living in Copenhagen in the 1980s and 1990s I used to go to the Danish Radio Symphony concerts in Radihuset very frequently. Listening to this recording on the AR1s was an uncanny experience. To borrow Telarc's phrase, I really felt I was listening through “a window in time,” as if the intervening years had vanished and I were back there then listening once more to that very orchestra in that exact hall, as I used to do so often. This was a remarkable experience indeed, I assure you, and one that I have seldom had with such intensity.

The AR1s indeed respond with ease not only to complexity but also to loudness. When the

music gets loud, they do not harden, do not shift in character, do not sound stressed. They just get loud. And they will get really loud. One of the demo discs that the Sony people played was part of Joe Morello's *Morello Standard Time*. The speakers effortlessly produced the loud live levels of a drum kit at close range. And they seemed completely at ease doing this, as was the amplifier of course. (The Saunders has huge power and sounds unforced and relaxed at any output level likely to arise in domestic listening.) Of course any speaker can be over-driven, but in a room of anything like domestic size, dynamic limits will not be an issue.

And low-level performance is also exemplary. The music does not lose liveliness as it gets softer; it just gets softer. The AR1s are exquisite in *pianissimo*, with the refined precision and continued vitality of real music at low levels.

At this point, the AR1s must be beginning to sound like a perfect speaker. They are indeed extraordinary, but, as is inevitably the case, they have certain characteristics—all speakers have some specific radiation pattern or another, for example. And one of these characteristics perhaps approaches a kind of artistic license, namely the exact choice of balance here.

On the maximally flat axis, the AR1s sound, as noted very smooth and integrated—but not exactly flat. There is a dip in the 3–5kHz range and a return to level and on the axis with the most high, to somewhat above level in the top. The high treble is as usual somewhat directional so getting a bit off the tweeter axis will pull it down some, closer to flat. Indeed, the maximally flat axis seems to be somewhat below the tweeter height at normal listening distances. However, on other

axes, the dip and return to level (and then some), becomes quite large, and the overall sonic effect of all this is an airy but somewhat subdued sound as far as “presence” is concerned. In a sense, the speaker has something like the traditional moving-coil cartridge balance.

The loss of energy in the 3-5kHz region also sets off a perceived midrange emphasis, some prominence around 1–2kHz. This emphasis is further set off by some sense of loss of energy in the 600–800Hz region, at least in my room and at my listening position. None of this may seem in practice a really serious distraction, but the midrange prominence and the presence-range dip are definitely audible. On some material, this may all add up to a kind of flattery. But on

### SPECS & PRICING

**Type:** Four-driver, three-way floorstanding speaker, bass-reflex loaded  
**Driver complement (per speaker):** Two 200mm aluminum woofers, one 130mm treated paper midrange, one 25mm fabric-dome tweeter  
**Frequency response:** 28Hz–60kHz  
**Sensitivity:** 88dB  
**Impedance:** 4 ohms  
**Dimensions:** 12½" x 42½" x 19½"  
**Weight:** 125 lbs. each  
**Price:** \$27,000/pr.

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## EQUIPMENT REVIEW - Sony SS-AR1



orchestral music in particular, there is a certain character to the speaker that is not really totally neutral. You need to listen for yourself to find out whether this appeals to you.

Being as I am, I experimented with EQing the speaker to be flatter on the preferred axis. This sounded more accurate to me and somewhat more musically gratifying, though the change in strictly musical terms was not huge. But there was a change in the tonal character of the top notes of violin and piano, for example and for that matter in the lower notes of the violin as well, though that was subtler. And the overall tonal nature of orchestral music shifted. However, few people are likely to want to EQ an expensive speaker on a permanent basis, so you will need to evaluate the balance of the speaker on its merits as it is. Your call.

It does occur to me that the dips noted might also be in a sense responsible for the remarkable coherence of the speaker. (External EQ is not the same as crossover design, and EQ'd, the speakers retained their coherence). The ear is much touchier about peaks than dips and perhaps it is the case that say the dip at 3–5kHz is exactly what makes the transition from mid to tweeter so convincingly inaudible. Crossover design is always about compromise, and I would not want to say the choices here are anything but good ones. Indeed, the mid-to-tweeter transition is in a way reminiscent of the BBC approach of long-standing, and in particular of the Spendor BC-1, one of the all-time great speakers. The judicious dip as a mechanism of driver integration has a grand history!

The relaxation of energy in the 3–5kHz range also acts naturally as forgiving of a lot of over-

recorded material. And I do not want to exaggerate at all the extent of this. Indeed, one has to keep in mind that audiophiles who form standards by listening to contemporary speakers are in fact likely to have a quite wrong idea about how much energy a speaker ought to have between 2 and 6kHz. A great many speakers nowadays are in fact a dB or two or even more elevated in response in this region, presumably in the interest of sounding “detailed” or “right there” or “real” whatever buzzword answers, never minding that real music in fact sounds rather the opposite of this kind of projection. The AR1s are blessed exceptions to this unfortunate trend.

The AR1s sound beautiful remarkably often, independently of exact balance questions. This beauty arises from their remarkable freedom from grain and perceived distortion. While acoustically generated music itself typically has a bit of grain structure, few speakers refrain from adding some of their own. The AR1s are almost uncanny in their freedom from this. Music sounds truly pure and remarkably beautiful. The Grieg Sonatas recording on the Bridge label (still available!) with Gerald Tarack, violin, David Hancock, piano, and engineered by Hancock himself (talk about the compleat recording artist), was positively exquisite in its purity and beauty of sound. And again truly hypnotic: Writing about it, I suddenly felt compelled to (and did) pause to listen to the second Sonata once more. For me, this is the sort of thing that truly justifies serious audio.

I also gave in to the temptation to play along with the recording. The match with real violin sound was surprisingly good, considering that the recording was in a hall while I was playing in a small room. There were some small shifts

in timbre, also observable in non-comparative listening, both in the character of the high notes and also in the bottom octave of the instrument—quite subtle in the latter case. Of course there were also differences between the violins, and I had to factor in that the sound to the player is not the sound to the listener, but I am used to those considerations. The essential gestalt of the violin was definitely well preserved, including the characteristic variations of timbre from note to note.

There is always a circularity in this sort of evaluation, in that recordings are used to judge speakers while speakers were used to judge recordings when the recordings were made and afterwards, too. Who really knows what any given recording sounds like by nature, exactly? (And never mind that many of the audiophile classic “Golden Age” recordings are demonstrably quite wrong). But overall, the AR1s made something like concert music out of a surprising number of recordings that I had some reasonable reasons to believe ought to sound like that. It is hard to ask for a lot more than that! But the speaker is somewhat intolerant of the older recordings with their rising top-end microphones.

All speakers have the characteristics of their general approach to radiating sound into the room. Dipoles, omnis, line sources (whether dipole or forward-radiating), forward-radiating speakers with controlled radiation pattern (whether horn-loaded or otherwise controlled), and wide-dispersion point-source forward radiators all sound quite different from each other no matter how their frequency response is set by design or adjusted after the fact. This is simply a fact of audio life.



## EQUIPMENT REVIEW - Sony SS-AR1

The AR1s belong to the moderately-wide-dispersion, forward-radiating, point-source family. This means on the plus side that they have the possibility, and in this instance the reality, of sounding remarkably like actual instruments and voices, with no directional artifacts as one might think of it. On the other hand, it also means that they are by nature quite sensitive to the room around them and in particular to the nature and proximity of the surfaces from which early reflections happen. Installation of foam pads, for example, altered the sound quite a lot.

The speakers have minimized diffraction and they vanish very well as apparent sources, and do the soundstage trick to a fare-thee-well. There is little to say about them in this regard because they simply do it right. There is no artificial widening or generated depth from oddball diffraction or reflections from the speaker structure. Since the nature of diffraction is well understood, it is an ongoing mystery how some nominally high-end speakers have straight hard-squared edges running around near the drivers and things like that, guaranteed to generate diffraction effects. Well, none of that here: The AR1s carefully curved shape is clearly designed to deal with diffraction problems and so it does, very effectively. (Incidentally, grilles off please! The grilles make the response bumpy in the lower treble—not disagreeable but not doing justice to the speakers' potential.)

Audiophiles are constantly reiterating that all they care about is the sound. But recent reactions to various speaker design have suggested to me that the audio public can be easily impressed by claims of technological breakthroughs, perhaps too easily impressed. To my ears, many of the

finest speakers available, in fact, appear on the surface rather not to be such “breakthroughs” at all, but to be refinements towards perfection of conventional ideas. Behind the scenes, inside where the sound really originates, beyond the visual impression, the sonic effects of these refinements can add up to really extraordinary sound quality, sound quality that escapes most of the supposed techno-breakthrough speakers.

The truth is that the conventional idea of how a three-way speaker works is a good one, a really good one if you can get it all to work exactly right. People would be making a serious mistake to dismiss the AR1s because they look like an ordinary speaker as viewed from the outside. If one does what audiophiles always claim they do, listen rather than look, the amazing qualities of the AR1s will be apparent. If you are happy with the slightly idiosyncratic choice of balance, this could well be your speaker of a lifetime. It is truly extraordinary, and it most surely shows that when it turns a hand to it, Sony can do speaker design at a level that most companies only dream of.

I tend to write dry, hard-edged reviews, and perhaps this one came across as no exception. So let me conclude by saying that for me there were many moments of absolute musical magic with the Sony AR1s, far more than with most speakers. One could be truly transported. There were indeed moments when it seemed that I was giving up less of the concert experience than with almost any other speaker. One can hardly ask for more than that. **tas**



fat lady

*“It's not over 'til the fat lady sings”*

*...“The Fat ladies reproduce instruments and voices with a timbre that is uncannily like the real thing and with an overall balance and lack of coloration that is well-nigh perfect.. they come most highly and affectionately recommended.” Jonathan Valin, The Absolute Sound, January 2011*



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# Morel Fat Lady

## Are We There, Yet?

Jonathan Valin

**I**s it *really* over when Morel's brand-new \$32k flagship speakers, The Fat Ladies, sing?

That's the bold promise of this wittily named arabesque of a three-way, four-driver floorstander from Israel and Great Britain (by way of British speaker designer Russell Kauffman). But before I even start to answer the Big Question I have to point out that Morel is certainly pulling a fast one in another regard: The Fat Lady ain't fat. In fact, she's a surprisingly demure (13" x 50" x 17"), strikingly attractive, sensuously curvaceous bit of modern sculpture, molded out of fiberglass, epoxy resin, and carbon fiber, without a single straight line in her body.

Morel says she was modeled to look like a musical instrument—and with her modernesque, slimmed-down-doublebass-like profile, she does. Like a musical instrument, she also has no internal damping. Instead, her high-tech chassis was specifically designed to “sing along” with the drivers in a “controlled” fashion—and, thanks to the superior damping properties of the

materials it's made of, to stop singing as soon as the drivers stop. The drivers, in turn, were specifically designed, developed, and fine-tuned to the cabinet.

Like Focal, Morel has a leg up on most other speaker-manufacturers in that it not only builds speakers but also builds and markets very high-tech drivers, and The Fat Lady uses bespoke ones: Two 9" cabon-fiber/Rohacell composite cones for the bass (with integral one-piece domes and double-magnet hybrid neodymium/ferrite motors, 3" long-throw aluminum voice coils mounted externally, copper-insulated center pole pieces, and diecast aluminum baskets); a 6" cabon-fiber/Rohacell composite cone for the midrange (with integral one-piece dome, hybrid neodymium/ferrite motor, 3" long-throw underhung aluminum voice coil mounted externally, copper-insulated center pole pieces, and a diecast aluminum basket); and 1.1" hand-coated soft dome for the



## EQUIPMENT REVIEW - Morel Fat Lady

treble (with pancake Neodymium magnet motor and underhung aluminum voice coil). Frequency response is claimed to go from 20Hz to 22kHz and to measure an impressive +/-1.5dB from 40Hz to 18kHz (I will validate this claim in a few paragraphs). I assume the speaker's distortion numbers must be commensurately impressive, though none are specified. Sensitivity is rated at 88dB. With a nominal 4-ohm speaker like The Fat Lady this usually means that sensitivity is actually 3dB lower than its rating. Not here, however. If anything The Fat Lady seems a bit higher in sensitivity than its specification, as I could drive it (without distortion) to very loud levels with a lot less gain than I'm used to from Magico M5s. Like the Nola Baby Grands, these speakers will rock the house with considerable ease (indeed, Morel claims that The Fat Lady can handle peak power of 1000W, which would result in SPLs that would drive me not just out of the room but out of the neighborhood).

Without a doubt, the Morel drivers, both in The Fat Ladies and also those modified for use in other ultra-high-end speakers, are exceptional. In talking to Morel's Russell Kauffman—who is an extremely interesting, intelligent, experienced, and quite obviously gifted speaker-designer (and also a just plain nice man)—I learned a good deal about the Morel drivers and the way he is using them. For one thing, Morel's midrange and tweeter drivers are not designed to behave in an entirely pistonic fashion; instead, they have been deliberately engineered to allow for a certain amount of controlled flexibility at various points in their diaphragms, so that their “break-up” modes, though potentially more audible in the passband, will in actuality be “self-cancelling.”

What this means—if I have it right—is that when one part of the driver's diaphragm “breaks up” by going out of phase and linearity at a certain frequency another part of the diaphragm simultaneously counteracts this phase/linearity shift by “breaking up” in the opposite phase-direction and to the same degree of non-linearity at the same frequency (or frequencies); thus, the sound of break-up is said to be instantaneously cancelled out.

(To understand why “break-up modes” are important, you might want to take a look at my Magico Mini II review in Issue 179 and my Magico M5 review in Issue 196. In a nutshell, when a midrange driver, for example, is crossed over to a tweeter, the midrange cone doesn't stop playing immediately, no matter how steep the crossover slope. In fact, it continues to play—albeit at a much reduced level—well out of its passband into the treble frequencies where it starts to behave non-pistonically or non-linearly and distorts. The very low-level distortion of this midrange's “break-up”—which is what this non-linear out-of-passband behavior is called—gets added to the sound of the tweeter it is crossing over to, subtly roughening up the sound in the treble. Breakup modes may appear to be esoteric, but I'm here to tell you that the difference between the sound of speakers in which the break-up modes of the drivers have been optimized and the sound of speakers in which they haven't is quite audible.)

Drivers with self-cancelling break-up modes are nothing new. (I am told that Focal and B&W, at least in their midrange drivers, do the same thing.) The expertise comes in limiting the “bad” behavior of the diaphragm. In the case of Morel tweeters, for instance, a compound is applied

at the factory directly onto the fabric dome that behaves in the same way as a shock absorber does on a car's suspension. With the midrange (and woofer) driver, the cone's tri-laminate construction of carbon fiber skins sandwiching a thin layer of Rohacell does this same damping trick. Thus the amplitude of the self-cancelling break-up modes is more artfully controlled.

This is Morel's contention at least—and though it goes a bit counter to that of certain other speaker manufacturers—I can honestly say that in the listening you do not hear The Fat Lady's tweeter being very slightly roughed up by the midrange driver as you did with, say, the original Magico Mini (and to a *much* lesser degree with that of the Mini II). Indeed, The Fat Lady has virtually the same seemingly seamless blend between midrange and tweeter as the Magico M5's (although The Fat Ladies' treble response is not as extended nor as near-perfectly flat as that of the M5).

You may wonder, as I did, why Kauffman removed all the stuffing from The Fat Lady's curvaceous enclosure. He has what I consider to be a very interesting answer to that question—which makes a curious but undeniable kind of common sense and is, in the case of The Fat Ladies, substantiated by listening. In Russell's view, the damping material inside a speaker cabinet doesn't just “damp” the energy of the backwave, it muffles and distorts it, stores it, and then releases some of this muffled, distorted, and stored energy back out through the enclosure and the diaphragm of the driver after a delay in time, messing up the clarity and speed of the signal.

To further explain what he meant, Russell used what I thought was a brilliant analogy. “Imagine,”

said he as we sat across a restaurant table from each other, “that you and I were simultaneously counting down the numbers from five to one. Together our voices would make a certain timbre at a certain intensity that would be different than just the sound of one of our voices; nonetheless, our voices would sound clear and what we were saying would be fully intelligible. Now imagine

### SPECS & PRICING

**Type:** Three-way, four-driver, floorstanding, ported dynamic loudspeaker

**Drivers:** Two 9" carbon-fiber/Rohacell sandwich woofers; one 6" carbon-fiber/Rohacell sandwich midrange; one 1.1" soft dome tweeter

**Frequency response:** 20Hz-22kHz (40Hz-18kHz +/- 1.5dB)

**Crossovers:** 200Hz/2.2kHz

**Nominal impedance:** 4 ohms

**Nominal power handling:** 300W (1000W peak power)

**Dispersion:** Within 1.5dB at 18kHz (horizontal over 60°, vertical over 20°)

**Sensitivity:** 88dB (2.82V/1m)

**Dimensions:** 13.375" x 50" x 17.375"

**Weight:** 97 lbs., each

**Price:** \$32,000/pr.

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# EQUIPMENT REVIEW - Morel Fat Lady

that the sound of our two voices was being augmented by a third voice that was slightly delayed in time—the sound of both of our voices muffled by damping materials and reflecting off the bitumen-coated surfaces of a small chamber. Whereas the sound of our two voices in tandem would be clear, the sound of the 'three' voices (the two of us counting down simultaneously and that third 'voice' which combines ours but muffles the combination via batting and roughs it up a bit via bitumen and then feeds it back to us not instantly but gradually over time) would be considerably more smeared and less intelligible. While the sound of our two voices—which stands in for the sound of music being played directly through the driver and the sound of the undamped cabinet 'playing along' with the music—can be compensated for by treating driver and enclosure as an undamped system and designing for the additional energy that the system will be generating and releasing, the sound of a heavily damped enclosure—and the muffling, losses of intelligibility, energy-storage, and time-delays it will cause—is much more difficult to compensate for.”

I’m not endorsing Russell’s logic, as I’ve heard many traditionally damped enclosures that sounded quite wonderfully clear and realistic, but I’ve also heard a certain—well, I wouldn’t call it “muffling,” exactly, but, for lack of a better word, a kind of hesitance or resistance to the free flow of musical energy that seems to make some speakers sound as if it were taking a bit of extra effort and, perhaps, a little added time to get the musical energy out of the box and into the room (and also adding a smidgeon of graininess to the presentation in the process). This hesitance

or resistance can make the sound a bit “over-controlled” (or overdamped, when it comes down to it). It is a presentation that I do not hear with dipoles or Radialstrahlers (which, of course, have neither boxes nor damping) and hear less of with the smaller enclosures of two-ways. Like I said, I’m not endorsing Russell’s argument, I am merely noting that I have heard an effect like that which he is describing with some damped enclosures (without realizing that that was what I was hearing), and hear less of it with the Fat Lady’s box, although, as I will explain, The Fat Lady’s cabinet may have a subtle signature of its own.

