the absolute sound

# Buyer's Guide to **Affordable High-End Audio 2017**

oppo

# An Inside Look... Literally.

Instead of telling you what makes the UDP-205 a revolutionary new step in home theater excellence, we've decided to crack open one of the units ourselves and show you just how it achieves its incredible audio and exceptional video.

Two ES9038PRO DAC chips— one for 7.1 channel analog audio, one for balanced XLR & RCA stereo output. These top-of-the-line DACs set a benchmark for audio excellence with best-in-class 140dB of dynamic range.

A custom-made 4K disc loader with an optimized laser mechanism loads discs quickly, keeps errors at bay, and plays nicely with a wide range of optical media, from UHD Blu-rays to SACDs and much, much more.

A massive toroidal power supply sends robust, clean power to the audio components throughout the UDP-205, with less exterior magnetic field influence compared to traditional laminated steel core transformers.


A specialized, high-stability and high-precision HDMI jitter reduction circuit reduces jitter and eliminates timing errors for accurate audio when using the audio-only port.

Dedicated stereo output with balanced XLR and RCA connectors transmit a pair of differential signals, providing better common-mode noise rejection and improved signal quality.

Also included in the UDP-205 is one of the most advanced 4K UHD Blu-ray processors, Dolby Vision compatibility, support for several 4K video codecs for user generated media, and HDR to SDR conversion for older displays.

UDP-205 is available for $1299 from oppodigital.com or from select retailers, resellers, and custom installers nationwide.

OPPO Digital, Inc. | www.oppodigital.com | Menlo Park, CA @oppodigital

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# From the Editor

## Welcome to the 2017 Buyer's Guide to Affordable High-End Audio!

Perhaps now more than ever high-end audio is considered an expensive hobby. But thanks to market demand and tech advances (and their "trickling down") great sound doesn't necessarily have to cost a fortune.

That's why we're pleased to offer this guide to affordable hi-fi gear of all kinds. Herein you'll find not only **39 full-length reviews from TAS**, but you'll also get:

- **"On the Horizon,"** featuring the scoop on **14 of the hottest upcoming products** across a variety of categories.
- **"How to Choose Components,"** essential reading excerpted from the latest (fifth) edition of Robert Harley's classic *Complete Guide to High-End Audio.*
- **"Sneak Previews"** of **brand-new equipment reviews** not yet published in TAS.
- **"Top Picks,"** where we've selected **the best affordable gear across six categories**.

Whether you're a longtime audiophile or a newbie, we hope you'll find this guide an invaluable resource to help you get the most bang for your buck on all your hi-fi buys.

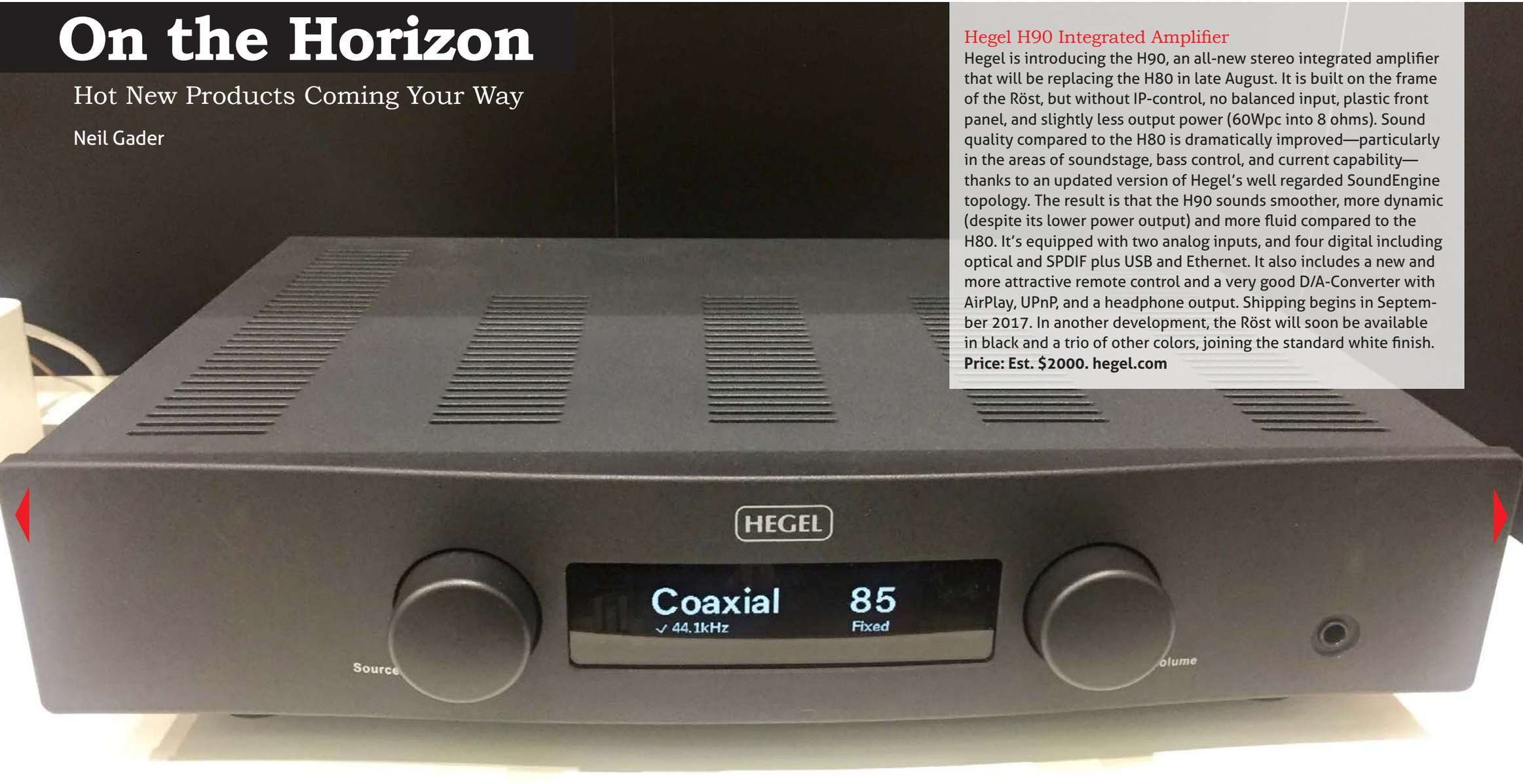
Happy listening!