That the Morel’s undamped box doesn’t seem to be adding resonance to the soundfield is, I confess, a surprising turn-of-events, given that the counter-argument to Kauffman’s—that an undamped box will ring like an undamped bell—makes just as much common sense. Nonetheless, physically, The Fat Lady does an excellent job of disappearing as a sound source. Though you can easily feel the enclosure transmitting sonic energy when the speaker plays just by putting a hand to its supple chassis, The Fat Lady never sounds aggressive, poorly focused, and confused, even at loud levels. Indeed, it is a model of clarity and resolution (save for the reproduction of certain very-low-level transient and imaging cues that I will come to). It also does an excellent job of sounding like one relatively seamless thing, thanks to a change that was made in its crossover.

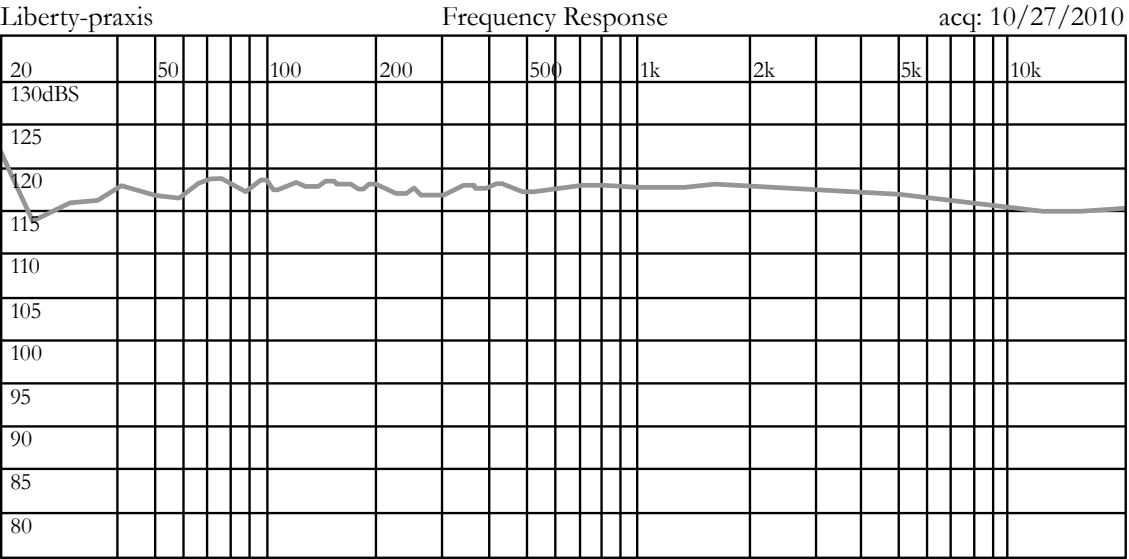
When I originally got The Fat Lady, she was still a work in progress—particularly in the bass. Kauffmann had been fiddling with the bass crossover for some months, trying to find a happy medium between too lean (as the speaker

sounded at last year’s CES) and too full, which is the way she sounded when she came to me. When I say “too full,” I don’t mean in the way that ported speakers sound “full” or “authoritative” or “powerful” due to a strong resonant peak somewhere in the 40–60Hz range (usually followed by a precipitous drop-off in the low bass). Though The Fat Lady is a ported design (I’ll give you a compass and five minutes to find that port, which is very cleverly concealed), its bass never sounded “peaky.” Instead, it sounded “plateaued,” as if the *entire* bass range from 150Hz down to close to a legitimate 20Hz was uniformly elevated some ten or twelve dB (which, in fact, it was—by measurement). Since she was also admirably flat above 150Hz and all the way out to the treble, listening to the first incarnation of The Fat Lady wasn’t unpleasant. The ample-for-

a-regiment bass was just a little distracting, like listening to a very well-behaved satellite coupled to a very well-behaved sub whose output had been turned up too much.

That plateau certainly provided great “foundation” for bass-range instruments. Bass drum, bottom-octave piano, Fender bass, kickdrum, doublebass, toms, bassoons, tubas had incredible power, impact, and clarity, enough to wow several of the rubes on my so-called listening panel into thinking that the fat lady had, indeed, sung. Which just goes to show you (or show some) that “big bass” that isn’t peaky or confused-sounding can be very attractive even to experienced listeners, and because The Fat Lady’s bass was flat as a mesa, albeit a mesa 10-12dB higher than the Big Valley below it, there was no peakiness or confusion (though there was

## Loudspeaker Frequency Response



# EQUIPMENT REVIEW - Morel Fat Lady

audible discontinuity).

In a way I am glad that I had the experience of hearing the elevated bass of the first iteration of The Fat Ladies—even though it was fundamentally wrong (and fundamentally unrealistic). Here's why: If that undamped box was going to ring or resonate, injecting four times as much bass energy into it as you were midrange and treble energy should've had that enclosure doing *grand jetés* across my listening room floor—and setting every node of my room to dancing along with it. The fact that none of this occurred indicates to me that The Fat Lady's shapely, undamped enclosure and its cleverly concealed port aren't screwing up the sound (as some predicted they would) in the obvious ways. It also indicates that, while that enclosure might have been singing along with the drivers, it also *stopped* singing pretty abruptly (though I will have a bone to pick—or, at least, a question to raise—in this regard).

Soon after I complained about the elevated bass, Russell returned to my home to install the “final” crossover (which is the *only* one installed in production models of The Fat Lady). It was immediately obvious that the superabundance of bass had been reduced and that, as a result, the speaker now sounded virtually seamless in octave-to-octave balance and exceptionally natural in timbre from top to bottom.

To demonstrate just how seamless and natural, let me show you two RTAs of The Ladies, taken in my listening room from near the listening seat. In the first plot (which is third-octave-smoothed), the X-axis is 5dB divisions, which is the scale I have generally used with RTAs. (I know, I know. According to some on this magazine, you can

hear a difference of 0.1dB, making the far-rougher granularity of my RTAs virtually meaningless. All I can tell you—and I can tell you this for an easily demonstrable fact—is that the general contours and relative flatness of the plots I take invariably reflect the way speakers sound *in my room*. I can also tell you that I only take these measurements after long listening—in this case, five months—and then primarily to reassure myself that I'm not making some kind of idiotic mistake.)

Folks, this is *exceptionally* smooth, near-Magico-M5-level frequency response. Indeed, outside of the slight 1–3dB droop in the topmost treble (which is audible as a very slight softening and sweetening and dampening of the overtones and energy of very-high-pitched instruments), it is exemplary.

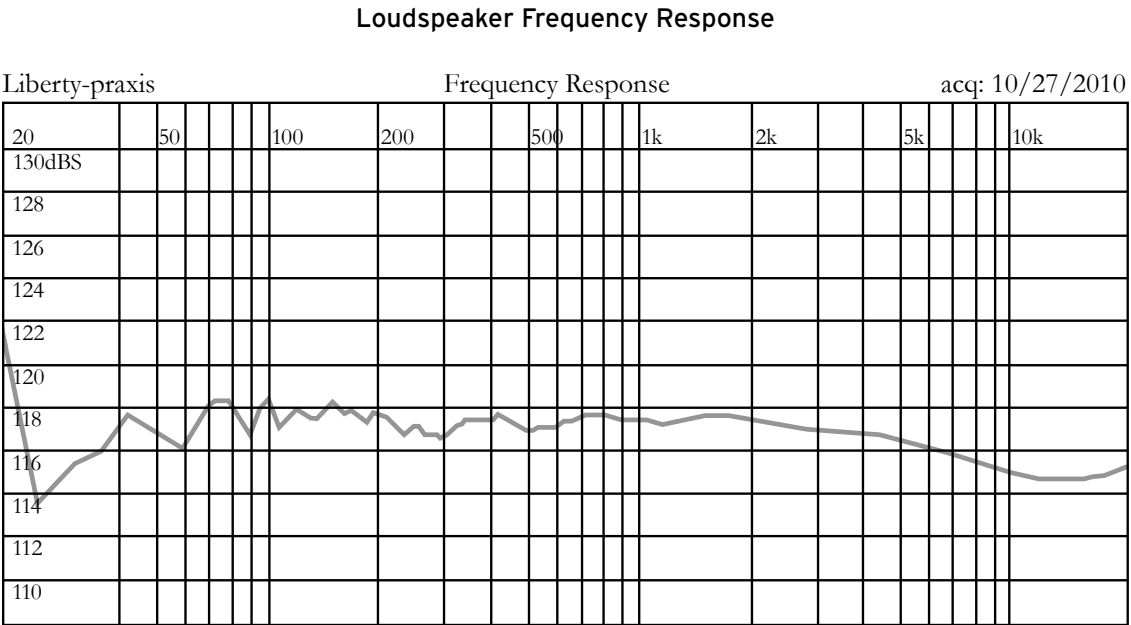
To show you just how exemplary I'm going to print a second RTA, in which the divisions of the X-axis are 2dB/octave.

I wouldn't have printed both of these RTAs if the speaker didn't sound as exceptionally smooth and natural in timbre as the plots indicate. Indeed, in tone color, (the top treble notwithstanding) this is one very lifelike transducer. From contrabassoon to piccolo, from a piano's C1 (32.7Hz) to its C8 (4.2kHz), The Fat Ladies make instruments sound as much like themselves as *any* speakers I've tested. (Which is perhaps the chief reason why my listening panel of primarily classical music lovers fell head-over-heels in love with them.)

Of course, accurate timbre is not the only key to lifelike sound. In fact, it is not even the first key (although for many of you it may be the most crucial). Before we hear the timbre of an instrument, we hear its starting transient, and that starting transient is absolutely critical

to distinguishing the kind of instrument that is playing (take away their starting transients and it's tough to distinguish a flute from a Stradivarius) and where it is located in space. Happily, The Fat Lady is very very good at this, too. While not quite as crisp, speedy, freed-up, and present as a few 'stats and two or three ultra-pricey dynamics I've reviewed (or am about to), it is certainly no slouch when it comes to transient response, reproducing percussion strikes such as the lightning bolts on *Sound the All-Clear* [Innova], or staccato piano notes such as those in Richard Rodney Bennett's “Five Studies for Piano” [Argo], or the music-box tinkle of the top-octave *pizzicatos* and the queasy chalkboard scrape of fingernails against lacquered wood in Attila Bozay's “Improvisations for Zither” [Hungaraton], or the lively plucked and strummed guitar and Autoharp strings in Ian and Sylvia's peculiarly cheery celebration of backwoods-Romeo-and-Juliet self-slaughter in “Katy Dear” [Vanguard] with considerable realism.

It is also very good at the duration and intensity of notes—not just their steady-state tone, where it excels, but also the amount of force with which they are sounded and the length with which they are sounded with that force. When I commented in my Audio Research Ref 40 review (see p. 168) on the natural authority with which this preamp reproduces powerful instruments, like the big brass choir on the right hand side of the stage in the third movement of Janacek's Sinfonietta [Denon], I was also commenting on The Fat Ladies, which don't just reproduce the gorgeous timbre of the brass but also the martial power of their initial utterance, their position on stage, and their lingering decay—both on *tenuto* and *staccato* notes. Ditto for the crashing bottom-octave



## EQUIPMENT REVIEW - Morel Fat Lady

piano *sostenutos* in Andre Bouccourechliev's cacophonous (although very well recorded) *Archipel IV* [Philips].

This may be getting monotonous, but The Ladies' staging is superior, as well. Thanks to that undamped enclosure's computer-optimized shape (with no parallel surfaces), the absolutely superb blend of the drivers that enclosure houses, and the low distortion of the drivers themselves, The Girlz disappear physically as sound sources and leave behind a stage that is wide and deep as a recording allows, with lifelike (though not razor-cut or particularly bloomy) image focus.

So does the fat lady sing when The Fat Ladies sing?

Well, yes and no. Here we have an extraordinarily well-engineered, very full-range transducer with exceptionally natural timbre top-to-bottom, an excellent disappearing act, first-class staging, very very good (though not great) transient response, outstanding bass clarity and resolution (with no port-peakiness in the midbass and deep-reaching bottom-octave response), and very very good to excellent marks in all the other standard audiophile categories. On top of this, The Fat Lady will play very loud without distortion and do a very good job at low listening levels. For an ultra-high-end flagship product (that also makes a striking design statement), it is also priced reasonably at \$32k. These are speakers that are endearingly easy to listen to, which is what you would expect from their list of virtues and which is why the Boyz on my listening panel finds these Girlz so easy to love.

If you're waiting for that other shoe to drop—and dropping other shoes is part of my job—it's not going to be dropped from a height; however,

here it comes. What The Fat Ladies don't do quite as well as, oh, the TAD CR-1s or the Magico Mini IIs (which, putting aside the Girlz's far better extension in the bass and smoother, albeit softer and less lively treble, is the speaker they most closely resemble sonically) is make musicians and instruments sound "there." Which is to say "present in the room with you."

Now, there are two ways of looking at this. One would be to say that the beryllium drivers in the TAD CR-1s are inherently brighter, faster, and more forward-sounding than the carbon-Rohacell sandwich drivers in the Fat Ladies, and this may be true. It is also true that all of the drivers in The Fat Ladies are made of the same materials, while those in the TAD CR-1 are not (the woofer is a tri-laminate), giving the Girlz an admirable "sameness" of sound from top to bottom. The trouble with this line of argument is that the TAD CR-1s are only as bright or forward as whatever LP or CD they are playing back is. In other words, the TADs are highly transparent to sources.

Take, for example, the song "Long, Lonesome Road" from Ian and Sylvia's great album *Four Strong Winds* on the original black-label Vanguard pressing. This is a classic, early-stereo, spaced-omni recording—very left/right, which is actually a plus in the case of this two-part-harmony duo. Typically, Ian pops up to the left of the left speaker, in the plane or a little in front of the plane of the speaker, with his guitar to his right and a little behind him, centered in or directly behind the speaker proper a little lower down than his voice. Sylvia is generally centered or a little to the right of the right speaker, in the plane or slightly in front of the plane of the speaker, with her Autoharp to the right of her, outside the right speaker, close

to the right wall, and elevated above the top of the speaker. On TAD CR-1s, both singers sound astonishingly present in the room, as if they weren't being projected by the speakers but were merely standing, singing, and playing slightly to the outside of them. It is a remarkable three-dimensional effect that—accurately, I think—reflects the simple miking technique.

With the TAD CR-1s (or the Magico Mini IIs) you get all of this holography. With The Fat Ladies you only get some of it. Oh, the timbres of the voices and the guitars are at least as lifelike through The Girlz as through these other great loudspeakers. But their images are a little more laid-back. Textural details have a little less sparkle and immediacy, as if the transient and microdynamic energy that like laser lights spark the illusion of presence have been turned down a notch. As a result, our sense of Ian and Sylvia as living breathing human beings is subtly reduced. Though not lacking in three-dimensionality, the duo sounds just a bit less freestanding in ambient air, a bit more "recorded there" rather than "really there."

I'm not sure why this is the case; I'm not even sure it is an unmitigated demerit. It may be that The Fat Ladies, with their ultra-flat, ultra-smooth presentation, are simply reproducing recordings without adding any of the spurious glamour or resonance of speakers that are less well-behaved in frequency response and cabinet construction.

On the other hand, it seems to me that it is at least possible that that marvelous undamped cabinet of Morel's, as successfully implemented as it is (and it is), may have a downside—that in singing along with the drivers, its "two-part harmony" may also be dissipating, covering up, or obscuring a small amount of the transient and

microdynamic energy that makes voices and instruments sound a bit more "there"—more free-standing, present, airy, and alive—through some of its pricier competition. It could also be that one of the very virtues of Morel's carbon-fiber/fiberglass/epoxy resin enclosure—that it *stops* "singing" very quickly because of its self-damping quality—may also be having something of the same effect, paradoxically draining off a little of the energy, duration, and life of the signal like an *overdamped* box (though, to be fair, the Girlz never sound dry or stinting in tone color).

As I said, these are only guesses, and the effect (and my complaint) is definitely minor. The Fat Ladies *never* sound boxy or unclear in any obvious way—just the opposite, in fact. Moreover, it could be argued, just as plausibly, that the damped boxes of the TAD and the Magico are adding stored and distorted energy to the signal, making certain instruments *seem* more forward and present than they should sound. (And, in the case of the Magico, I've recently heard evidence that its stacked-birch-and-aluminum boxes *are* storing a bit of energy and adding a bit of grain that Magico's new all-aluminum enclosures are not.) Still and all, if the energy that the TADs and Magicos are adding—via enclosures or drivers—is illusory, it is being added *mightily* selectively and, on the (great) recordings where it is "added," it is making instruments and vocalists sound more realistically "there in the room."

Whether they were completely right or mostly right and a little wrong in creating their high-tech undamped carbon-fiber enclosure, Morel and Mr. Kauffman have undoubtedly created a truly outstanding loudspeaker in The Fat Ladies—one that several on my listening panel like above all



## EQUIPMENT REVIEW - Morel Fat Lady

others I've yet had in my home. I know precisely why the Boyz feel this way: The Fat Ladies reproduce instruments and voices with a timbre that is uncannily like the real thing and with an overall balance and lack of coloration that is well-nigh perfect (the Ladies are neither bright nor dark nor both—anywhere); their slight droop in the top treble makes for no irritation or aggressiveness in the upper frequencies and does not rob the speaker of treble extension or resolution (or, at least, not much); their bottom end is as smooth, finely detailed, and deep-reaching as that of any ported speaker I've heard, without any of the peakiness that adds spurious “slam” to ported bass; their soundstaging is excellent; and they are always a pleasure to listen to.

While I'm not sure that they signal the end of the ball game when it comes to high-end transducers, they are nonetheless an impressive and innovative debut from a company not previously known for building reference-level loudspeakers and a superb and relatively economical choice for well-heeled listeners who value the sound of the real thing above all else. From me and the Boyz, they come most highly and affectionately recommended. **tas**



# TAD CR-1

## A Compact Reference, Indeed

Neil Gader

One of hallmarks of greatness is the ease with which a subject completes a daunting task. For the TAD CR-1 loudspeaker, music reproduction comes easy. For the listener, it takes only a handful of songs, a few minutes of “program material” if you will, to register the presence of a component that functions on the highest plane of musicality and fidelity. The CR-1 drops jaws. I’ve seen it. It releases torrents of oohs and aahs. It can summon tears. And even the dubious, the dismissive, and otherwise disinterested, those who pooh-pooh the minutiae and fetishistic aspects of the high end, suddenly “get it.” One listener had this to say after I lifted the tonearm from his favorite track “It Can Happen” from *90125* [Atco] by the prog-rock band Yes: “I *know* this song like the back of my hand and I’m struggling to process all the new information.” Believe me, brother. I hear you.

The CR-1 is the stand-mount sibling to the \$70,000 320-pound TAD Reference One. Smaller yes, but it takes a dry sense of humor to characterize the CR-1 as a compact. At a thick 25" tall (it looks taller) and weighing in at hernia-threatening 100 pounds (it feels heavier), the CR-1 is anything but the kind of compact suitable for a meter bridge in a home recording studio. Rather its resemblance—both external and internal—to the Ref One is so complete that, except for the stands, it appears almost like an optical illusion of the flagship.

Reduced to its most basic specs, the Technical Audio Devices (TAD) CR-1 is a three-way, bass-reflex design equipped with a front port. Like the Reference One, construction quality and finish are unreservedly sumptuous, rivaling anything I’ve seen in the upper reaches of the industry. The teardrop-shaped cabinet, finished in a deep high-gloss Pommele Sapele wood, is a fluid series of soft curves that rises pagoda-like to the rear. Rich thick cladding enshrouds the forward compartment that houses the drivers—an 8" woofer and exotic coincident CST midrange and tweeter drivers



## EQUIPMENT REVIEW - TAD CR-1

### TAD Tech

TAD left no technological stone unturned designing the CR-1. However, it is the deployment of the beryllium CST that makes the CR-1 what it is.

The actual decision to go forward on this project was made in 2000 during a TAD research project examining modern concentric technology. However, other factors also informed the final decision. Pioneer, TAD's parent company, had, in fact, produced its own concentric as far back as 1954. Additionally, TAD's professional division was already highly experienced building beryllium drivers. And finally Andrew Jones was well versed in concentric technology, partly by virtue of his stint at KEF. The goal was clear: reproduction with controlled directivity over a wide range from a single point with uniform phase. The key hurdle, said Jones, was how to get around the historic limitations of concentric drivers. Not to mention the fact that beryllium cones had never been attempted in the 6" format required. The finalized cone profile was derived through finite element analysis and boundary element analysis. Compared to less rigid materials like aluminum, beryllium offered two advantages: It allowed the cone to have a flatter profile resulting in superior acoustic characteristics, and, in its supporting role as a waveguide, it provided extra-linear directivity performance for the inset tweeter. As TAD states, "This unifies the acoustic center of the tweeter and midrange and reconciles the

phase and directional characteristics through the crossover range," ensuring ultra-wide-range reproduction from 250Hz to 100kHz

The beryllium diaphragms—lighter and more rigid than other metals—are produced using a vapor-deposition technique developed and refined by TAD. The tweeter diaphragm shape was conceived using an optimization method based on TAD proprietary computer analysis. It controls differential vibration produced by the diaphragm and moves it out of the audible band, providing response to as high as 100kHz. The large midrange cone is similarly produced, resulting in a cone that is ultra-light and as delicate as an eggshell—hence the grille guard protecting the driver.

In order to keep vibration from the driver unit from entering the enclosure, TAD developed a specific isolation technology to structurally separate the CST driver from the enclosure. The technology not only reduces the radiation of secondary sound, but it also limits the influence of the energy from the bass drivers. The 8" bass is a unique short voice coil/long gap design that linearizes magnetic flux density along the gap. The TLCC (Tri-Laminate Composite Cone) aramid diaphragm has a triple-laminated construction—woven Aramid fibers sandwiching a foam acrylic cone—while the suspension system employs TAD's traditional corrugated edge, further contributing to high linearity.

The multi-compartment enclosure employs

an internal framework derived from the TAD Reference One. It's a construction of 21mm-thick CNC-machined birch plywood. Onto that is a cladding of hot-press-formed laminated MDF panels. The different materials reduce enclosure resonances. The rearward flow of the cabinet's teardrop shape also minimizes sound diffraction and unwanted resonance from internal standing waves. Anchoring the enclosure is a 1" thick aluminum base which lowers the center of gravity and stabilizes the cabinet against the forces generated by the bass-driver motor system. Where the enclosure meets the base is also the location of the flared bass-reflex port. It has been aerodynamically optimized based on precise fluid design technology refined by the TAD pro division. Isolated bass, midrange, and treble crossover networks eliminate electrical and magnetic interactions. The rear terminal panel is a whopping 1" thick aluminum and acts as a heat sink for the network. Other custom-made parts include air-core coils, non-inductive resistors, and PP film capacitors. In sum, a high-tech *tour de force*. **NG**

with pure beryllium cones. (See sidebar.) There's no point teasing my conclusion out to the last paragraph. The TAD CR-1 is the finest stand-mounted speaker I've ever encountered—if not one of the flat-out best speakers period. It combines the warmth, weight, majesty, and soundstage of a floorstander with the image focus and precision traditionally reserved for narrow-baffle compacts. Its range of tonal expression is immense thanks to its mix of harmonic complexity, naturalistic bloom, and musical forthrightness. It has a tonal balance that is uncannily neutral, providing as wide an expression of timbre as I've heard. There is nothing generic about any aspect of the CR1's presentation. Whether it's the cello section sparring with the bass violas during Copland's *Appalachian Spring*, or the soft interplay between Ricki Lee Jones and Lyle Lovett during "South Dakota," the CR-1's ability to focus evenly and specifically on each micro-element of the performance is quite breathtaking.

"Lean" is another four letter word not uttered around the CR-1. Built upon heavy musical bones, every note is laden with sinew and substance. Dynamically it can be physically forceful—virtually pinning you to your seat with impact—yet it never sounds "hi-fi" or forced. A quick big-band blast of trombones or the singular grumble of a baritone sax is reproduced with a lower-mid/upper-bass body that few speakers of this type can match. Of note, it measured virtually flat in my room at 40Hz with plenty left in the tank into the low 30s.

Low-level resolution? Dynamics? Hello? No missteps here, either. During Russian pianist Evgeny Kissin's performance of "The Lark" I could hear, more easily than ever before, his clothes lightly rustling as he shifted on the piano bench



## EQUIPMENT REVIEW - TAD CR-1

and his light inhalations of breath softly breaking the silences between notes. The CR-1 holds onto rapidly decaying timbre and resonances like a cat clinging to a shower curtain. During “Angel Eyes” there were details in the low-level decay of the orchestra and in the last vestiges of Sinatra’s crackly vibrato at the end of the lyric that made me feel like a time-traveler. And during the *1812 Overture* the easily smothered inner voices of bass viols and low brasses and winds were reproduced with such opulence that it was as though the speaker had the equivalent of night vision, penetrating the darkest corners of the soundstage.

A good solo piano recording like Kissin’s *Pictures At An Exhibition* builds upon the resonances of the instrument until the sound becomes an unbroken harmonic waterfall. With the CR-1’s grip, the waves of treble trills and arpeggios ring true, but they don’t harden and congeal—they merely build upon each other, filling the room with their sound and with the resonant sound of the acoustic space in which the recording was made.

In terms of transient quickness, the CR-1 is able to summon up the necessary mayhem to drive a Metallica track but equally able to switch gears and reveal the micro-nuances of Delmoni’s violin vibrato. True to its studio monitor heritage, its lack of high- and low-level compression causes familiar tracks to seemingly re-balance themselves—just the ticket to hearing ever deeper into a mix. And timbre and tonality do not shift with increased volume; all greater loudness does is increase image size and dynamic scale equally across all octaves. I noticed this on the Sinatra disc—a marvelous illusion, his voice

simply growing in size and scale with an increase in volume but remaining otherwise unaltered tonally.

This is not to say the CR-1 lacks character. Every speaker has one. Its sound may seem darker and warmer than neutral to some, even a little too burly in the lower mids, upper bass, and midbass—a slight tip of the hat, perhaps, to the British tradition of elevated mid-to-upper



bass. Some may even prefer the extra detailing of a rising treble, but that would be another speaker, not the CR-1. The point here is that the choices that have gone into the TAD’s voicing have been very carefully made and, in my view, the consequences of these choices are musically convincing.

Most significantly, the CR1 is less about individual audiophile criteria than about their seamless integration into a musical whole. And here is where the impact of the CST coincident driver cannot be underestimated (see sidebar). This is a watershed transducer that, were it not so bloody expensive (manufacture costs for this driver are approximately \$1100 each), might one day find its way into more than just two models. Without it, the CR-1 is just another super-premium three-way. The CST sounds fast and free—ribbon-like in that regard but with the wider lateral dispersion that a concentric cone buys you. But the single aspect that makes the CR-1 what it is is the way music emerges as a single block of sound—unified and coherent. First time listeners will immediately note the unbroken continuity between drivers, no sensation of the tweeter-on-top, mid/woofer-below syndrome. There is no discontinuity between tweeter and mids. Credit some of this to the common diaphragm material but more of it, perhaps, to the CST alignment. The result is a genuine absence of horn-type (cupped-hands) shoutiness. And though stereo listening is best in the sweetspot, tonality is superb even well off-axis, horizontally or vertically.

Of course, many of these same attributes are common to excellent loudspeakers. But there are certain elements that make the experience of listening to the CR-1 as unique as it is exceptional.

First among them is the gravitas, the sheer body of sound that the TAD projects in the 100–250Hz range. I noted this weight factor on the first blasts of energy during Stravinsky’s Duetto for Trombone and Bass Viol from *Pulcinella* and on the force and bloom from the baritone sax from Jen Chapin’s disc *ReVisions* [Chesky]. Whereas other speakers of this dimension and spec tend to roll off upper-bass/lower-mid output, creating a thinner balance and heightened articulation distinct from the recording, the TAD sinks its teeth into this range, driving air and dynamics, nailing the venue down and occasionally scaring the hell out of you. And this is what accounts in my view for its startling soundstaging. The way a needle can hit the groove and the CR-1s seemingly raise a curtain to reveal the soundspace is pure sonic theater. With apologies to Phil Spector (although he may owe apologies to us), it puts up a Wall of Sound unlike anything I’ve heard in my listening room.

There is another and related element of bass response that deserves to be touched upon—the contrasting effect of a bass-reflex design versus an acoustic-suspension one. The CR-1 arrived hard on the heels of the brilliant Magico V2. The Magico made a terrific impression on me not least for its tight, elegant low-frequency response, attributable in part to the vault-like rigidity of the cabinet but equally as much to the implementation of its acoustic-suspension design. I’ve often stated my preference for the control and pitch resolution of acoustic suspension layouts. Mediocre ported speakers often have the “one note” pulse or overhang artifacts that slow and cloud bass response. However, I found that at the level of the CR-1 the distinctions were no longer

## EQUIPMENT REVIEW - TAD CR-1



as clear-cut and that both kinds of bass loading easily validated their merits. The TAD was not discernibly a ported speaker except to the extent that bass response sounded a bit more relaxed and effortless, as if the reins had been loosened just enough to give it some added bloom. The V2's emphasis, on the other hand, was planted on getting the notes spot on, withholding some of the acoustic bloom and, dare I say, emotion.

Fact is, except for the last few chunks of the bottom bass octave and a modest reduction in orchestral scale, the CR-1 has no significant weaknesses (unless of course you haven't been able to break your addiction to organ toccatas). It doesn't take Hoover Dam to drive the CR-1, and I got very good results with integrated amps as dissimilar as the EAR 834 and the ARC DSi200. I did have a couple reservations. The lowest bass evidenced a little wooliness and a slight leanness, and there was a drier character in the treble that didn't fully blossom. However, at TAD Designer Andrew Jones' gentle prodding I installed the new TAD M600 monoblocks. Rated at 600W into 4 ohms these 198-pound (each!) behemoths polished away the few reservations that I had with the CR-1. They seemed to settle and calm the CR-1s in ways I can only describe as silken in the mids and fuller on top; bass response became more authoritative and a little deeper. The differences were exemplified in Boxstar's pristine new 45rpm remastering of Julie London's *Julie Is Her Name*, where London's voice sounded richer, fuller, and more fluid, and during Jennifer Warnes' "Way Down Deep" where the bounce, quickness, and tactile relationships of the talking drum/conga percussion section were born anew.

### Conclusion

Products come and go in a heartbeat in this industry and are just as quickly forgotten after the sparkle of editorial fireworks dies away. That will not be the fate of the TAD CR-1. The CR-1 is a speaker of such rich tonal expression and sensitivity to the source that you will find, as I have, that it's difficult to wrestle yourself away from it. Like I said in this year's Golden Ear Awards "There's just flat out more honest music coming from the TAD CR-1 than any stand-mount speaker I've ever heard." I can't remember the last time I used the expression "state of the art." There, I just did.

### SPECS & PRICING

**Type:** Three-way dynamic driver in bass-reflex cabinet

**Drivers:** One concentric with 1.375" tweeter and 6.5" midrange; one 8" woofer

**Frequency response:** 32Hz-100kHz

**Sensitivity:** 86dB

**Impedance:** 4 ohms

**Dimensions:** 24.7" x 13.4" x 17.5"

**Weight:** 101 lbs. each

**Price:** \$37,000/pr.

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## EQUIPMENT REVIEW - TAD CR-1

### Further Thoughts

In Issue 205, my good pal Neil Gader reviewed the TAD-CR1s—the sneak. The speakers were originally slated to come to me for review, but Neil got them first for a “quick listen.” That quick listen soon turned into a lengthy love affair—and a rave. Frankly, having heard the CR1s in my own system, I fully understand why. They’re just plain great. Indeed, with the recent demise of the Magico Mini II—no longer in production, alas—I’d have to say that the CR1s are now the highest-fidelity ultra-high-end stand-mount speakers on the market. The truth is even if the Mini IIs were still being made I’d have a tough time choosing between them and the CR1s. That’s how good I think the TADs are.

If I were going to single out one thing that the CR1s do better than the competition, it wouldn’t be their exceptional bass (which goes appreciably deeper than that of the Mini IIs, in part because the CR1s are a three-way design with a separate tweeter, midrange, and woofer, and not a two-way with a tweeter and a mid/woof); nor, as remarkable as they are, would it be their concentrically-mounted beryllium midrange and tweeter. (When I review the TAD Reference One loudspeaker later in this year, I will discuss the plusses and minuses of coincident drivers, and the exceptional execution of TAD’s version; I will also include a lengthy interview with TAD’s Chief Engineer, Andrew Jones, who, IMO, is one of the three foremost “New School” speaker designers

currently at work).

All of the TAD drivers obviously work together exceptionally well, although you can hear the slightly different signature of the beryllium midrange and tweeter in the Coherent Source (concentric) pair and of the non-beryllium tri-laminate 8” woofer if you come *very* close to the speaker (I mean a few inches away). At anything like a normal seating distance, however, all three drivers sound like one thing, with just a faint and very attractive glimmer of beryllium brightness that, to my ear, adds lifelike presence to vocals and instrumental harmonics without adding any unnatural harshness or glare to the top treble.

All of this is marvelous in itself, but what really makes the CR1 stand out for me is its imaging. The drivers and enclosures just aren’t there as sound sources, making instruments and voices sound unusually freestanding—the way they sound with really tiny minis or big omnis, albeit with much tighter focus and higher clarity than omnis and much more natural image size, much fuller frequency response, and much better dynamic range than tiny minis. One listen to Christopher Campbell’s *Sound the All-Clear* [Innova] will tell you all you need to know. The phantasmagorical panoply of instruments on the Campbell disc is simply *there*—to the front of the speakers, to their sides, way to their sides, behind them, way behind them, way to the sides behind them,

between them. There is none of the sense that you get with many other very fine speakers that the instruments (or any pitch-ranges of the instruments) are being projected by and upon individual membranes or cones, or living on the front surfaces of enclosures or emanating from inside the enclosures themselves.

When you mate this near-boxless, near-driver-less presentation with exceptionally natural timbres, surprisingly deep-going bass (flat down to the mid-to-low thirties in my room), world-class resolution, stunning soundstage width and depth, and lifelike transient speed and dynamic range, you get a one-of-a-kind loudspeaker: a relatively compact (although scarcely tiny) ultra-high-end stand-mount that sounds a lot like a great, ultra-high-end, multiway floorstander, which is precisely the result Andrew Jones was aiming for. Aside from the last three-quarters of an octave of bass, the only obvious thing that separates the TAD-CR1 from some of the Big Boys is a slight reduction in image/stage height, which probably has a lot to do with the relatively low height (20.9”) of the CR1s’ excellent ST1 dedicated stands.

I fully understand that even very-well-heeled music lovers swallow hard when they come across a stand-mount speaker with a price tag of \$37k (*not* including the, IMO, essential TAD-ST1s). But think of it this way: The TAD-CR1s aren’t stand-mount speakers; they are full-range speakers that just happen to sit on stands. For those who lust after TAD Reference Ones or Magico Q5s but don’t have the room for either, the CR1s are in my opinion, at this writing, the best option available.

**Jonathan Valin**





# Vandersteen Audio Model 7

## A New Reference

Robert Harley

**R**ichard Vandersteen has accomplished many things in high-end audio, but building a loudspeaker that is competitive with the best in the world regardless of price heretofore has not been one of them. Instead Vandersteen has spent the last thirty-five years creating high-value, no-nonsense speakers that anyone can afford. For example, his Model 2 (now the 2Ce Sig.II. at \$2195) is probably the best-selling audiophile-quality loudspeaker of all time. Moreover, for the first 22 years of the company's existence, Vandersteen's most expensive loudspeaker cost just \$3695 per pair. Working at the edge of the art was clearly not in the Vandersteen playbook.

And then to everyone's astonishment, Vandersteen showed up at the 2009 Consumer Electronics Show with a loudspeaker in an entirely different league. The Model 7, priced at \$45,000 per pair, featured novel driver and enclosure technologies—and sounded stunningly great. Even under show conditions, it was apparent that the Model 7 was something special. Now that I've had the 7 in my home for the past six weeks, I can say that the great sound it produced at CES was just the tip of a fabulous iceberg. This is a world-class product that invites comparison with any other loudspeaker, regardless of price or technology.

The Model 7 is both avant-garde and

conservative. Its balsa-wood and carbon-fiber drivers are cutting edge, as is its carbon-fiber-clad enclosure. But these innovations are based on Vandersteen's long-held commitment to time-and-phase coherence, as well as on the physical platform and overall architecture underlying the Vandersteen Model 5 (see my review of the Model 5 in Issue 118, June/July 1999).