Julie Mullins, Editor

# On the Horizon

## Hot New Products Coming Your Way

Neil Gader




### Hegel H90 Integrated Amplifier

Hegel is introducing the H90, an all-new stereo integrated amplifier that will be replacing the H80 in late August. It is built on the frame of the Röst, but without IP-control, no balanced input, plastic front panel, and slightly less output power (60Wpc into 8 ohms). Sound quality compared to the H80 is dramatically improved—particularly in the areas of soundstage, bass control, and current capability—thanks to an updated version of Hegel's well regarded SoundEngine topology. The result is that the H90 sounds smoother, more dynamic (despite its lower power output) and more fluid compared to the H80. It's equipped with two analog inputs, and four digital including optical and SPDIF plus USB and Ethernet. It also includes a new and more attractive remote control and a very good D/A-Converter with AirPlay, UPnP, and a headphone output. Shipping begins in September 2017. In another development, the Röst will soon be available in black and a trio of other colors, joining the standard white finish.
**Price: Est. $2000. hegel.com**

# On the Horizon


## Clearaudio Charisma V2 Cartridge

The Charisma V2 is Clearaudio founder Peter Suchy's moving-magnet masterpiece, setting new performance standards for mm cartridge clarity, soundstaging, bass, and dynamics. The Charisma V2 uses the same Boron cantilever and double-polished Gyger S stylus found in their top-of-the-range Goldfinger Statement mc cartridge. Handmade in their German factory, the generator utilizes ultra-high-efficiency magnets that are precisely matched, ensuring flat frequency response and excellent channel separation. The Charisma V2 output is a real world 3.6 mV, allowing it to easily drive most phonostages for maximum system compatibility. It is housed in a special ebony wood body with silver inlay for added mass and resonance control. Weight is 9 grams, and recommended tracking force is 2.4 grams. **Price: $2000. A special trade-up price for Clearaudio Maestro mm cartridge owners is available for $1500. musicalsurroundings.com**


## Oppo Digital UDP-205 4K Ultra-HD Audiophile Blu-ray Disc Player

Oppo Digital is proud to present its newest release, the UDP-205 4K Ultra-HD Audiophile Blu-ray Disc Player, which combines high-performance audio with reference-quality video for a superior home theater experience. With HDR10 and Dolby Vision compatibility and a wide variety of supported 4K video disc and file formats and codecs, 4K video comes to life with natural, true-to-life colors. Dual ES9038PRO DACs, a built-in headphone amplifier, HDMI audio jitter reduction, and dedicated stereo RCA and XLR outputs all receive clean, robust power from a massive toroidal power transformer for top-notch crystal-clear audio. Priced at $1299, the UDP-205 provides unparalleled value to audiophiles, movie lovers, and savvy enthusiasts alike. **Price: $1299. oppodigital.com**