Both loudspeakers are four-way and share the same 12" powered push-pull woofer. Both also use a 7" mid/bass driver, a 4.5" midrange unit, and a 1" dome tweeter. The rear-firing tweeter is a .75" alloy-dome in both products. As with the Model 5, the 7 features an eleven-band fixed-frequency equalizer, accessible via a row of tiny



rear-panel trim pots, that operates below 120Hz, allowing the speaker's low-frequency response to be tailored to the room. The 7 also shares with the 5 outboard passive high-pass filters (small boxes inserted between the preamplifier and power amplifier) that roll off low frequencies. This low-frequency rolloff is the inverse of a bass-boost in the built-in woofer amplifier, resulting in flat response.

But that's where the similarities end. The 7 features entirely new drivers (except the woofer and rear-firing tweeter), crossovers, and enclosure. The loudspeaker, which has a very modern look, can be painted in any automotive color—also a departure.

The key development that made the 7 possible is a new driver technology that Richard Vandersteen spent the past ten years developing.

## EQUIPMENT REVIEW - Vandersteen Audio Model 7

All the drivers except the aluminum-cone woofer and the rear-firing tweeter are made from a sandwich of balsa wood clad with carbon fiber on both sides. In the case of two midrange units, the cone is a whopping 1/4" thick at the apex. Vandersteen claims that these drivers are the first to deliver perfect piston behavior throughout their passbands. The crossovers are all first-order, which maintains the time-and-phase coherence that is a hallmark of every Vandersteen design.

Sensitivity is a rather low 85dB (2.83V) with a 4-ohm impedance. The 7's simpler crossover (a benefit of the powered woofer) makes its impedance more resistive than reactive, presenting an easier load to a power amplifier. Still, you should plan on driving the 7 with a hefty amp. (See the "Technology" sidebar and my interview with Richard Vandersteen for more technical detail.)

### Listening

The Model 7 is amazingly great in so many areas that it's hard to know where to begin. This isn't a speaker that improves upon its predecessors in just one or two performance areas, but across the board.

Nonetheless, I'll start with the 7's greatest achievement, its stunning purity and clarity through the midrange and treble. Even in an era in which significant advances in dynamic-driver technology have produced greater transparency, higher resolution, and lower coloration, the Model 7 stands out for its complete lack of dynamic-driver "sound." The 7 strips away a layer of coloration and artifacts, revealing an absolutely glorious purity of timbre that must be heard to be believed. These speakers seem to disappear as

a source, not just spatially, but in their freedom from a type of sound we've become inured to from dynamic loudspeakers. You simply don't hear the cones when listening to music through the Model 7. In fact, this loudspeaker is electrostatic-like in its clarity, transparency, and complete absence of boxiness.

The result of this technical achievement is a musical presentation that is simply breathtaking in its beauty. In choosing an example to illustrate my point, I could literally name any one of the hundreds of recordings I've played through the Model 7. I say this because every single CD, SACD, or LP I heard bowled me over. No matter what the instrument, voice, or ensemble, the 7's special quality was unmistakable. Sonny Rollins' sax on *Sonny Rollins* (the fabulous Music Matters 45rpm reissue of Blue Note 1542) had a burnished warmth, presence, and expressiveness that were startling. Or take the Bill Evans LP *Quintessence* that showcases Evans in a rare quintet format. His piano had lifelike immediacy yet without a hint of forwardness; Ray Brown's bass was a tangible image perfectly and precisely located between the loudspeakers, with a sense of body that conveyed the impression of being in the room with the instrument; and Philly Joe Jones' understated brush work had an uncanny realism. I had the distinct impression not of listening to a recording, but of experiencing a live musical event. I've heard this record on quite a few systems, but never reproduced with the same degree of almost spooky "you-are-there" realism.

Not surprisingly, the 7 was stunning in its reproduction of voice. It created the most lifelike rendering of vocals I've heard from a hi-fi system. The 7 achieved this through its totally uncolored tonal balance, seemingly perfect spatial

perspective (not too forward, not too laidback), precise image focus, and, most importantly, a stripping away of any sense of the sound being created by a mechanical contrivance. Try the acoustic guitar and vocal track "Done Got Old" from Buddy Guy's great disc *Sweet Tea*; the sense of immediacy, presence, and realism of his voice is goosebump-raising. These speakers completely disappear, leaving the powerful impression of listening to music itself rather than a recreation of it.

The 7's treble was as revelatory as its midrange. The top end was as clean and pure as the mids, with no trace of dome-tweeter hardness, glare, grit, or artifice. In fact, the top end sounded as though it were reproduced by a ribbon tweeter, but without a ribbon tweeter's dynamic limitations. Cymbals played *fortissimo* and mixed in prominently had the same level of energy you hear from the instrument in life, but were totally devoid of the hardness that makes you feel assaulted. In fact, I reveled in hearing this much treble energy reproduced with such liquidity—it was as though my ears relaxed and opened up to the performance.

This treble performance on its own would be remarkable, but what really vaulted the Model 7 into new territory was the sonic and musical synergy between the pristine midrange and glare-free treble. The 7 had a sense of seamlessness in which the harmonics of instrumental timbres seemed like integral and natural extensions of the fundamentals—more "of a piece" than I've heard from any other multiway dynamic loudspeaker. The way the harmonics and fundamentals integrated within the musical fabric was very much like what I hear from full-range ribbon and electrostatic

systems. You simply don't hear the tweeter as a tweeter with the Model 7. The complete absence of an audible transition between the midrange and treble—that unnatural sense of the treble "riding on top" of the music (which never occurs in life)—was a key component of what made the Model 7 so immersive musically. It wasn't just that the transition was seamless, but also that the midrange and treble had the same lack of color, contributing to the powerful illusion of hearing music rather than its recreation. As a result, the 7's reproduction of strings, whether massed or solo, was revelatory. The beautiful recording of Arturo

## SPECS & PRICING

### Vandersteen Audio Model 7 Loudspeaker

**Type:** Four-way dynamic loudspeaker  
**Frequency response:** 22Hz-40kHz +/- 2dB  
**Sensitivity:** 85dB, 1M/2.83V  
**Impedance:** 4 ohms nominal (+4, -0.5 ohms)  
**Crossover:** 100Hz, 600Hz, 5kHz, 6dB/octave  
**Driver complement:** 12" powered push-pull woofer; 7" mid/bass unit, 4.5" midrange, 1" tweeter (front-firing), .75" tweeter (rear firing)  
**Integral amplifier power:** 400W  
**Dimensions:** 14" x 44" x 20"  
**Weight:** 170 lbs. net (each)  
**Price:** \$45,000/pr.

### VANDERSTEEN AUDIO

116 W. Fourth Street  
 Hanford, CA 93230  
 (559) 582-0324  
 vandersteen.com

CLICK HERE TO COMMENT IN THE FORUM AT [AVGUIDE.COM](#)

[www.theabsolutesound.com](#)

## EQUIPMENT REVIEW - Vandersteen Audio Model 7

### Setting Up The Model 7

The Vandersteen Model 7 was the first loudspeaker set up in my new listening room. The new room looked like it had good sonic potential, but you never know until you set up a pair of speakers and listen. I was apprehensive before Vandersteen's arrival, and greatly relieved after hearing the 7 sound so good.

The way in which Richard Vandersteen set up the Model 7 in my room was unlike that of any other loudspeaker designer I've encountered. He measured the room's dimensions, calculated where he wanted to put the speakers (a third of the way into the room, with the listening couch a third of the room's length from the back wall), and once positioned in the calculated location, didn't move them again. Usually, loudspeaker placement involves dozens of "listen/move" cycles to dial-in the sound, sometimes over a period of two days. Vandersteen's setup could have taken just an hour.

Once the speakers were in position, Vandersteen put a custom jig on the front baffle that had a laser attached to it. With a piece of cardboard on the listening couch to substitute for the listener, Vandersteen precisely adjusted the toe-in and rake angle for each speaker by watching the laser's position on the cardboard. Rake angle is particularly important with time-and-phase-coherent loudspeakers; there's only one correct rake angle for a given listening distance and height that results in all

the drivers' outputs arriving simultaneously at the listener's ears. Although some of the Model 7's qualities are apparent when listening off-axis or standing up, it's really a different experience when you sit exactly in the sweet spot. This is truer of the Model 7 than of other loudspeakers, in my experience.

Once the speakers were positioned, Vandersteen used an SPL meter and a CD with test tones to measure the 7's bass response as modified by my room. The test tones' frequency corresponded with the center frequencies of the eleven-band equalizer. Vandersteen wrote down the amplitude of each frequency (one speaker at a time), and used this information to increase or attenuate the level at that frequency, via the tiny trim pots on the rear panel, to achieve flatter response. Note

that Vandersteen doesn't try to eliminate room-induced colorations with the equalizer, just reduce their severity.

After setting the equalizer on each speaker, Vandersteen measured the response again and tweaked a couple of the equalizer bands. The difference in smoothness of response before and after the equalizer was worth the effort, but cleaning up the bass also conferred an increase in midrange openness and clarity. Incidentally, my new room measures quite flat in the bass, which bodes well for future reviews of loudspeakers without bass equalization.

With the equalizer dialed-in, Vandersteen had me play a recording that I knew was right on the edge of being excessively bass heavy. We used this recording to set the woofer level (a knob on the 7's rear panel). Next, we listened

to a number of acoustic bass recordings and set the woofer's "Q" for the best combination of weight and articulation. If the "Q" is set too low, the bass is highly articulate but lacking body and extension. If set too high, the bass loses its agility and precision, and the presentation is overly thick.

As expected, this tremendous flexibility in adjusting the 7's bass to the room in which it plays greatly contributed to the bass performance but it also contributed to the overall impression of listening to music rather than to a recreation of it. I didn't hear bass bloat or colorations that would have been a constant reminder that the sound was being reproduced by loudspeakers. **RH**





## EQUIPMENT REVIEW - Vandersteen Audio Model 7

Demoni playing the Bach Partita No. 2 in D-minor on Water Lily exemplifies all I've written about the 7's reproduction of timbre and seamlessness from top to bottom. The instrument was vividly brought to life with a full measure of high-frequency energy, but with zero grain, stridency, or hardness. This lack of abrasive edge fostered a more relaxed and intimate feeling during listening sessions. The only other multiway dynamic loudspeaker I've heard that's in the same league as the Model 7 in this midrange-to-treble transition is the Revel Salon2, although the Salon2 doesn't quite match the Vandersteen in timbral purity.

The midrange and treble were massively resolved, yet not in a hi-fi sense of the term "resolution." The 7 presented a finely filigreed rendering of detail that revealed the subtleties of sounds and musical nuances in a way that was utterly natural and musical. It wasn't the kind of detail that calls attention to itself as "high resolution," but rather the antithesis: The 7's high resolution contributed to the sense of not listening to a hi-fi system. The 7 excelled at revealing music's micro-dynamic structure in a vivid, though not aggressive way. Subtle cymbal and brush work by great drummers sounded alive and real by virtue of the 7's dynamic agility and its ability to reach way down to present even the finest detail with precision. This is the level of detail that CD-quality digital audio misses, and can only be appreciated with LP as a source or high-res digital that's done right.

These qualities combined to make listening to music through the Model 7 so compelling. I had the sense of complete immersion in the musical performances rather than of hearing a sonic presentation in front of me. I could listen at high

playback levels with no sense of being assaulted, and long sessions produced no fatigue. Part of this quality is due to the extraordinary BALabo preamplifier and amplifier reviewed by Jonathan Valin in Issue 201 (the best electronics I've yet heard), about which I'll have more to say in a future issue. But with any electronics and sources, the 7's combination of clarity, lack of color, resolution, and ease was unmistakable. I should point out that the 7 has a very narrow sweet spot over which this presentation occurs. Sit too high, or off to the side, and the sound is still wonderful, but not as captivating.

The Model 7's soundstaging was as impressive as its tonality. The 7s, which were positioned slightly wider than I thought would have worked, produced not just a huge and well-defined soundstage, but portrayed image size more accurately than I've heard before. Small instruments sounded small, and large instruments sounded large. Image focus was extraordinary. I had the impression of hearing instruments as three-dimensional objects, not as flat cutouts. Acoustic bass had a "roundness" that conveyed the instrument's dimensions, along with a vivid impression of strings attached to a large wooden body. Once again, this precise focus was confined to a relatively small area on the listening couch; small head movements changed the soundstage focus.

The 7 was also significant in the way in which it portrayed the decays of notes, and the musical effect this had on the listening experience. Sounds seemed to hang in space longer, resulting in a "fuller" and "denser" presentation. This wasn't just reverberation decay, but the notes themselves, even in fast-paced, closely miked recordings. Rim shots were revelatory in

their transient quickness and the way the sound hung in the air after the attack.

After seeing (and hearing) Richard Vandersteen dial in the Model 7's bass with the eleven-band equalizer, woofer level control, and woofer "Q" adjustment, it struck me just how useful adjustable bass is in a loudspeaker. The bass was good just using proper loudspeaker placement, but the adjustments took it to another level. The equalizer smoothed the response, and the level and "Q" controls dialed in the bottom end for just the right bass balance and tautness. (See the "Setting Up The Model 7" sidebar for more detail.) The powered 12" woofer plays low and loud (if asked to) with a complete sense of ease. The 7 will even reproduce organ pedal points with authority. Kick drum had the requisite amount of heft and impact, and transient response was surprisingly taut.

As a side note, the 7 seemed to magnify the differences between recordings, between analog and digital (immensely), and between the associated components that were rotated through the system. This is a loudspeaker that is very sensitive to the signal you feed it, and is not out of place in a system of reference-grade electronics such as the BALabo.

Although the 7 played loudly enough for me, it doesn't match six-figure speakers in large-scale dynamics or in the ability to fill a large room with high-sound-pressure levels. Above a certain SPL, the magic diminishes. If you want to play Reference Recordings HRx high-resolution orchestral spectaculars at pant-leg-flapping levels, the Model 7 probably isn't for you. I must reiterate, however, that I discovered the Model 7's macro-dynamic limitations not during normal music listening, but only when pushing the system

to find its upper comfort boundary.

### Conclusion

The Vandersteen 7 is a stunning achievement that must be regarded as one of the world's great loudspeakers, regardless of price. The lack of color and artifacts through the midband and treble are simply breathtaking—the state of the art in my experience. It is impossible to overemphasize the impact this ineffable beauty of timbre had on music listening. It's the kind of sound that makes you melt into the listening seat and not want to leave it.

In light of the 7's overall performance, I feel churlish bringing up three minor caveats: 1) the 7's need for a substantial power amplifier (the power meters on the ARC Reference 210s suggested that the 7s drank up all these amps could put out); 2) the 7's inability to play extremely loudly in a large room; and 3) the need to sit in the sweet spot for the best focus, although the 7's gorgeous tonal balance is evident from another room.

I feel even more churlish bringing up these points considering the 7's bargain price of \$45,000. Save your letters of outrage ("How can a \$45k speaker be a bargain!"); the 7 is exactly that. One could spend six figures and not get the 7's magic. And compared with many other loudspeakers in its price range, the 7 is simply a runaway.

If I had to choose, right now, as a single loudspeaker to spend the rest of my life with, it would be the Vandersteen Model 7.

## EQUIPMENT REVIEW - Vandersteen Audio Model 7

### Technology

The Model 7 represents the culmination of a ten-year development effort. The core technology is the “Perfect Piston” drivers made from a sandwich of carbon-fiber skins around thick balsa wood (1/4" thick in the case of the two midrange drivers). These drivers, which have very high stiffness and low mass, are claimed to be the first moving-coil drivers to exhibit completely pistonic behavior in their passbands. The problem Vandersteen’s cone design reportedly eliminates is flexure of the cone as it is driven by the voice coil. Think of a cone being pushed and pulled by a relatively small circle at the cone’s center where it is attached to the voice coil. With enough force, or at a high enough frequency, the cone will flex under this force, with parts of the cone moving incoherently. It is this incoherent movement that introduces distortion. It would be simple to make a cone that didn’t flex, but making one that doesn’t flex *and* is light is another matter.

The 7" mid/bass driver, the 4.5" midrange driver, and the front-firing tweeter are all made from this three-layer, carbon-fiber/balsawood structure. The mid/bass driver starts life as a ScanSpeak Illuminator that is then fitted with Vandersteen’s cone and built on Vandersteen’s magnet structure. The midrange unit features an open basket to reduce the amount of energy reflected from the basket to the back of the diaphragm. This reflected energy can cause the diaphragm to vibrate, which

is obviously unwanted. The tweeter is built on the ScanSpeak Illuminator platform with Vandersteen’s carbon-fiber-and-balsa-wood dome diaphragm. Each of these drivers is built one at a time by hand. Vandersteen believes that using just one type of diaphragm material over the entire range (above 100Hz, where the 7" driver crosses over to the aluminum woofer) is critical to achieving a seamless blend between drivers. The rear-firing tweeter is a conventional alloy type.

The 12" woofer was designed from scratch for the Model 5, and is used here in the Model 7. It is a push-pull design with dual voice coils driven by a 400W integral amplifier. The two magnet assemblies and voice coils, one on either side of the cone, push and pull the cone. The cone is made from two sections of spun aluminum around a honeycomb structure for greater rigidity. Among the benefits of a powered woofer are less strain on your main power amplifier (it needn’t deliver current through the woofer), the removal of the series inductor between the amplifier and the woofer (a huge benefit, by the way), and a more benign load for your amplifier (the speaker’s impedance is less reactive).