## EC Living Tana SL-2 and L-2 by Electrocompaniet

Blending Scandinavian design with heritage for high-performance sound and simple operation, the Tana SL-2 is an all-in-one solution combining a wireless loudspeaker, a powerful amplifier, and a wireless audio streamer. The system can play music from your collection, has built-in Internet radio, and is compatible with all the most popular streaming formats and services including Spotify, Tidal, Airplay, etc. Easy to set up and use, it can be controlled from any tablet, smartphone, PC/Mac, or directly from the system itself; it's also compatible with third-party control systems. No additional software required. The aluminum body offers solid construction, while the variety of changeable color grilles and decorative band finishes including classic matte black and copper, matte chrome or even handcrafted wood options perfectly complement any décor. To ensure top quality, it's designed and built in Norway and incorporates analog Class AB amplifiers and sophisticated signal processing from the Classic Line. EC Living also includes the Rena line of components that enables amplification and streaming capability to existing passive speaker systems. The amplifier designs and streaming features are common throughout all EC Living products. **Price: Tana SL-2: $949; Tana L-2, $799 (speaker only add one). electrocompaniet.com**

# On the Horizon

## Periodic Audio Be In-ear Monitor

In any in-ear monitor, the transducer is at the heart of what the user hears, and Periodic Audio has taken a no-compromise approach to its design, choosing superior metals including pure beryllium for its flagship model Be. Be, and all Periodic Audio IEMs, use a single wideband dynamic transducer design, which eliminates the crossover network—there are no electrical components between the amplifier and the transducer, which allows for smooth, clean sound throughout the audio band. The counter balance sets the center of gravity perfectly to avoid pressure on the tragus, and/or anti-tragus, while the lightweight polycarbonate body provides high strength and zero resonance. With a design focused squarely on performance, safety, and comfort, the award-winning Be in-ear monitors offer an affordable yet high-quality solution for music lovers on the go. **Price: $299. periodicaudio.com**


## AudioControl Rialto 600 Zone Amplifier/DAC

The AudioControl Rialto 600 is a high-performance zone amplifier/DAC with an internal preamplifier engineered as a solution for adding audio zones, enhancing TV set-ups, or for improving multi-room streaming systems. The Rialto 600 will power speakers of all types including those with low impedance, and can serve as a favorable upgrade for computer audio and gaming. This compact amplifier features switchable digital and analog audio inputs combined with volume control circuitry that can be controlled via IR or RS232 commands. The amp delivers 2 x 100 watts into 8 ohms, 200 watts into 4 ohms and 400 watts in mono, stable down to 3.6 ohms. The Rialto 600 features a Wolfson DAC, creating an all-in-one solution that is equipped with AccuBASS equalization and selectable high/low-pass crossovers. Source selection, volume, and AccuBASS are controllable via remote or home automation commands. The Rialto 600 is available in white or black and has a five-year warranty. **Price: $849. audiocontrol.com**

## Astell&Kern KANN Portable Player

The Astell&Kern KANN features a dedicated 3.5mm unbalanced/2.5mm balanced headphone out and 3.5mm unbalanced/2.5mm balanced dedicated line out jacks; 64GB of internal memory; support for full-size SD (up to 512GB) and microSD (up to 256GB) cards for additional storage; USB-C connection for faster charging and transfer speeds; larger battery and a built-in headphone amplifier. Featuring a single AKM AK4490 DAC chipset, KANN is the first sub-$1000 player from Astell&Kern to support native playback of 32-bit/384kHz high-resolution PCM audio and native playback of DSD audio, up to quad (DSD256). Other features include Parametric EQ (PEQ), VCXO reference clock (Femto Clock) for minimal jitter, AK Connect support, USB DAC function, Wi-Fi connectivity, DLNA networking support, OTA software updates, digital audio output via micro-USB, aptX HD, and support for high-resolution music streaming services including Tidal. Available in two colors: Astro Silver and Eos Blue. **Price: $999. astellnkern.com**

# On the Horizon

## Bryston BCD-3 CD Player/DAC

The BCD-3 has been engineered to play back Redbook CD and CDR discs using a premium transport/laser pickup assembly mated to two AKM 4490 384/32-bit DACs. The BCD-3 utilizes a single master clock that syncs the transport to the DAC, eliminating one of the primary sources of the unwanted artifact known as jitter. The DAC in the BCD-3 is based upon Bryston's acclaimed BDA-3 platform and includes a fully discrete Class A analog output stage and independent analog and digital power supplies. Users have their choice of balanced XLR or unbalanced RCA stereo outputs as well as transformer-coupled SPDIF/AES digital outputs. The BCD-3 is network connectable, enabling software upgrades via an Ethernet jack and there is a remote 12-volt trigger input as well. The front panel, available in black or silver aluminum, has been designed to aesthetically match Bryston's Cubed Series amplifiers. All Bryston digital products are covered by a five-year warranty. **Price: $3495. bryston.com**

## NAD C 338 Integrated Amplifier

NAD Electronics' new C 338 is the first hi-fi amplifier to feature built-in Chromecast for a wide range of streaming options. It is also a highly versatile Class D amplifier designed in NAD's Classic Series tradition to deliver class-leading performance, connectivity, and flexibility at an affordable price. The C 338 allows users to seamlessly stream and listen to music, podcasts, and playlists from many popular apps. With Bluetooth also natively integrated, the C 338 can wirelessly connect to any smartphone, tablet, or Bluetooth-enabled device within range so users can stream their favorite music apps or libraries in high fidelity. Using proprietary Hybrid Digital technology, the C 338 amplifier delivers 50 Watts of continuous power per channel (into 8 and 4 ohms) and a remarkable 150 Watts of dynamic power at 4 ohms, all with virtually no noise or distortion. Joining its higher end siblings, the C 368 (see Sneak Preview) and C 388, these three new Hybrid Digital DAC amplifiers cover a range of technologies, power, and price-points yet all are designed to provide remarkable performance and value. **Price: $649. nadelectronics.com**

## Dynaudio Special Forty Loudspeaker

The Dynaudio Special Forty 40th anniversary loudspeaker incorporates the all-new Esotar Forty 28mm soft-dome tweeter, a design exclusive to this model. Based on Dynaudio's Esotar², it features a new, high-grade neodymium magnet for extended frequency bandwidth, significantly lower resonant frequency, and further minimized distortion. The Esotar Forty is mated to a newly designed 17cm mid/woofer utilizing a Nomex spider suspension and fiberglass voice-coil former to offer optimized mechanical symmetry. A higher-grade neodymium magnet in a new hybrid magnet system is set inside the large-diameter aluminum voice-coil. The woofer's Airflow Basket frame provides an anti-resonant foundation, reducing reflections and improving air movement behind the geometrically optimized MSP (magnesium silicate polymer) cone. The result is improved performance with lower distortion and higher power handling. The drivers are complemented by a phase-aligned, impedance-linearized, first-order crossover design featuring audiophile-grade components. The Special Forty is available in a choice of two exclusive high-gloss lacquer finishes: Grey Birch and Red Birch. **Price: $2999/pr. dynaudio.com**

# On the Horizon


## Cardas Iridium Power Cable

A good power cable can bring dramatic improvements to any high-fidelity audio component. Now, joining the Iridium Speaker, Interconnect, and Phono wires, the Iridium Power brings high-performance power delivery to the affordable end of the Cardas product line. Shielded with two Cardas 11.5 AWG crossfield conductors, PFA tape dielectric, and a toroidal filter, Iridium Power shares design features with the company's higher-end power cables. Iridium Power is light and flexible, and comes terminated with Cardas 3455R power connectors. It has enough capacity to be used with almost any electronics from sensitive digital sources to power amplifiers. Iridium Power rounds out the Iridium product line, which now offers remarkable price-for-performance value in high-end cabling. **Price: $270/1m. cardas.com**


## Purist Audio Design Impresa Silver Headphone Cable

Purist Audio Design has just released a new revision of headphone cables, the Impresa Silver. Extensive hours of testing, listening, and comparing various wire designs and connectors using top headphones has resulted in the creation of a very musical, high-performance headphone cable. Purist Audio engineers have designed a twin proprietary silver-alloy two-conductor wire with Nano technology to improve wire conductivity and strengthen the conductors. The Impresa Silver achieves a mere 0.0213-ohm/m resistance and a capacitance of 20 pF/FT for a quicker release that's said to produce a more transparent, true, and airy sound. For the connectors Purist Audio sources from and works with companies such as Furutech and Neutrik to provide a sonically revealing cable of high quality. The Impresa Silver offers increased clarity with focus and transparency, a great match for today's high-end headphones. **Price: $690/1m. puristaudiodesign.com**

## Audio by Van Alstine DAC MK 5

The AVA DAC MK 5 is a multi-format digital-to-analog converter designed for superb accuracy and musicality. Based on the renowned AKM AK4490EQ D/A converter device, AVA's implementation uses optimized, independent, active voltage references for the highest conversion accuracy. Analog processing is handled by discrete solid-state Class A circuits. These highly linear and musical circuits present the kind of transparent highs and liquid mids one would expect from the best tube circuits combined with the solid bottom expected from the best solid state. With the DAC MK 5, there's an absence of the clicks, pops, and other drama when switching between formats—even to and from DSD. The DAC MK 5 seamlessly supports PCM data streams up to and including 192kHz as well as DSD64 and DSD128 formats. Sample rate and format information are displayed via front panel indicators. It has a total of five inputs: two coax SPDIF, two optical SPDIF, and one USB input. **Price: $1899. avahifi.com**