The crossovers are first-order, a requirement of loudspeakers with perfect phase coherence. If you put an impulse into a phase-coherent loudspeaker, you’ll see all the drivers responding in

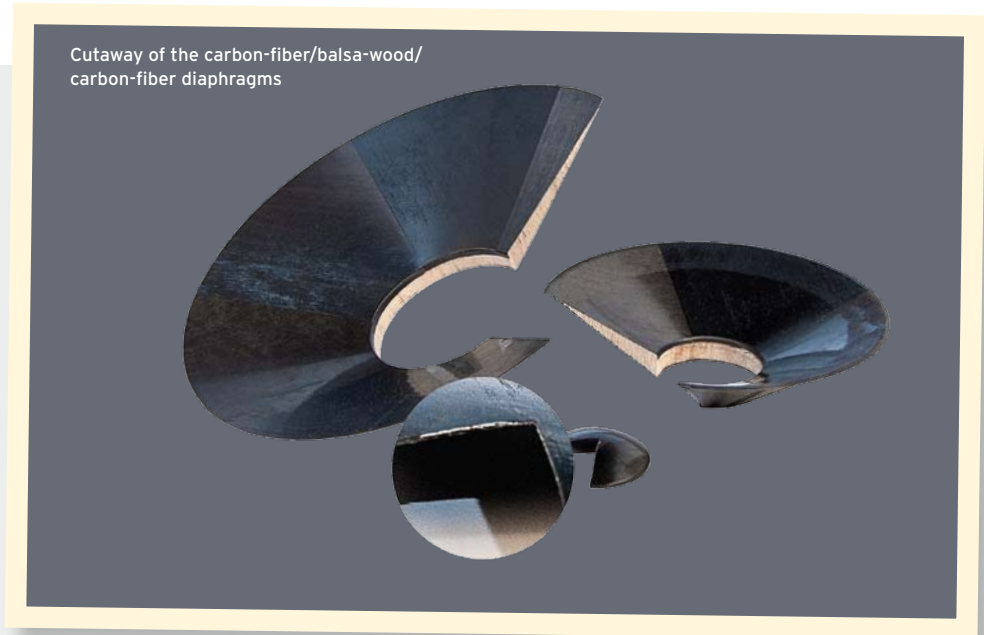
perfect unison. This isn’t true for all other loudspeakers. There is some debate, however, about the audibility of a lack of phase coherence. Indeed, many of the world’s great loudspeakers are not phase coherent. The crossovers at 100Hz, 600Hz, and 5kHz are implemented with cost-no-object silver and copper-foil caps and hand-wound copper-foil air inductors. Two of the capacitors cost \$500.

When ordering a pair of 7s, you must specify whether you will use balanced or unbalanced connection between the preamplifier and power amplifier. This is because the passive high-pass filter that rolls off the bass driving the power amplifier has either balanced or unbalanced jacks, not both. Note that you don’t need an additional pair of short interconnects; the filter boxes are fitted with a captive

AudioQuest cable.

The “Stealth” enclosure, new for the Model 7, is made from structural panels composed of multiple layers of an unnamed “non-resonant” material in a constrained-layer damping arrangement. These panels are then clad with carbon fiber on both sides in a high-temperature autoclave. The baffle and other smaller elements are made from a molded and machined epoxy composite material. A felt-like material surrounds the tweeter and midrange drivers. The enclosure’s shape is designed to minimize the baffle area and reduce diffraction.

The bi-wireable inputs are a terminal strip of nearly pure copper rather than the traditional binding posts. Vandersteen found that a strip was sonically superior to any binding post he tried. **RH**



# Richard Vandersteen Talks with Robert Harley

**R**ichard Vandersteen literally founded one of the core companies of American high-end audio in his garage. A truck driver with a mechanical bent, he built a loudspeaker for his own enjoyment in 1975. Pleased with the results, he took it to a local high-end audio dealer for his opinion. The dealer was impressed and asked Vandersteen if he planned on showing the speaker at CES. “What’s CES?” Vandersteen responded. That speaker became the Vandersteen Model 2, the largest-selling high-end speaker of all time.

The self-educated Vandersteen designed and built much of the industrial machinery in his factory. He also built, from scratch, an airplane that he routinely flies. Vandersteen is a “hands-on” kind of guy who combines out-of-the-box thinking with practical solutions.

An exchange between Vandersteen and a consumer-audio-show attendee exemplifies the man. I was moderating a panel discussion of loudspeaker designers at a show when an audience member asked the panelists what they thought about evaluating loudspeakers using double-blind, ABX, matched-level comparisons with dozens of listeners followed by extensive statistical analysis of the results. Vandersteen replied “Hell, just open a bottle of wine and spend an evening listening to ‘em. You’ll know if the speaker’s any good or not.”

After 35 years of making affordable loudspeakers, Vandersteen has entered new

territory with the Model 7. I began by asking him what inspired him to develop the Model 7, and particularly, the unique balsa-wood and carbon-fiber drivers at the heart of the product.

**Richard Vandersteen:** It was my desire to have pistonic drivers for the mid/bass, midrange, and tweeter when we came out with the Model 5 in ‘97. In the end, it just wasn’t going to happen, but we brought the 5 out anyway and I’ve been working on the problem ever since. We started off looking at a whole range of structural materials for the cones including metal and different composites. The structural foams just didn’t have the compressive strength by weight. Everything I’m talking about now is by weight, because weight is an important factor. I ended up with the combination of balsa wood and ultra-high-modulus carbon fiber. I discovered that about four years ago and have been working since then to be able to manufacture

drivers from it.

The problem is, How do you bond carbon fiber to balsa, which looks under a microscope like the end of a box of drinking straws? The straws have capillary action that tries to draw the epoxy into the straws and make it heavy.

By the time we’d solved all these problems about two years ago, I put these drivers in a speaker that had technology right out of the Model 5 and took it to CES.

## **What’s special about the drivers’ performance?**

For years we’ve “herded the sheep,” trying to control driver breakup resonances and modes through cone profiles, different materials, doping agents, and so forth. These new drivers are the first time that I know of, using dynamic drivers, where you have critically damped true pistonic action at all frequencies, plus an octave, to where you could make the mid/bass driver, the midrange, and the

tweeter out of the same material and have them all be truly pistonic in their operating ranges with an octave of margin for use in a first-order, time- and phase coherent design.

You can find a lot of midranges that have nice flat response all the way out to 10kHz. The problem is that everything above about 2kHz is just random energy that’s been averaged pretty well. If you strip that away, it gives you a much clearer window on the micro-information that’s in recordings. It’s really quite striking when you hear the balsa driver contrasted with a very, very high-quality midrange made out of a really good paper or poly or even some of the composite cones. You strip away all that spurious energy that’s caused by this random behavior, and all of a sudden it’s just strikingly clear. It’s hard to describe except you know that it’s right.

## **What processes go into making the drivers?**





Well, that's part of the patent. It's a very, very, tedious procedure. But it starts with very careful grading of the balsa. We use it in the end-grain, and you need to remove all of the moisture in a chamber that is basically like a kiln. And then it needs to be stored that way at all times because once you get the moisture down to less than one percent, it's like a magnet for any moisture that would be in the air around it. So it has to be stored in an environment that also has no moisture.

Then you need to machine the center wafer that goes between the carbon fiber front and back skins. Our midrange, for instance, is a quarter-inch thick at the voice coil and narrows so that the front and back skins actually meet at the surround. The reason the cones are so stiff is that carbon fiber is stiff in itself, but not if it were in a single plane. The balsa functions like the webs in the truss of a home. The sandwich structure makes the cone much stiffer than you could get with just one layer of any kind of material, no matter what it's made out of.

A wonderful side benefit of all of that is when you do have an eventual breakup, instead of having a 10 or a 20dB peak before it rolls off, you end up with three or four dB—very little because it's so well damped by the fact that balsa happens to be a fantastic natural dampening agent. So it gives us the structural strength that we need, but it also damps the carbon fiber, which is very hard and stiff.

#### How did you hit on the idea of balsa wood?

I remembered it from when I flew remote-controlled airplanes when I was much younger. We started off looking at Rohacell and other structural foams that I learned about building my [full-size] airplane from scratch. I kept wanting it stiffer and lighter. It was a constant battle. I finally

decided to try balsa and found that by weight it's eight times stiffer in compression than Rohacell, which is one of the better structural foams.

#### Were you surprised by the sound quality when you first heard it, or was it what you had expected?

I've been listening to a pair of these speakers in one way or another, now, for about two-and-a-half years, and I'm still surprised by their lack of sound, and their ability to dig things out of recordings that I never knew were there, even my own mastertapes. I don't know that I've fully experienced the full benefit of this technology yet. When you listen to music as much as my wife and I do, and you're two years into them, and you're still discovering new things, and you haven't changed the product—I've never had that happen in my 35 years of making speakers.

One of the things that really struck me somewhere around the middle of this process, where I was beginning to experience what this was doing from a distortion and a clarity standpoint, was that older cone technologies are going to have a tough time. We've had piston tweeters for some time, but once you get used to hearing drivers made from the same material from 100Hz on up—it's addictive.

#### What was it like the first time you connected the prototype and listened?

Well, my first impression was that it was very, very different. It caused me to go back and make sure I had done everything correctly. We have samples of every driver made on Earth and this was so different. After about a week of listening I sat there one evening with some mastertapes I'd made years ago and said: "It's different, but it's just obviously right." It put me closer to the

church where I made those mastertapes than I'd been before.

#### Did you think that there'd be resistance to a \$45,000 Vandersteen product or have your customers been waiting for this level of product from you? It's a real departure.

We made thousands and thousands and thousands of Model 2s, and a large percentage of the market wanted to go up to \$2500 a pair for our speakers. We were late coming out with the Model 3—uh, very late—probably five years later than we should have been. And we were at least a decade late coming out with the Model 5s.

That's mostly because I've never considered it a challenge to make an expensive speaker that was good. What got me up in the morning and always gave me a lot of personal satisfaction is how good a speaker you could make for how little money, because that obviously meant that you had higher volume. And we've never used off-the-shelf drivers. If you wanted to use custom drivers, especially back in those days, you had to have a reasonable amount of sales in order to get this bizarre stuff done by the vendors. So there was always the pressure to keep the volume up, and it just wasn't really a challenge to me to make an expensive speaker. But these drivers in the Model 7s have challenged me plenty.

So, again, we're probably late coming out with something after the 5, because people naturally want to graduate up. In its own way, I think the 7 will represent as good a value or even maybe a greater value than our products ever have at any price point, even though I know \$45,000 is a lot of money. I mean, you can buy a car for that.

#### You use adjustable bass and powered woofers in the 5 and the 7, but that's not a universally

#### accepted architecture. It seems to have tremendous benefits.

Yeah, I agree. And to be honest with you, if I had my way and if it were financially feasible, all of the full-range speakers that we make would be that way because it's such a tremendous advantage to have a dedicated amplifier that's designed with only one task in mind, and that is to drive that woofer in that enclosure. There's so much that can be optimized—let alone the actual size of the enclosure. I'm surprised that there aren't a lot more people doing that.

On the other hand, it is unconventional, and people tend to resist things that are not conventional. For instance, someone looking at a pair of Model 7s might have a \$77,000 amplifier, and there may be a reluctance to say that from 100Hz and below, he's not going to be driving that speaker with his \$77,000 amplifier; he's going to be using the one that's built in the speaker.

The way we've done it, though, is that actually that amplifier still is driving the speaker. It's just not providing the current. So the signature of whatever amplifier is driving the system—the way we do it in the Quattro, the 5 and the 7s and our 2W subwoofer series—that character and that signature is passed onto the bottom end.

You can assess anything you want about an amplifier's prowess in the bass by listening to it on a Model 7. The voltage gain is provided by the customer's amplifier. It's only the current gain that we provide in the amplifier module.

And being able to adjust for a room—how many of us haven't had difficulties getting the bass right in our sound rooms? This system does not correct for a bad room, because the treatments are still necessary sometimes. But it certainly can minimize the problems. **tas**

# Magico Q5

## California Dreaming

Jonathan Valin

If it does nothing else (and it does *plenty* else), the Magico Q5—the current top-line, full-range, four-way dynamic loudspeaker from the Berkeley-based company that has, over the last four years, shaken up the *status quo* in the ultra-high end—cuts straight to the core of what we mean when we say something is a “high-fidelity” component.

This is the very issue that led to the foundation of this magazine, and the position that Harry Pearson staked out almost forty years ago has been a beacon and a bone of contention every since. Should “high fidelity” components, as HP argued, aim to reproduce the sound of acoustic (i.e., unamplified) instruments as they are heard in life in a concert or recital hall? Or, in a significant variant of the absolute sound approach, should they reproduce precisely what was recorded on the disc, whether that sounds like the absolute sound (as it ideally should) or not? Or should they aim at something else again, something far less prescriptive and more personal? Should they simply (or perhaps not so simply) consistently please whoever listens to them?

Although these views aren’t necessarily mutually exclusive, over the years they have typically been cast as if they were, as if they represented opposing sides in a never-ending battle between the forces of “realism,” “accuracy,” and “musicality.” All three positions

are rife with contradictions, all three share certain patches of common ground, and all three have been “shaped,” like battlefields, to reflect the prejudices of individual reviewers and listeners. The absolute sound school, for example, has trouble dealing with amplified music, such as rock ‘n’ roll, which in today’s world makes its proponents seem old-fogeyish. After all, what is the “absolute sound” of a Fender Stratocaster or Telecaster? By the same token, will a speaker that delivers the whomp of a Fender Precision bass guitar as it sounds at a rock concert via a Marshall stack also do justice to the pitches, timbres, and dynamics of an unamplified cello or doublebass? For that matter, will an “accurate” system tend to make both Fender bass and cello sound a bit too cold and analytical, like an unretouched glamour shot?

There is no single answer to these (and a zillion other questions) that will satisfy all music lovers, which is precisely why I try to take the biases of different kinds of listeners into account whenever



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I write a review. The way I see it most of us fall into one of three basic groups: what I call the “absolute sound” listeners (who prefer music played by acoustical instruments recorded in a real space, and gear that makes those instruments—no matter how well or poorly they were recorded—sound more like “the real thing”); the “fidelity to mastertapes” listeners (who want their music, acoustical or electronic, to sound exactly as good or as bad, as lifelike or as phony as the recording, engineering, and mastering allow); and the “as you like it” listeners (who care less about the absolute sound of acoustical instruments in a real space or fidelity to mastertapes and simply want their music to sound some form of “good,” which is to say exciting, beautiful, forgiving, non-fatiguing). Though I think these groupings are valid, I also think that no listener is purely one type or another, i.e., the fidelity to mastertapes listener also wants his music to sound like the real thing, *when the recording allows*; the absolute sound listener wants his music to sound beautiful, *when the music or orchestration allows*; the “as you like it” listener puts excitement and beauty ahead of fidelity to sources, but is not at all unhappy when those sources also sound like the real thing as *he defines it*. What I haven’t been as clear about, perhaps, is where I stand in this triumvirate—and why.

I stated my opinion on this crucial topic about twenty years ago when I wrote a book about RCA recordings, and in spite of occasional forays into other kinds of listening I haven’t really changed my mind. Since *The RCA Bible* has been out of print for a very long time, let me quote what I had to say way back when:

“How much of the ‘absolute sound’ of an

orchestra does a microphone really capture? Well, it’s a fact that microphones differ significantly from the response of the human ear. Throughout the fifties and into the sixties Mercury Records, for instance, used German microphones (Telefunken 201’s and Neumann M 50’s) with a rising high end. Are Mercury’s ‘living presence’ recordings [from Watford Town Hall] actual transcriptions of the sound of the LSO with Dorati at the helm, or are they the products of hot mikes—ones that added a little upper-midrange sheen and bite to the LSO strings, winds, and brass—or are they some incalculable blend of both?

“Well, you’d have to have been at the Watford Town Hall to know for sure. And even then, you’d have to have been sitting where the microphones were placed. And since you don’t hear in three channels mixed down to two and your chair’s not

tall enough to put you where the mike heads were located and your ears have a different frequency balance and directional pattern than mikes, you’d be hearing sounds that were different from those which the microphones recorded. How different? The question is unanswerable. On the basis of a recording we can never know what the LSO ‘really’ sounded like on a particular afternoon, on a particular piece of music. All we can know is what the tape heads recorded.”

Twenty years on, I stand by what I wrote. For me high fidelity means fidelity not to the absolute sound and not to some idealized sound but to the sound of the mastertapes, which still seems to me to be the one and only “truth” we’ve got. That this truth is inevitably a compromise that will be further compromised in playback is simply the way the recording/playback process works.

To achieve high fidelity as I define it means that the loudspeakers and everything else in the playback chain need to “disappear” as sound sources. To accomplish this, they must be neutral, transparent, high in resolution, seamless in top-to-bottom coherence, low in distortion, and capable of a high degree of realism rather than romance. As beguiling as such things can sometimes sound, pieces of gear that impose a beautiful or exciting or forgiving sonic template on the presentation—and, thus, *don’t* disappear—are, in spite of any other virtues, finally not for me. This doesn’t mean that they aren’t or shouldn’t be *for you*. I have no argument with friends and colleagues who prefer a less “neutral” speaker, either because they think a more bespoke presentation makes music more like the real thing (as, for example, with those “absolute sound” types who eq their systems to roll off the treble and/or boost the bass—or who prefer equipment that effectively does the same thing because of built-in dips and boosts in frequency response) or because they think a romantic presentation makes recorded music more attractive and, well, “musical.”

What I do have an argument with is calling such presentations “high fidelity.” By my lights anything that makes you more aware of the way sources are being colored and distorted by your system is, *ipso facto*, less of a true high-fidelity component and more of a tone control. I don’t want to hear my equipment automatically adding virtues or subtracting flaws from every record (even from records that benefit by such additions and subtractions); I want to hear what is on the recording, good, bad, or indifferent, because, as I just argued, the recording is the one indisputable





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truth that stereo systems can be faithful to. The way I see it, if you're unhappy with the sound of the LPs and CDs you're playing back, then don't try to correct the problems with your stereo system. Instead, go out and buy better records.

My position has had certain undeniable consequences when it comes to the kind of playback gear I prefer and how I set it up. While as a reviewer I've recommended any number of different kinds of loudspeakers for different kinds of listeners (and was sincere in these recommendations), as a civilian I've always owned electrostats, planars, and (occasionally) two-ways. Why? Because they were (and in many respects still are) the lowest-distortion, lowest-coloration, highest-resolution, most transparent-to-sources, least-present-in-their-own-right transducers—the “highest-fidelity” speakers, if you will, by my standard of high fidelity.

Yes, my preferences have always entailed major sonic trade-offs, particularly in low-end response and dynamic range on *fortissimo* passages. However, because I prefer electrostats, planars, and two-ways does *not* mean I don't care about bass. What I don't like isn't the bottom octaves; it's what typical dynamic woofers in typical noisy enclosures *do* to the bottom octaves. In most listening rooms, such drivers sound powerful, all right, but they also almost inevitably sound ill-defined in pitch, grossly distorted in dynamic scale (lumping up in the midbass because of the way those woofers excite themselves, their enclosures, the other drivers, and the room), steeply rolled off in 20-40Hz range, and relatively veiled in the mid and upper octaves because of the group delay and break-up modes of those big cone woofs. It's all well and good to say that

a Fender bass or a Noonan drumkit requires a speaker with “slam” to sound like the “real thing”; it's quite another to ignore the cost of the dynamic distortion, group delay, and lumpy frequency response that so often accompanies speakers with such “slam” (or to claim, quite absurdly in my opinion, that acoustic instruments such as cellos and doublebasses also benefit from what a midbass peak adds to the presentation).