# On the Horizon


## Audience Forte powerChord and Forte 8 Outlet Power Conditioner

Audience announces the development of two high-quality, affordable power products, the Forte powerChord and Forte 8 outlet power conditioner. Both of these contain an atypical level of quality and technology for entry-level high-end audio products. The Forte powerChord is 10 AWG andmade of high-purity stranded copper with high-quality XLPE insulation. Like the new upper-end Au24 SX powerChord by Audience, the Forte powerChord ground leg is shielded for extra-quiet performance while leaving the two conductors unshielded for unimpeded dynamics. Housed in a robust and handsome enclosure, the Forte power conditioner is an 8-outlet system using hospital-grade outlets and a star-ground buss bar system with RF filtration based on Audience Auricap XO+ capacitors. **Prices (estimated): Forte powerChord Forte 8, $749; powerChord $249/6". audience-av.com**

**Feature**

# How to Choose Components

Robert Harley

*Excerpted and adapted from* The Complete Guide to High-End Audio *(fifth edition).*

*hifibooks.com. To order call (800) 841-4741.*

## System Matching

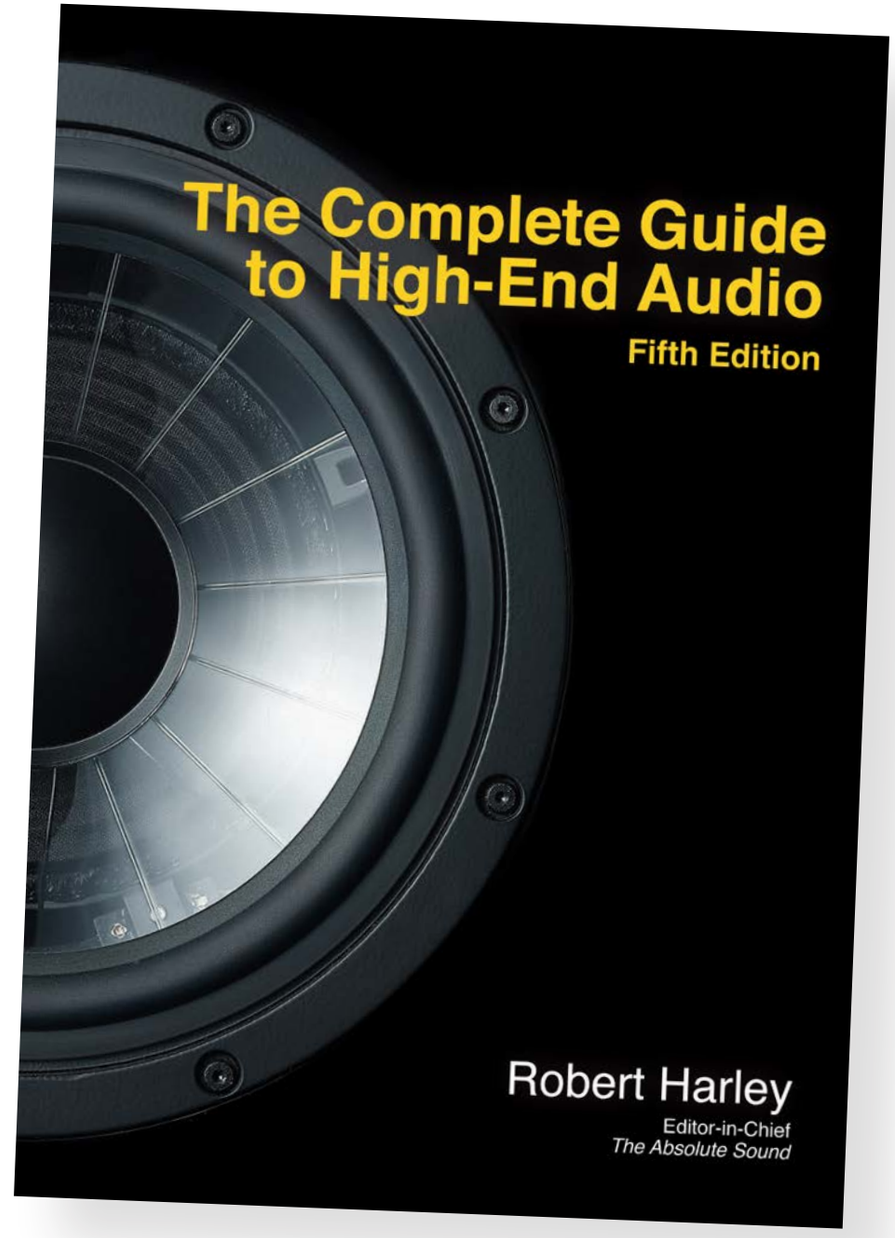
It is a truism of high-end audio that an inexpensive system can often outperform a more costly and ambitious rig. I've heard modest systems costing, say, $1500 that are more musically involving than $50,000 behemoths. Why?

Part of the answer is that some well-designed budget components sound better than ill-conceived or poorly executed esoteric products. But the most important factor in a playback system's musicality is *system matching*. System matching is the art of putting together components that complement each other sonically so that the overall result is a musicality beyond what each of the components could achieve if combined with less compatible products. The concept of synergy—that the whole is greater than the sum of the parts—is very important in creating the best-sounding system for the least money. System matching is the last step in choosing an audio system. You should have first defined the system in terms of your individual needs, set your budget, and established a relationship with a local specialty audio retailer (if there's a dealer in your immediate area). After you've narrowed down your choices, which products you select will greatly depend on system matching.

Knowing which components work best with which other components is best learned by listening to a wide range of equipment. Many of you don't have the time—or access to many diverse components—to find out for yourselves what equipment works best with what other equipment. Consequently, you must rely on experts for general guidance, and on your own ears for choosing specific equipment combinations.

The two best sources for this information are magazine reviews and your local dealer. Your dealer will have the greatest knowledge about products he carries, and can make system-matching recommendations based on his experience in assembling systems for his customers. Your dealer will likely have auditioned the products he sells in a variety of configurations; you can benefit from his experience by following his system-matching recommendations. With the unfortunate decline in the number of audio dealers, a few catalog-based retailers have emerged that offer a wide selection of products along with expert advice.

The other source of system-matching tips is



# Feature How to Choose Components

magazine reviews. Product reviews published in reputable magazines will often name the associated equipment used in evaluating the product under review. The reviewer will sometimes describe his or her experiences with other equipment not directly part of the review. For example, a loudspeaker review may include a report on how the loudspeaker sounded when driven by three or four different power amplifiers. The sonic characteristics of each combination will be described, giving the reader an insight into which amplifier was the best match for that loudspeaker. More important, however, the sonic descriptions and judgments expressed can suggest the *type* of amplifier best suited to that loudspeaker. By *type* I mean both technical performance (tube vs. transistor, power output, output impedance, etc.) and general sonic characteristics (hard treble, forward presentation, well-controlled bass, etc.).

Let's say the reviewer drove the loudspeakers with four amplifiers: a low-powered but sweet-sounding integrated amplifier, a high-output-impedance tube design, a medium-to high-powered inexpensive solid-state unit, and a massive solid-state amplifier that requires two people to lug it into the listening room. The reviewer reports that the integrated amplifier just didn't have enough power to produce sufficient volume, and that the sound lacked dynamics. The high-output-impedance tube amplifier was mushy in the bass and had a reduced sense of pace and rhythm. The inexpensive solid-state amplifier had terrific bass control, but its forward presentation and grainy treble made it less than ideal with the loudspeaker under review. (All of these terms—*forward*, *grainy*, *pace*, etc.—are defined in the next chapter.) Finally, the reviewer concludes that the solid-state behemoth is the only amplifier suitable for this particular loudspeaker.

This doesn't mean that the most expensive amplifier will work best with *every* loudspeaker. I can think of loudspeakers for which this scenario would be completely different. Another loudspeaker would sound just fine with the integrated amplifier, suggesting that using the huge solid-state unit would be overkill. However, if the loudspeaker was a little *tizzy* in the treble and lean in the midbass, the tube amplifier would tend to ameliorate these tendencies. Finally, if the loudspeaker wasn't that sensitive to treble grain, but needed to be driven by an amplifier with control and authority in the bass, the inexpensive solid-state unit would be a good choice—and the most cost-effective.

These reports of system matching can extend beyond the specific products reported on in the review. A fairly good idea of which type of sonic and technical performance is best suited to a particular product can be gained from a careful reading of product reviews. For example, you may conclude that a particular loudspeaker needs to be driven by a large, high-current amplifier. This knowledge can then point you in the right direction for equipment to audition yourself: you can rule out low-powered designs.

By reading magazine reviews, following your dealer's advice, and listening to combinations of products for yourself, you can assemble a well-matched system that squeezes the highest musical performance from your hi-fi budget.

## Dos and Don'ts of Selecting Components

Some audiophiles are tempted to buy certain products for the wrong reasons. For example, many high-end products are marketed on the basis of some technical aspect of their design. A power amplifier may, for example, be touted as having "over 200,000 microfarads (μF) of filter capacitance," "32 high-current output devices," and a "discrete JFET input stage."