It is because the bass response of large, full-range, multiway dynamic loudspeakers is generally so problematical—so far from “high fidelity” as I've defined it—that I've tended to steer clear of these beasts. Better to live without low bass, than with distorted and exaggerated bass. Indeed, outside of the Rockport Hyperion that I reviewed about twelve years ago, I hadn't come across a big cone speaker that I was tempted to live with until I reviewed the \$90k Magico M5. Here, for once, was a big multiway that seemed to have the transparency, low-distortion, and near-seamless octave-to-octave balance and “disappearing act” of a 'stat or really good two-way, with the added benefit of standard-settingly well-integrated deep bass and dynamic range limited only by the amount of power you could feed it. At the time, I thought the M5 was, overall, the best loudspeaker I'd reviewed.

Not that I thought the M5 was perfect. Other speakers (planars and 'stats) were more detailed, particularly at low levels; other speakers (cones and hybrids) were louder and more “exciting” in the midbass; other speakers (particularly ribbons) had a bit more air and life and transient speed in the midband and treble; and other speakers (particularly 'stats) were lower in grain. Still and all, I found it hard to conceive of another truly

full-range speaker that would outdo this one in fidelity to sources or, when those sources were first-rate, in realism. But...I was wrong.

Which, at long last, bring us to the subject at hand, the \$60k Magico Q5.

Unlike the Magico M5s, the Q5s were not a case of love at first listen. Indeed, when I first heard them at CES 2010 I thought they were very detailed in the mids and treble but rather dark in overall balance and lumpy in the bass. Still under the spell of the superb M5s, I wasn't fully won over until I took a trip to Magico's offices and factory in Berkeley, California, late in 2010, and heard the Q5s side-by-side with my beloved M5s, playing back the same music via the same amps, preamp, and source. Here the difference between the two speakers was unmistakable and, to my surprise, entirely in favor of the much-less-expensive Qs.

I can sum up this difference rather quickly—the Qs were and are *substantially* lower in distortion and *substantially* higher in resolution than the Ms. Explaining the reasons for their shocking superiority, however, will take a little time.

One of those reasons is obvious to anyone with eyes: the Qs' enclosures. The M5s use stacked Baltic birch boxes with two-inch-thick, flat aluminum faceplates (as did the Magico Minis and Mini IIs and other M Series speakers); the Q5s use constrained-layer damped, 6061T aerospace aluminum enclosures built around elaborate 6061T aluminum strut frames. While aluminum has always been Magico's enclosure of choice (e.g., its ultra-pricey, limited-edition M6 and Ultimate speakers), such enclosures were too expensive to build and market at a reasonable price until Magico acquired its own

CNC-equipped machine shop in San Jose, California.

Magico has long argued that enclosures (and the materials they are made of) are one of the keys to lowering the distortion and increasing the transparency and neutrality of loudspeakers. Indeed, the rationale for building the M5s' birch-ply-and-aluminum box was precisely to reduce the amount of energy the enclosure would store and then release in a peaky, time-smeared fashion. Through artfully balancing the three factors—mass, stiffness, and damping—that go into the construction of any “low-resonance” enclosure, Magico seemed to succeed in this goal with the M5, building a sealed box that didn't appear to be singing along with the drivers. (For more on

### SPECS & PRICING

**Type:** Four-way, five-driver, sealed-enclosure, floorstanding loudspeaker  
**Driver complement:** Two 9" woofers, one 9" mid/bass, one 6" midrange, one 1" tweeter  
**Sensitivity:** 86dB 1w/1m  
**Impedance:** 4 ohms, 2.75 ohms min.  
**Frequency response:** 18Hz-50kHz +/-3dB  
**Minimum amplifier power:** 50W  
**Dimensions:** 11.8" x 47" x 12.5"  
**Weight (net):** 420 lbs. each  
**Price:** \$60,000/pr.

MAGICO  
 Berkeley, CA  
 510-649-9700  
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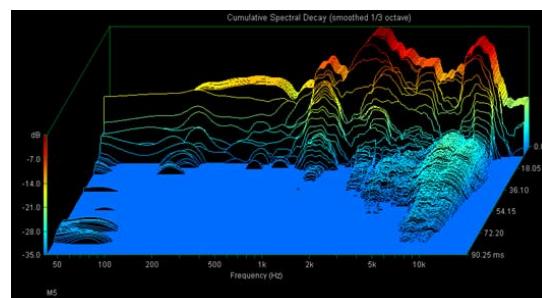
this topic see the interview with Alon Wolf that accompanies my M5 review in Issue 196.)

I could clearly hear the difference the M5s' enclosure was making in the standard-setting seamlessness of its presentation, particularly in the bass octaves, which, for the first time in a large multiway, did not stick out like an open drawer at the bottom of a bureau. What I didn't realize until I listened to the Q5s superior damped-aluminum box was that the M5s' enclosure, heroically constructed though it was, was still adding a slight (but audible) graininess and opacity to the soundfield.

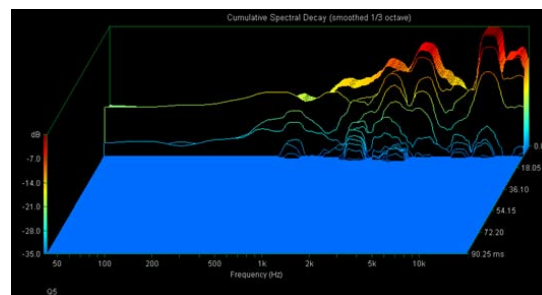
When I wrote my review of the M5s I'd mildly complained about this slight graininess and opacity, which obscured low-level detail at low volume levels in comparison to the finest 'stats and ribbons and which, at the time, I attributed to the relatively greater mass and inertia of the M5s' cone drivers. However, when I heard the aluminum-bodied Q5s, which (save for the tweeters) use the same NanoTec carbon-fiber-sandwich drivers (albeit in a slightly different configuration) as the M5s, I realized that much of the M Series speakers' low-level grain had to be coming from their "noisier" boxes. The side-by-side comparison was and remains the most astonishing demonstration I've ever witnessed of how the superior engineering and construction of an enclosure can markedly affect even the highest-fidelity speakers.

Though I didn't make the following cumulative spectral decay measurements (Magico itself did), I can confirm that the reduction in graininess and opacity between the M5s' enclosures (Illustration 1) and those of the Q5s' (Illustration 2) are every bit as audible and dramatic as these graphs

suggest. You won't need a golden ear to hear the consequent lower noise, superior transparency-to-sources, higher resolution at lower volume levels, improved transient speed, and better overall definition of the newer speaker, whose enclosures simply "stop" playing more quickly and completely than the M5s' do.



**Illustration 1. Cumulative Spectral Decay plot of the M5, showing the energy being stored and released over time by the M5's birchply-and-aluminum enclosure.**



**Figure 2. Cumulative spectral decay plot of the Q5, showing the energy being stored and released by the Q5's damped-aluminum enclosure.**

All right, we have a substantially quieter cabinet. What else has changed in the Q5? Once again, another key difference will be obvious from merely looking at the speaker: the tweeter, which is now the MBe-1 beryllium dome rather than the (superb) MR-1 ring radiator of the M5 and Mini II. Magico claims wider frequency extension, greater power handling, and lower distortion from this beryllium unit, and, once again, I can attest that all of these things are so. The MBe-1 comes closer to the sound of a true ribbon tweeter (and I've just been listening to a great true ribbon tweeter—for which see my comments on the Maggie 3.7s elsewhere in this issue) than any dome tweeter I've heard, with almost exactly the same breathtakingly lifelike speed, resolution, and seemingly limitless bandwidth. However, what Magico is not emphasizing is that—like every beryllium tweeter I've heard (and every true ribbon, for that matter)—the MBe-1 tends to sound more than a little hot when it is listened to directly on axis. Where the M5s' MR-1 ring-radiator virtually disappeared as a sound source until a hard treble transient came along, you will always be vaguely aware of the presence of the MBe-1, *unless* you toe the speakers out a bit so that you are listening to the tweeter slightly off-axis (i.e., so it is not pointing directly at your ears but a bit to the outside of them). To be fair, Magico explicitly tells you that the tweeter is designed to be listened to slightly off-axis and that the slightly-outside-the-ear alignment I just mentioned is the one it recommends. Though you may lose a slight bit of treble-range glamour and immediacy by following Magico's toe-in instructions (just as you do with a true ribbon), the upside in top-octave smoothness, overall

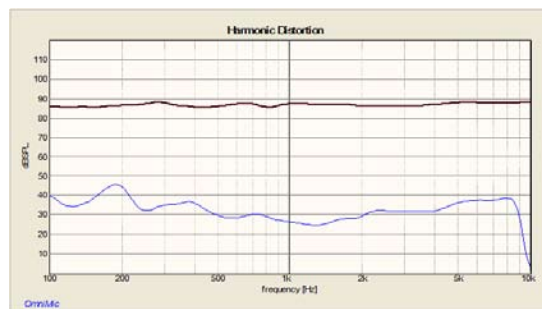
blend with the midrange, midbass, and woofers, and sheer realism (on great recordings) is well worth the trade-off.

Another change between the M and the Q that is obvious to the eye is the driver configuration. I'm not going to go into Magico's NanoTec technology again—for that I refer you to my M5 review in Issue 196—save to say that the company's pioneering use of nanotube carbon-fiber skins (which are said to have sixty times the tensile strength of high-carbon steel) surrounding a Rohacell foam core have made for highly linear, very wide bandwidth drivers that are not just pistonic throughout their passbands but exceptionally well-behaved throughout their startbands and stopbands, controlling (in combination with Magico's steeply sloped elliptical crossovers) the breakup modes that roughen up the linear response of the drivers that the signal is being passed to and from. (Once again, I have heard the difference that reduced out-of-passband breakup modes make in the sound and, like Magico's new quieter damped-aluminum enclosures, it is dramatic.) What's different here is that the Q5 uses a dedicated 6" midrange driver and a dedicated 9" mid/bass driver along with its two 9" woofers, where the M5 used a 6" mid/bass driver with a 6" midrange and two 9" woofers. The move to a larger mid/bass driver is said to improve articulation, as well as lower distortion, and, once again, it is a fact that the Q5 is a faster, more finely detailed, more transparent loudspeaker than the M5—and that this speed and resolution and transparency are audible at very low volume levels, which was not the case with the M.

Indeed, when it comes to low noise, the combination of the Qs revised driver complement

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and its improved enclosure is impressive. Although I am unable to perform harmonic distortion measurements in an anechoic chamber (which is, of course, the right way to do it), I am now able to make rough THD measurements, thanks to new OmniMic software and hardware designed by my friend Bill Waslo (the author of the Liberty Instruments' Praxis Suite program I use to take frequency response measurements and RTAs). Here is how the Q5s measured in my room, with the understanding that ambient noise was probably raising these THD curves several dB:

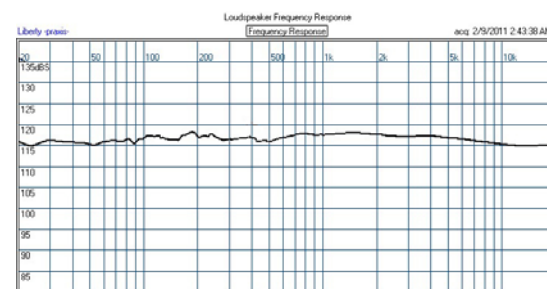


Note that these measurements were taken at very loud levels (almost 90dB SPL), where most speakers do not fare as well as they do at lower volumes, and also note that, in Bill Waslo's own words, they are "extraordinary." Even at its highest (and this was probably skewed by traffic passing on the street outside my house), THD at nearly 90dB SPLs was below 1% and typically on the order of 0.4%! These are loudspeaker measurements, folks. Not a preamp.

The net result of this incredibly low distortion is greatly improved low-level resolution at low volume levels and, consequently, greatly improved overall dynamic range. Where the M5

for all its many virtues was not the equal of a 'stat like the MartinLogan CLX at reproducing *pianissimos*, the Q5 very nearly is. And it is vastly superior to the Logans (and to planars) when it come to overall dynamic range—from going very soft to very loud.

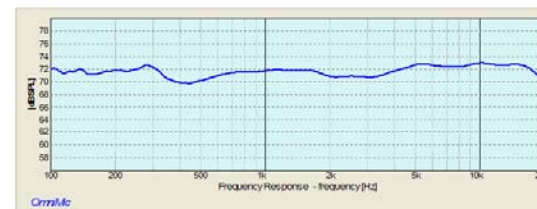
As for frequency response, this is an area where many of the best contemporary loudspeakers do well or, at least, better than they once did. From go, Magico speakers have shown wonderfully, and the Q5 is no exception. Below you will find



an RTA I took from my listening position. (Note that the granularity is 5dB per octave, with 1/3<sup>rd</sup> octave smoothing.)

An RTA measures the response of a speaker in your room (which is to say, it includes the effects of the room). As you can see, the Q5 is a wonder in my little space, staying within a couple of dB or so of flat from 20Hz to 20kHz. However, to give you even more of "close-up" view of the Q5s' frequency response, with the room taken out of the equation, here is a gated measurement take from closer-in and a bit more on-axis (a so-called "quasi-anechoic" measurement):

There are several things to note here. First the granularity is 2dB (with 1/3<sup>rd</sup> octave smoothing). Second, this is, well, very flat response.



Taken together with the RTA and the other measurements, it rather makes you understand how several reviewers could've found that the Q5 set new standards of fidelity.

These measurements do raise a critical point, however—one, in fact, that was a large part of the reason that Harry Pearson started an "observational" magazine called *The Absolute Sound*—and that is: How far does measuring the quantities of various parameters of performance go toward an assessment of the quality of the loudspeaker in actual playback of music?

There was a time, not very long ago, when I would've said that measurements such as the ones above were beside the point. I'm not sure I believe that anymore, although I am sure that measurements don't tell the whole story (as some would've have you believe, including Magico's Alon Wolf and Yair Tammam). The Morel Fat Ladies, for example, were exceptionally flat-measuring speakers, too, and yet, superb as they were and are, they did not sound like the Q5s.

I'll tell you a speaker that does sound a good deal like the Q5s—and it is an interesting comparison, not just because of what it tells you about the speaker in question but because of what it also tells you about the Magicos. That speaker is the Magneplanar 3.7. I haven't measured the 3.7 and I rather doubt that it would be as exemplary in frequency response as the Q5 is (and it would

certainly be more rolled-off in the treble and the bass). But, minus the Q5s' far superior dynamic range, much deeper and more powerful low end, and more extended top end, from the lower midrange to the mid-treble these two speakers have very similar presentations—in resolution, in low distortion, in transparency to sources, in realism.

One conclusion you could reach—and I reach it in my 3.7 comment in this issue—is that the \$5.5k Magnepan 3.7 is one helluva great buy. But the other conclusion—and it is every bit as interesting—is that here is a multiway cone speaker in a large metal box that sounds *incredibly* similar to a virtual single-driver ribbon speaker without an enclosure. You may not think this is astonishing, but I do.

For all my adult life as an audiophile, I have been searching for just such a speaker—one that would have the speed, low distortion, high resolution, lack of "boxiness," transparency to sources, and (when those sources permitted) the extraordinarily high level of realism of a great ribbon or 'stat *without* the inevitable downsides of a ribbon or 'stat—without the membrane-excursion-and-mass limits that reduce dynamic range on the loud side (and, with planars, sometimes on the soft one), without the low-bass limits (also membrane-size, dipole-dispersion, and excursion-related) that keep something like the otherwise great 3.7 from reproducing flat bass below 45Hz (and the Logan CLXes below 55Hz), without the thinness of image that can make many planars and 'stats sound as if instruments are painted on the canvas of their panels, rather than standing freely in space like the three-dimensional objects they are. Here, in



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the Q5, is that very speaker.

How does it sound? Like whatever is being played through it (and whatever amps and preamps and sources are feeding it). It comes closer to being a true, full-range “high-fidelity” transducer than any other speaker I’ve yet heard. But if you want to know what it sounds like on really great recordings, then I can answer more definitively: It sounds so much like the real thing it will take your breath away.

No other speaker I’ve had in house, including the great M5, can reproduce a piano like, oh, the Bösendorfer on the superb Nova recording of Paul Dessau’s First Piano Sonata with such lifelike realism, top to bottom, with such an unstinting combination of ribbon-like speed and delicacy and cone-like authority and solidity that it sounds as if the instrument (albeit naturally somewhat reduced in size) is sitting there in front of you. Every nuance of the pianist’s touch, every aspect of the piano’s action (from keys to hammers to the little microtonal vibrations of the strings when they are sounded, sustained, or damped), every quality of pitch, timbre, intensity, and duration that you hear in life are reproduced with a clarity and realism that make many other large multiway dynamic speakers sound downright smeared and opaque.

On the best recordings, well-recorded voices like those of Melody Gardot or Madeleine Peyroux or Marc Cohn or David Byrne have that in-the-room-with-you immediacy (born of incredibly fine low-level resolution coupled to lightning transient response and exceptional neutrality of timbre) that I used to associate solely with ribbon, planar-magnetic, and electrostatic loudspeakers. The Qs are *that* quick and finely detailed and low in

distortion. You’d just have to hear it to believe it, and even then it’s hard to believe coming from a big cone loudspeaker. Better yet, when voices are accompanied by large ensembles, such as Birgit Nilsson’s keen, powerful soprano in the thrilling “Agamemnon” aria from Richard Strauss’ *Elektra* [London], you hear...everything. Voice, strings (including individual instruments within the choirs), winds (ditto), brass (ditto), percussion (ditto). No matter how loudly they play, and the orchestra and soloist alike get very loud in this aria, all of the performers stay in tight, distinctive, easy-to-make-out focus. Nothing gets lost, and the music, the composition, the orchestration, and the performance gain thereby immensely.

It goes without saying that the Q5s are virtual wizards at separating out the timbres of hard-to-distinguish instruments playing *en masse* at the same pitches and the same dynamics (I mentioned several examples of this “sorting hat” magic in my Issue 213 review of the Technical Brain electronics, which, BTW, are the almost ideal companions for these ultra-transparent loudspeakers). They do the same trick with hard-to-decipher lyrics, the harmonies of backup singers and choirs, overdubs, the splicing in of different takes (several of which I’d never noted before in numbers from *Stop Making Sense*).