While these may be laudable attributes, they don't guarantee that the amplifier will produce good sound. Don't be swayed by technical claims—listen to the product for yourself. Just as you shouldn't make a purchasing decision based on specifications, neither should you base your decision solely on brand name. Many high-end manufacturers with solid reputations sometimes produce mediocre-sounding products. A high-end marque doesn't necessarily mean high-end sound. Again, let your ears be your guide. I'm often pleasantly surprised to find moderately priced products that sound as good—or very nearly as good—as products costing two or three times as much.

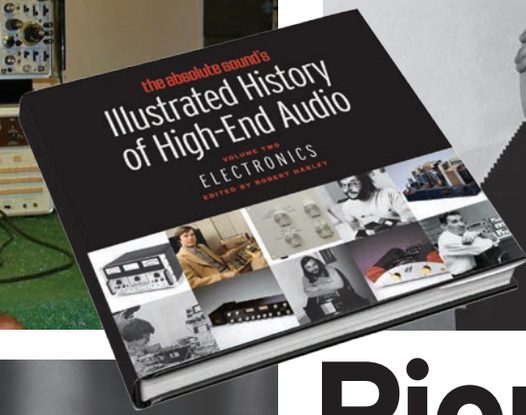
When choosing components, however, you should consider the company's longevity, reputation for build quality, customer service record, and product reliability. High-end manufacturers run the gamut from one-man garage operations to companies with hundreds of employees and advanced design and manufacturing facilities. The garage operation may produce good-sounding products, but may not be in business next year. This will not only make it hard to get service, but also greatly lowers the product's resale value.

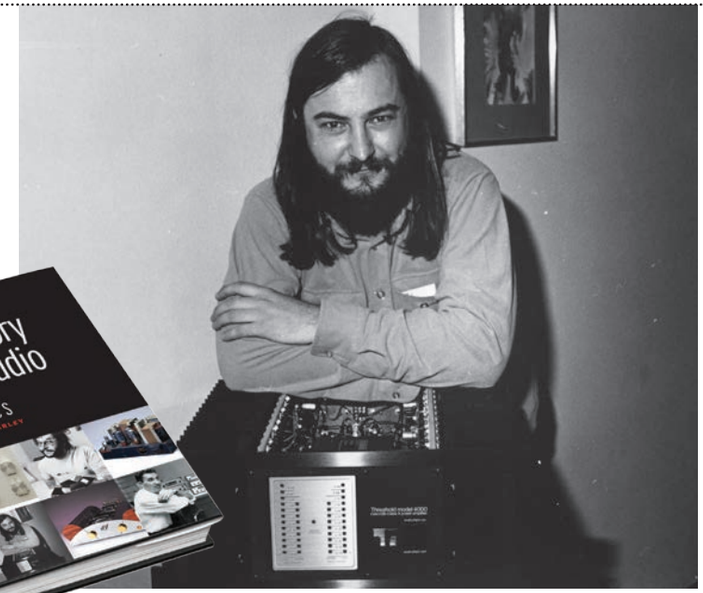
High-end manufacturers also have very different policies regarding service. Some repair their products grudgingly, and/or charge high fees for fixing products out of warranty. Others bend over backward to keep their valued customers happy. In fact, some high-end audio companies go to extraordinary lengths to please their customers. One amplifier manufacturer who received an out-of-warranty product for repair not only fixed the amplifier free of charge, but replaced the customer's scratched faceplate at no cost! It pays in the long run to do business with manufacturers who have reputations for good customer service.

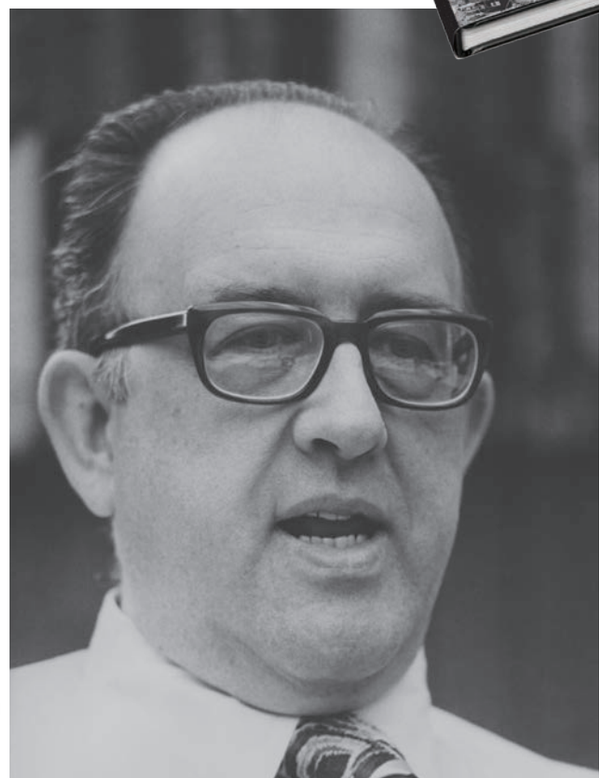
Another factor to consider before laying down your hard-earned cash is how long the product has been on the market. Without warning, manufacturers often discontinue products and replace them with new ones, or update a product to "Mark II" status. When this happens, the value of the older product drops immediately. If you know an excellent product is about to be discontinued, you can often buy the floor sample at a discount. This is a good way of saving money, provided the discount is significant. You end up with a lower price, plus all the service and support inherent in buying from an authorized and reputable dealer rather than a private party.