Something that *does* need to be said is a word about the Q5s’ bass. That word is “fantastic.” Indeed, if I were to pick the single most exceptional thing about this thoroughly exceptional loudspeaker it would be its bass response. One of the very first things I noted about the Q5 was its incredible ability to reproduce the pitches of deep-reaching instruments. We are so used to *not* hearing these low pitches—to hearing

an overabundance of harmonics instead and “supplying” the missing pitches, like amputees experiencing the sensation of a phantom limb—that it comes as a surprise to hear the actual pitches being sounded on, oh, Tina Weymouth’s bass guitar at the start of “Take Me to the River” or Andrei Gavrilov’s thunderous piano in Schnittke’s “Quasi una sonata” [EMI] and realize that the notes are actually much lower in pitch (and much more powerful in intensity) than what we’d previously thought. Again and again, I had this experience with bass-range instruments and the Q5s. Indeed, pitch definition is so clear and dynamics are so lifelike that it is as if the resolution we automatically expect to hear in the midrange had somehow been transposed several octaves into the bass. Or to put this another way, it’s as if the entire gamut from below 20Hz up to, oh 2kHz was being reproduced by a single driver, capable of the same resolution, transient speed, dynamic range, neutrality of timbre, and transparency to source at every pitch. It’s like hearing a super-ribbon or ‘stat, some *Transformers*’ version of a membrane speaker that has the guts of a cone. Although I know no one in his right mind or with a functioning ear on either side of his head would dream of saying this, one would have to be outright daft to call this speaker “low-frequency restricted.” It is anything but.

However here’s what the Q5 isn’t: It isn’t inherently peaked up in the mid-to-upper bass and sucked out in the power range of 100–500Hz. It’s flat and virtually undistorted everywhere. For some listeners, particularly those who prefer the sound of speakers with such a built-in peak and a power-range suckout that further exaggerates that peak, the Q5s’ flat, low-distortion, high-



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fidelity bass might seem lacking in “oomph,” at least on some kinds of music. It’s not that the Q5s won’t deliver lifelike “slam” on bass guitars or toms or kickdrums (just ask *anyone* who’s heard the Qs in my listening room, including half a dozen manufacturers); it’s that they won’t exaggerate that “slam” (and in the process obscure the pitches, timbres, and durations of notes above and below that mid-to-upper bass peak). Exaggeration just isn’t part of their design brief.

I suppose I should say another word about the Q5s disappearing act, although it would be the same word I used about its bass response. These things just aren’t there as sound sources, *provided they are properly set up and driven*. Their staging is vast (on recordings with vast staging), their imaging even more precise and lifelike than that of the M5 (thanks to the reduction in enclosure noise and possibly the reshaping of the cabinet), their perspective entirely recording-dependent.

This does bring me, however, to the downsides of the Q5s. Even though they are incredibly demure loudspeakers by multiway standards—a mere 47" high, 11.8" wide, and 19.5" deep—their internal volume is actually greater than that of the physically larger M5s, which means that, like the M5s, these guys are capable of injecting a tremendous amount of energy (particularly bass energy) into the room. As was the case with the M5, unless you live in a palace you will need to carefully and extensively “treat” sidewalls, frontwalls, and backwalls to get the kind of performance out of the Q5s that I am getting in my room. As noted, you will also need to toe these speaker out more than you did with the

M5s, so that you’re not listening to that “hottish” beryllium tweeter on axis. (If there is one area of this speaker that could stand improvement, IMO, it would be the tweet. I thought the blend of the MR-1 ring-radiator in the M5 was slightly smoother and less audible, although the MR-1 was not as extended or as finely detailed or as dynamic as the MBe-1.) You will also need a *very* powerful amp to drive the Qs. Magico rates the Q5’s sensitivity at 86dB/1w/1m, but as is usually the case with Magico speakers this rating is intentionally misleading. The Q5 is a 4-ohm speaker, which means it takes 2 watts to reach its rated sensitivity; on top of this it is a 4-ohm speaker with a minimum impedance of 2.75 ohms at 56Hz. To sum this up in plain English, this is an 83dB-sensitivity loudspeaker that is also a fairly difficult load. You’re going to need a very powerful, very high-quality solid-state amp or a humongous tube amp (like the ARC 610T, which is a great combination, by the bye) to drive these things to lifelike levels, even in a relatively small room. At \$30k less than the M5 the Q5 qualifies as an exceptional “bargain” by ultra-high-end standards, but a lot of that savings (and then some) may get eaten up by what you end up paying for a suitable amp and preamp.

As I said at the start of this review, I am fundamentally a “fidelity to mastertapes” type of listener. For me, high fidelity means fidelity to sources. Since I was in my twenties I’ve dreamt of a speaker like the Q5 but, since there was nothing like it until now, I’ve settled for the compromises of ’stats, planars, and two-ways (some compromises!). Now that I’ve found a speaker that *does* do the things I love about ’stats, planars, and two-ways without their trade-

offs, I’m a bit at a loss for words, save for “I want it.” (Be careful of what you wish for, my friends.) I’m not going to call the Q5 “the best” speaker out there—there are too many other worthy options, some of which will soon be coming my way, and too many other kinds of listeners for whom the Qs will probably be too neutral, too characterless, too “analytical,” too lacking in “slam.” What I will say is that they are, as of this writing, the “best for me.” A dream come true. Now, if I can talk Wolf and Tammam into some sort of once-in-a-lifetime “deal” (which would be a first for the folks at Magico) I will do the unthinkable: I will put my money where my heart is and buy the damn things. *tas*





## Jürgen Reis: the heart and soul of MBL

To understand what allows MBL systems to achieve their unique reproductive qualities, you should get to know the individual who is and has always been the heart and soul of MBL. For nearly thirty years as MBL's Chief Developer, Jürgen Reis has been responsible for shaping the acoustic imprint of our audio systems. Time and again he and his team of engineers have developed jewels of sound whose naturalness and harmonics far exceed those of any established standards.

He can do this because in his long experience as a musician and sound engineer, he has found that in the world of sound, with its multilayered patterns and interwoven structures, there are dimensions that lie beyond anything you can learn from electrical engineering textbooks.

For Jürgen, technically sophisticated circuitry is just the first step in a long journey of listening and research in the quest for the

perfect component. It takes hours, months, and years of painstaking work to develop transcendent devices that withstand the test of benchmarks beyond measurable parameters. Only when not just the technical side of music, but its very *being* is reproduced; only when the act of listening to music blossoms into a highly emotional experience can a development at MBL be concluded. Only then is Jürgen, the musician and sound engineer—and above all else,

the passionate music listener—satisfied.

This is what makes Jürgen Reis the true heart and soul of MBL. Because just like all the other company employees, he is dedicated to music and unwaveringly committed to the highest pursuit of natural, emotional sound.

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# MBL 101 X-Treme Omnidirectional

**Zowie!**

**Jonathan Valin**

**O**ver the years I've reviewed my share of big, expensive loudspeakers, but none as big or as expensive as the six-and-a-half-foot tall, three-thousand-five-hundred pound, four-chassis, \$200,000 MBL 101 X-Tremes. And none, I am relieved to say, as good.

Why relieved? Well, if you were at the last two CESes you wouldn't have to ask. Even driven by MBL's own superb, ultra-pricey, near-dedicated electronics, the Xes sounded—how shall I put this?—not very good. *Real* not very good. Indeed, when I went to Germany to visit MBL's offices and manufacturing facility this past spring, I had no intention of reviewing MBL's flagships. I'd come for the debut of the 101 E MkII, a revised version of the speaker that has won more TAS Best Sound of Show awards than any other competitor.

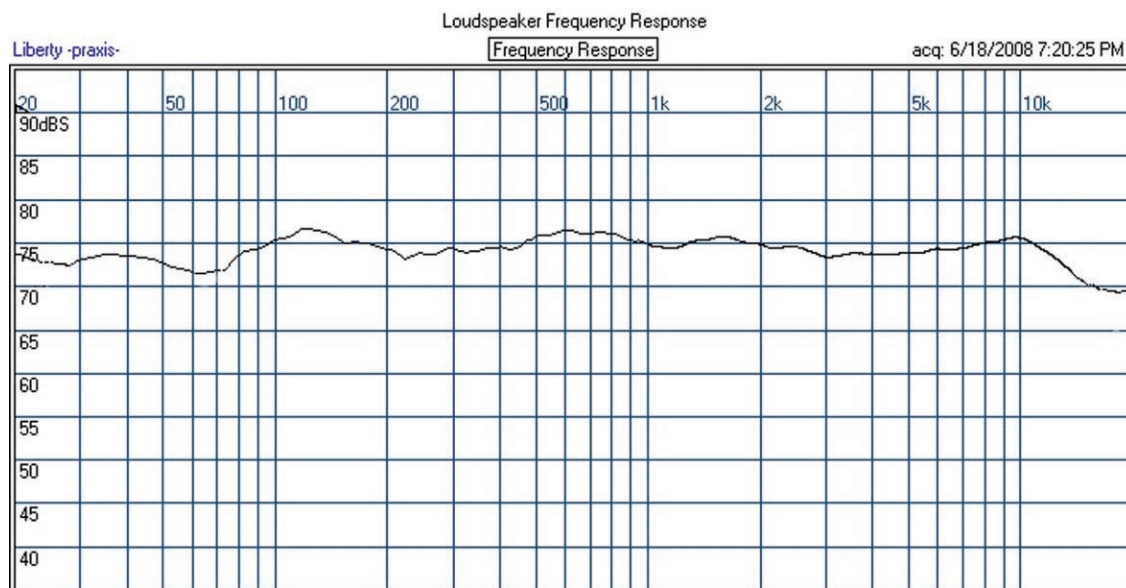
What made and makes the 101 Es such showstoppers is their uncanny ability to get the first step in enjoying music right. Before it does

anything else (and it does many things else), music works on us physically. It excites us. Gets us moving. Starts our toes tapping and our butts wiggling and our arms waving like air-guitar players (or air conductors). When a performer or a hi-fi really allows us “into” the music and the music “into” us, we are always and only a half-step away from dancing and singing and sheer self-abandon. It's one of the chief reasons why we listen.

The 101 Es own this first step in musical enjoyment. They are the thrill rides—the rollercoasters—of the high-end audio amusement park. Though they have any number of things



## EQUIPMENT REVIEW - MBL 101 X-Treme



going for them, it is primarily their sensational dynamic range, speed, and impact, their huge enveloping soundstage, their uncanny three-dimensional presence, their through-the-floor bass, and, of course, their ability to play very loud without compression or confusion that make them so electrifying. Sheer sonic excitement may not mean much to those joyless souls who want to hear a vocalist or a Mahler symphony sound precisely as good or as bad as she or it did in the engineering booth on the day of a recording session; as for me, I still thrill to the thrill of getting goosebumps on my arms or feeling a chill run up my back when a stereo—a mere contraption playing back another mere contraption—captures the excitement of the real thing.

So...given my intention to review a greatly revised version of a speaker I knew was great,

how did I end up with a speaker that I thought I knew wasn't? This, my friends, was serendipity—combined with a touch of lunacy on my part and on Wolfgang Meletzky's (inventor of the Radialstrahler driver and the "M" in "MBL").

As fate would have it, before visiting MBL's Berlin offices and its factory in Eberswalde (a picturesque town outside of Berlin), I made the mistake of stopping at the Munich High-End Show for a few hours, where I heard the 101 X-Tremes properly set up and playing in a much better room than the echo chambers of The Venetian at CES. What a difference! I literally didn't recognize the sound—it was that improved. Though still a little dark in balance and perhaps a little too lively in the upper mids and lower treble (the Munich room was enclosed in glass), this was a far cry from the shrieking harridan I'd heard at CES. Sweet in

timbre, incredibly wide and deep in soundstage, huge in dynamics, with sensational bass and top treble and the kind of three-dimensionality in the midrange that only Radialstrahlers seem to own, the X-Tremes sounded like giant 101 Es but with a timbral and dynamic suavity, a focus and refinement that the wilder, woollier 101 Es never quite managed.

By the time I got to Berlin, my schnitzel was cooked. Hell, I'd already reviewed the 101 Es; I wanted a crack at the Big Boys.

Of course, there were the little problems of the Xes' sheer size and mass to deal with.

What we have here, on *each* speaker-side, is essentially two 101 Es without their subwoofers and subwoofer cabinets—one trio of Radialstrahler (Deutsch for "omnidirectional") drivers facing upward and another, immediately above it, down, in a mirror-image array. The bottom trio of Radialstrahlers is mounted on a massive (over 500 pounds) base constructed of birchwood, brass, and aluminum in a constrained-layer sandwich; the upper set is bolted to a similarly massive top piece, also made of a constrained-layer sandwich of birch, brass, and aluminum, with a high-quality dynamic "ambience tweeter" nestled out of sight on its roof. Thick struts of stainless steel and cross members of powder-coated brass provide top-to-bottom and side-to-side structure and support. Each speaker-side weighs half-a-ton.

In addition to the gigantic Radialstrahler "towers," the 101 X-Tremes come with two six-and-a-half-foot-tall subwoofer towers that weigh better than half-a-ton all by themselves. Each sub array comprises three ported, lacquered-birch and aluminum boxes, fitted on top of each other

via heavy-duty aluminum pegs and sockets, with the sub crossover controls and the MBL amplifier that drives the entire array housed in the middle box. Two 12" aluminum-cone drivers with very wide and flexible surrounds are mounted in a push-push configuration inside each of the three boxes—one woofer on the right side of the enclosure, one on the left, both stabilized and cross-braced by a massive aluminum rod running between them to prevent the drivers from passing resonant energy to each other and to the box itself. That makes a total of six 12" woofers per speaker-side, twelve 12" woofers altogether. *That*, my friends, is a lot of bass.

Although the 101 X-Tremes break down into pieces, the pieces themselves are massive (roughly 300 to over 500 pounds each). With the invaluable help of three of the strongest human beings on earth (piano movers from the Cincinnati company of Elam and Sons), Jeurgen Reis (the X-Treme's designer, who had come over from Germany to assist in setup), David Alexander (MBL's U.S. importer), and I managed to haul the 101 Xes upstairs to my listening room. (Those of you interested in how this Herculean feat was accomplished, go to the forum on AVguide.com and look at the thread "MBL 101-Xtreme Radialstrahler" in the "Speakers" category.)

After assembling the speakers, Reis positioned the Xes and dialed them in—a two-day process that involved many large and small adjustments in the physical location of the Radialstrahler towers and their woofer stacks, as well as adjustments of the controls for each of the twelve Radialstrahler drivers and the two ambient tweeters on top of the Radialstrahler towers, plus tweaking of the gain, group delay (phase), and Q of the woofer



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stacks. (The crossover point between the woofers and the Radialstrahlers is fixed at around 100Hz with a slope of 18dB/octave and cannot be adjusted.) This is a very large, extraordinarily heavy, exceedingly complex speaker system that absolutely requires professional assistance in setup. In other words: Kids, don't try this at home without adult (German) supervision (and, of course, the Elam brothers).

If the 101 Es looked, as I once wrote in TAS, like R2D2 in a hot tub, the assembled 101 X-Tremes looked like the jungle-gym in Nikolai Tesla's house. As a visiting wag remarked, like 'em or hate 'em, they certainly make a design statement. What I expected to hear from these ultra-cool high-tech giants was more or less what I'd heard in Munich—a bigger, better 101 E. But from go, that's not the sound I got.

Let me be honest here: Forget everything you may have heard from the 101 Xes at CES—I had to. Forget everything you've read, including everything I've written about the 101 Xes (counting what I just wrote about its poor-to-mixed performance at CES and its excellent performance in Munich)—I had to. In all candor, this was the most surprising first listen I've had with *any* loudspeakers. They simply didn't sound at all like what I expected based on my show experience, good or bad.

First of all, the 101 Xes were so much more neutral in balance than I anticipated that I was shocked (and still am). They didn't seem to have any of the of the frequency-response lumpiness—the darkness or over-ripeness or hard aggressiveness or searing treble or bloated bass—that I had (secretly) expected to hear from them on the basis of CES auditions. Indeed,

if the 101 Xes sounded like any other speaker, it was the Magico Mini IIs, which is to say that they were solidly and impressively and, again, totally unexpectedly (at least to me) uncolored, undistorted, and “flat.”

Of course, Radialstrahlers have always sounded boxless (they have none) and incomparably big, open, and spacious. But 101 Es were never what I would call truly neutral in balance. The 101 Xes *were*, and even bigger, more open, more spacious than the Es—and not by a little bit. Plus, they had simply sensational dynamic range and scaling—truly lifelike speed, pace, and impact even on instruments (like huge drums or plucked bass guitar) that are nearly impossible to scale realistically in a home. At the same time they had the same “in the room with you” presence on voice and guitars and pianos and strings that makes listening to the 101 Es like looking into a diorama.

Pleased but mystified, I did an RTA on the 101 X-Tremes after Reis and Alexander departed—just to find out if I was fooling myself about their neutrality. I wasn't. At the top of this page you'll find the RTA, taken in my listening room with a calibrated microphone and Liberty Instruments' Praxis software.

For what it's worth, from 20Hz to about 14kHz this is the flattest frequency response I've measured in my listening room with *any* loudspeaker, including the Magico Mini IIs! The Xes' waterfall and impulse plots were also superb.

Though these plots were a reassuring confirmation of some of what I was hearing, they scarcely accounted for all that impressed me about the 101 X-Tremes, which, like any

Radialstrahler, have a unique sonic presentation that no measurements can describe.

To explain the uniqueness of the 101 Xes (or the 101 Es) you have to consider how they generate sound. Radialstrahler drivers are omnidirectional. They are, literally, pulsating spheres—point sources that radiate equal amounts of energy at all frequencies through a 360-degree soundfield. Unlike conventional wide-dispersion dynamic drivers, they do not sound or measure substantially differently “off-axis,” which is to say, they don't change in frequency response or introduce higher amounts of distortion and phase/time incoherence as you move away from the central axes of their drivers (in fact, their drivers don't have central axes). They produce precisely the same signal whether you are sitting in front of them, to the sides of them, or behind them. Necessarily, this means that they bring the entire listening room into play in a way that no other kind of loudspeakers (including dipoles and bipoles) does.

You might think that energy being broadcast in equal amounts at all frequencies toward literally every surface of your room would make the sound you end up hearing a confusing, echo-chamber-like mess. That it doesn't has to do with two interrelated phenomena: the 101 Xes' frequency-independent, constant-directionality dispersion, and the Precedence Effect.

First, unlike conventional loudspeaker drivers (particularly tweeters) that tend to send spotlight-like beams of inherently-more-distorted off-axis sound toward sidewalls—where, delayed only slightly in time, they bounce back to your ears alongside the direct output of the loudspeaker, screwing up timbres, dynamics, and durations

at certain frequencies—an omni doesn't “selectively” energize specific spots on your walls. It doesn't work like a specular flashlight. It works like a diffuse glowing ball. It energizes your room *uniformly* at all frequencies, so that any reflected early arrivals will comprise the entire signal and not a small distorted piece of it.

Of course, an omni is still creating broadband room reflections, but we don't hear them as colorations because of the Precedence Effect.

The Precedence Effect is a psychoacoustic phenomenon whereby an acoustic signal

### SPECS & PRICING

**Type:** Four-way omnidirectional loudspeaker with separate subwoofer towers and ambience tweeter in four chassis

**Drivers (per speaker side):** Two Radial TT100 woofers, two Radial MT50/E midrange, two HT37/E Radial tweeters, one “ambience” dome tweeter, six 12" aluminum cone subwoofers

**Frequency response:** 20Hz-40kHz

**Sensitivity:** 88dB/2.8V/2pi

**SPL:** 109dB

**Power handling:** 500W (continuous), 2200W (peak)

**Weight:** 3600 lbs.

**Price:** \$199,000/pr.

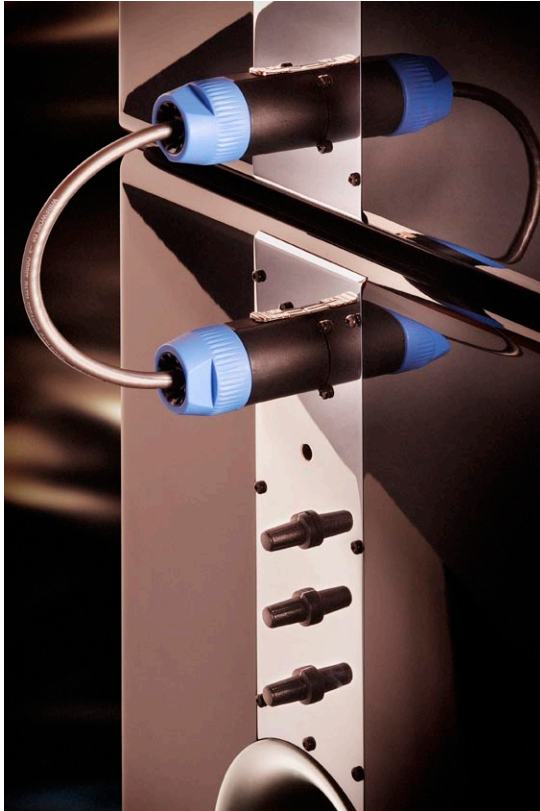
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arriving first at our ears suppresses our ability to hear any other signals, including echoes and reverberations that arrive up to about 40ms after the initial signal (provided that the delayed signals are not significantly louder than the initial signal). As Dr. Siegfried Linkwitz says on his fascinating Web site at [www.linkwitzlab.com](http://www.linkwitzlab.com): “The ear/brain automatically relegates [these late-arriving signals] to the earlier learned acoustic behavior of the room and readily blankets that information and thereby the [sound of the] room itself.” Far from being more colored by room reflections,

drivers, and enclosures, boxless omnis are in principle much *less* colored by all of these things and potentially much more faithful to sources because they essentially take the room sound *out* of the equation, thanks to the Precedence Effect and the fact that they are lighting up reflective surfaces uniformly at all frequencies rather than selectively at specific frequencies.

Omnis not only light up every surface of your room evenly; they light them up with *tremendous* energy, greatly reinforcing uniform power response through the passband (albeit at a price in loudspeaker sensitivity). Part of the reason that MBL Radialstrahlers are so famously lifelike in dynamics (particularly when they are played at moderate to loud levels) is the sheer amount of energy they are generating thanks to the unusually large surface area of their drivers. Consider a Radialstrahler woofer (the big silver pumpkin-like driver at the bottoms and tops of the Radialstrahler towers in the photos of the MBL 101 X-Tremes). Every square inch of these giant spheres is producing sound with the same intensity as the central portion of a conventional dynamic woofer (and without any of the center-to-edge drop-off in power or increase in distortion of a conventional woofer). In radiating area a Radialstrahler woofer is the equivalent of something like twelve 12" cones! (And each side of the 101 X-Treme has two of them!). The exact same thing is true of the Radialstrahler midrange and tweeter (and what a tweeter!).

You might think that drivers this large would be slowed down by their mass and would ring like bells being struck when hit with an electrical signal, but their size actually works to their advantage. Since they're driven over the entire

surfaces (they expand and contract, accordion-like, when playing), they have to move only very small amounts to make very loud sounds. These small excursions also mean that they don't have to move very much to *stop* making sounds. Plus for all their size they are made of lightweight materials (the midranges and tweeters are formed from petals of carbon-fiber, the woofers' from an aluminum-magnesium alloy) and, because of the volume of air inside them, are virtually self-damping. No, Radialstrahler drivers aren't as lightweight as, oh, Quad ESL-2905 or MartinLogan CLX membrane drivers. (And, at *really* low listening levels, not as quick on transients or as high in resolution, either—though the difference in speed of attack and resolution of detail is surprisingly small and is completely gone at moderate to loud volumes, while the difference in sheer lifelike power delivery on big dynamic swings is hugely in the 101 Xes' favor. 'Stats and ribbons are fast but relatively “weightless,” like hummingbirds. Radialstrahlers are fast and strong, like bulls.)

Putting all of this energy into your room is going to mean that—omni theory notwithstanding—you will need to selectively damp certain surfaces of your room, particularly the walls between the speakers and behind the listening position. But then you have to selectively damp walls with any speaker. What you will get for your trouble is, I promise you, something extraordinary.

*Everyone* who's heard the MBL 101 X-Tremes—from my usual listening panel of friends and colleagues (many of whom have auditioned every piece of gear that has come through my room) to visiting manufacturers (some of competing loudspeakers)—has had the exact same

reaction, expressed in almost exactly the same words: “Where are the speakers?” Despite any shortcomings (and I will come to these), the MBL 101 Xes (properly situated and adjusted) sound less like loudspeakers than any other speaker system I've heard. All of the various ways in which speakers betray that their sound is being projected in narrower or broader dispersion patterns by individual drivers in resonant enclosures simply aren't present (lending considerable credence to Dr. Linkwitz's argument about the superiority of frequency-independent, constant-directionality transducers). What you hear, instead, is a soundfield that seems, magically, to have been imported *in toto* from some other place—from a concert hall or a recording studio—and plopped down in your listening room. There's simply little to no vestige of “speaker” in the traditional sense. To put this differently, where other transducers sound the way movies look—like a two-dimensional medium imitating a three-dimensional one—the 101 X-Tremes sound the way a *theatrical play* looks—no ersatz third dimension, but actual people on an actual stage right there in front of you (albeit reduced in size).

I've heard speakers with great “disappearing acts” before (the Magico Mini IIs, *par excellence*), but none like this one, which doesn't so much disappear as not show up in the first place. It's really a bit bizarre that a system that calls so much attention to itself when the music isn't playing, because of its huge size and ultra-cool high-tech looks, vanishes so utterly when the music is on. It is, perhaps, the most astonishing bit of acoustic legerdemain I (or any of my friends) have ever witnessed.

When the recording allows, the Xes' magical

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three-dimensional soundfield extends far beyond the boundaries of the speakers (including their woofer towers) and far beyond the backwall. When the recording doesn't, the stage shrinks accordingly. The notion, advanced by some, that the "soundstage control" of omnis is always set to "11," to borrow from Nigel Tufnel of Spinal Tap, just isn't true. Yes, they add an attractive bit of air and spaciousness to most recordings, but like any great transducer they reproduce what they are handed with high fidelity.

Where omni detractors used to have an indisputable point was imaging. For all their many virtues, something like the 101 Es had trouble focusing vocalists and instrumentalists at center stage (though not at the sides of the stage); there was always a vagueness, a swimminess to their central images, which lacked the specificity of other high-end speakers. However, I am happy and astonished to report that imaging is no longer an issue with the 101 X-Tremes, which focus voices or instruments at center stage with all the precision of Magico Minis (and with more lifelike size, to boot).

What's changed? Well, there are two Radialstrahler arrays now per speaker side, in a mirror image (or quasi D'Appolito) configuration; the midrange and tweeter Radialstrahlers have been greatly improved with new formers and voice coils; the crossovers have been upgraded with new caps from Mundorf and Intertec; the 101 E's vibration-producing subwoofers have been moved to their own constrained-layer enclosures; and the entire Radialstrahler tower is now heavily damped and braced by massive applications of constrained-layer materials. In other words, all of the drivers and crossovers have not just been

audibly improved, made higher in sensitivity, and less subject to exciting room nodes (thanks to the D'Appolito configuration), but they are also seeing orders of magnitude less vibration than they did in the 101 E, which, I have to think, was a large part of why they didn't image very well.

Not only have these changes in drivers, crossover, and support system wrought big improvements in imaging, they have, to my ear, also improved overall smoothness of frequency response, resolution at low volume levels, and bass response.

Let's start with the last first. Putting twelve 12" woofers in two towers might seem like a recipe for overloading a room. But I'm here to tell you that the effect is just the opposite. While the 101 Es low bass was one of its glories, because it went so incredibly deep and sounded so incredibly fast and dynamic for a single driver in a small, dual-ported enclosure, it was also (or occasionally could be) one of its shortcomings. As great as it was to hear bass drum strikes detonating like sonic booms, or doublebass choirs growling like semis pulling away from a curb, or organ notes rattling the floor and walls like a subway passing outside the window, the 101 E's bandpass sub was a little wild and woolly. It was fast and powerful all right and tremendously exciting, but it was adding vibration to itself and the Radialstrahlers ensconced above it and it was more likely to excite room nodes (since it was fixed in one spot facing downward toward the floor).

In my room the 101 E subs tended to lump up around 60–80Hz, to the extent that with the right recording (or should I say the wrong one), like, say, just about any LP or CD with good solid Fender bass, you could be wowed and annoyed

simultaneously—wowed by the sheer extension and floor-shuddering, pantsleg-shaking power of the MBL's bottom end, annoyed by the sub's room-induced boominess at select frequencies. Don't get me wrong. I still think that the 101 E's bass is astounding. The best I've heard. I just think that the 101 X-Tremes' bass is better. By adding more and better woofers and locating them at different heights from the floor, walls, and ceiling (both in the bass towers and in the Radialstrahler towers), the Xes are *much* less likely to reinforce room nodes—and so they sound. They may be a little less purely astounding now, but that is because they are calling less attention to themselves. They are audibly and measurably flatter, smoother, better controlled, lower in distortion, and much better integrated with the Radialstrahler drivers than the 101 E's bandpass subs. At the same time, they are every bit as impressive in extension, speed, and power delivery as the 101 E's subs, and more impressive in resolution. If you think you've heard all there is to hear in the way of timbre, texture, and dynamics in low-pitched instruments (like bottom-octave piano, double bassoon, doublebass, bass drum) think again. In the bass, these things sound the way 'stats would sound if they went down flat to 20Hz and had the weight, body, and density of tone color of great cones. The Xes' sheer resolving power coupled with their speed, neutrality of timbre, lifelike cushioning of air, and astonishing three-dimensionality make things like forcefully bowed cello or bass (or forcefully struck timp) come alive in a way that very few other speakers I've heard can match—and none that I've heard in my home exceeds. It may be that the Wilson Alexandria X-2 Series 2 that Robert Harley recently reviewed or





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the Magico M6 would outdo them in the bass; even so, this is phenomenal low end.

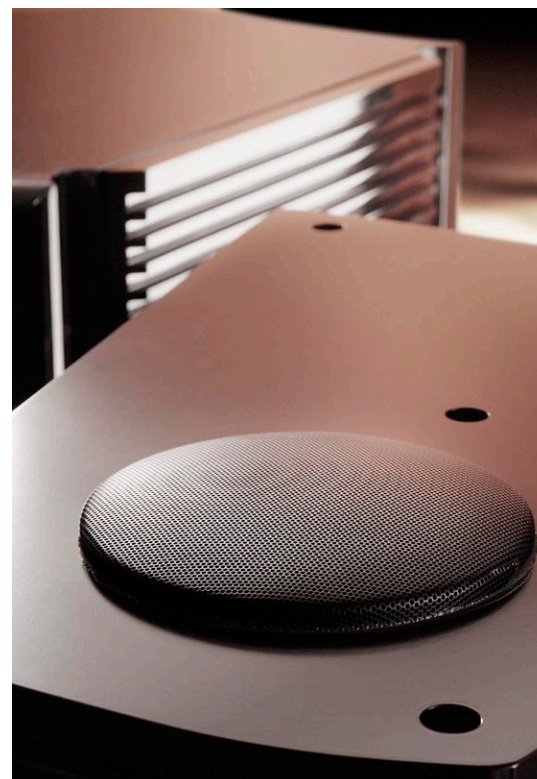
As those of you familiar with my writing know, I'm generally no fan of outboard subwoofers. Not to put too fine a point on it, I almost always hear them as separate and separable drivers. With the 101 X-Tremes, for once, I don't. This is the most seamless blending of subwoofer and main speakers I've heard. Indeed, I would dare anyone, who didn't already know where they crossed over, to tell me by ear alone where the 101 X-Treme sub towers were starting and the Radialstrahler towers stopping. They are as much of a piece as the Radialstrahlers themselves.

Of course, it probably doesn't hurt that they are being driven by built-in MBL amplifiers. And I *know* that it doesn't hurt that they have been painstakingly tweaked in by Juergen Reis. (Before he worked his magic, you *could* hear the sub towers quite plainly. Indeed, I believe that the proper dialing in of the sub towers has been the chief problem at shows—that and playing these things at jet-airplane-engine levels.)

Lowering the amount of resonant energy and improving the drivers and crossovers of the Radialstrahlers and their subs has also improved another area of 101 E weakness—realistic playback at lower volume levels. Like dipole Maggies, the 101 Es tended to lose a little dynamic scale at both the *piano* and the *forte* end of the spectrum when played softly. You needed to turn up the juice to make them come to life (which was why the MBL gang has always played them loud at shows). Though still not the match of a Magico Mini II, a Quad ESL-2905, a MartinLogan CLX, or a Symposium Acoustics Panaroma in timbre, texture, and dynamic nuance when played at low

volumes (under 80dB average SPLs), the 101 X-Tremes are *considerably* improved in all three areas over the 101 Es—to the extent that you can now listen through them to chamber or acoustic rock or folk music with the same pleasure (and with very nearly the same sense of verisimilitude) that you'll get through them from any and all kinds of music played at louder levels (80dB+ average SPLs). It used to be said that MBLs were a rock 'n' roller's loudspeaker. Not anymore. Low-level resolution, top-to-bottom neutrality, and dynamic scale at all volumes have been greatly improved. And at lifelike SPLs, the Xes are very nearly unmatchable in every area save for top-treble extension, where the ribbons in the Symposium Panoramas and the ring-radiator tweeter in the Mini IIs outdo them. (While not as extended on top as these two other great speakers, let me assure you that neither the Pans nor the Minis can reproduce a cymbal as realistically as the Xes' Radialstrahler tweeter.)

As noted earlier *in re* electrostats, the 101 X-Tremes don't just deliver the goods with superior speed and startling neutrality; they deliver them with a power and a lifelike duration that reminds me of the TW Acoustic Raven AC-3 turntable. Through the 101 X-Tremes, instruments like struck cymbals aren't just wispy, floaty little things expressed with exquisite delicacy that then die away like a sigh—half color, half air, like aural half-tones. They are the big, powerful, *solid* bell-bronze instruments they are in life, whose sound is reproduced with the power and lingering, shimmering sustain that describes their physical presence—their three-dimensional shape and material composition—in addition to their timbre and texture. All instruments are so described



by the 101 X-Tremes, not just in richly colored outline but in solid, richly colored shape. To hear the Xes—well, not really the Xes because they aren't there as sound sources—but to hear the way they conjure up something like Mark Cohn's terrific cover of Willie Dixon's "29 Ways" is to hear something much closer to musicians in a club or hall or recording studio than to mere hi-fi. Cohn's centered voice, his voice doubled for backup and panned hard right and left (sometimes well "outside" the physical bounds of the speakers), the hard spikes and soft-palmed strokes of percussion distributed throughout the stage, that

wonderful purling Hammond organ that comes flooding across (and beneath) the floor like a dark, burbling tide...once again, it is like watching a play to hear these things conjured up in three dimensions before eye *and* ear. While we all listen, perforce, blind to stereo, the 101 X-Tremes go further toward compensating for our hunger to see what we hear—to fulfilling the definition of the word "stereo" (which literally means "three-dimensional" or "solid")—than anything else I've yet auditioned.

The 101 X-Tremes are not the only great loudspeakers I've heard—merely the best. They aren't quite as transparent as MartinLogan CLXes. They aren't quite as lifelike in timbre as Magico Mini IIs. They aren't quite as fast in transient response as Quad ESL-2905s. They aren't as colorless in the midband and treble as Symposium Acoustics Panoramas or as microscopically finely detailed (at least at low-to-moderate volume levels). They are ungodly expensive. They are huge. They require extensive setup and fine-tuning, and in spite of the fact that they are 6dB more sensitive than 101 Es they still do best biamped with *four* of MBL's own nearly \$100k/pair 9011 monoblocks and fed by MBL's own superb 6010 D preamp (although the ARC Reference 3 preamp is, IMO, every bit as good as the MBL 6010 D with MBL's powerhouses, and a pair or two of ARC's 610Ts represents much-less-expensive and equally impressive alternative amplification). They need the best sources and cabling that money can buy. They are handmade to order and take at least 90 days to build. In short, a system built around them represents an insanely complex and expensive investment of time, space, and upwards of half-



## EQUIPMENT REVIEW - MBL 101 X-Treme

a-million dollars, which, in this economy, is a stretch even for the ultra-rich and ultra-loony. Although they did exceedingly well in my smaller room (so well that even saturnine Juergen Reis pronounced himself greatly pleased), they will probably do better in medium-sized-to-large rooms, although I would be wary of rooms that are too large (since Radialstrahlers need to see walls at some distance to function the way they are designed to function).

There may be other speakers—in fact, there are other speakers (some of which I’ve mentioned)—that *marginally* outdo the 101 X-Tremes in this area or that, and there are some on the horizon that will doubtlessly prove competitive. That’s OK. There’s room for more than one great transducer, even at this level of excellence. This said, I rather doubt that the 101 X-Tremes will be beaten out by any other kind of loudspeaker when it comes to their uncannily realistic recreation of space, their three-dimensionality, their dynamic range and scaling from top to bottom (above 80dB SPLs), and their “you-are-there” presence.

Frankly, the other reaction that every single listener who’s heard the 101 X-Tremes has had, once he gets past the Xes’ disappearing act, is: “This is the most realistic stereo system I’ve heard.” It hurts me to say so, since I will never be able to afford them, but when it comes to sheer lifelike excitement at moderate-to-loud listening levels I have to agree. *tas*