The best source of advance information on new products and what's about to be discontinued are reports in audio magazines and their websites from the many consumer and trade shows held around the world.

## Book Feature





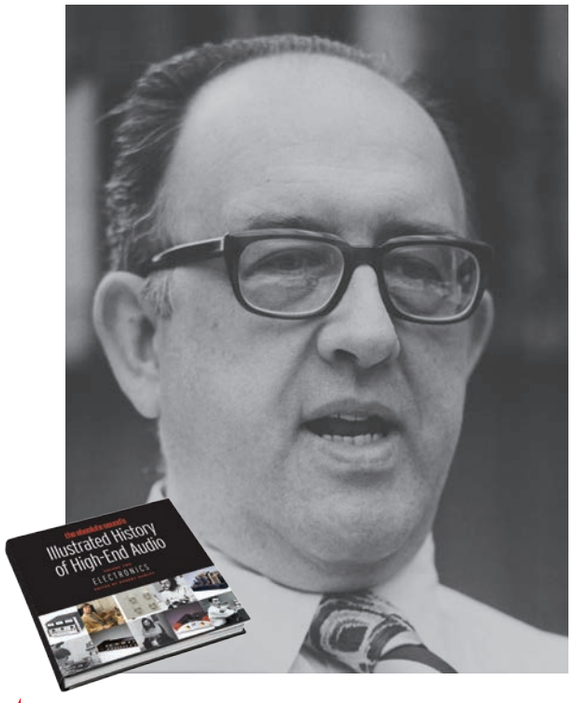
# Pioneers of High-End Audio

**We're celebrating three of the industry's** greatest electronics designers and companies with the following short excerpts from *The Absolute Sound's Illustrated History of High-End Audio, Volume Two: Electronics.*

TAS' *Illustrated History of High-End Audio* is a series of richly illustrated large-format books that reveal the inside stories of the pioneering individuals who created legendary companies and invented iconic products. The size of an LP cover, and printed on art-quality paper, each hardbound book is packed with candid interviews, historic photos, analysis of the industry's most significant products, and technical milestones.

You can see the full profiles, interviews, and more historic photos of the following pioneers (and 94 others) in *Volume Two: Electronics.* Go to tasbook2.com for more information.

# Book Feature




## William Zane Johnson and the Audio Research Corporation

Jonathan Valin

**Where would the high end be** without William Zane Johnson, the founder and, for better than forty years, chief designer of the Audio Research Corporation? Well, I'm not sure. Maybe in a year or two somebody just like Johnson would have come along. (He was one of those visionary figures so seminal to any movement that if he hadn't existed, sooner or later, someone would surely have had to invent him.) But I can tell you for certain where I would have been as an audiophile in a world without WZJ: Nowhere.

Even though he was famously upbraided by an irate engineer when he introduced his Dual 50 tube amplifier at a trade show in 1970—"You've set the audio industry back 20 years!" the fellow shouted when he spotted all those "old-fashioned" glass-bottle 6L6s, 12AX7s, QA2s, and 6FQ7s sprouting from the chassis—the consumer world didn't see it that way.

With the subsequent introduction of his SP-3 preamplifier in 1972—probably the single most important debut of the high-end era—WZJ changed everything: minds, prejudices, the market, the competition, the future. That preamp hit the audio world like a bombshell, provoking not just outrage from AES types wedded to solid-state but an agonizing reappraisal by audiophiles of exactly where that great new thing—the silicon transistor—for all its superior measurements and greater convenience had actually left them.

Oh, there had been plenty of stirrings of discontent in advance of ARC's arrival on the scene. As is noted (repeatedly) elsewhere in this volume, first-gen transistor gear was, for the most part, terrifyingly unreliable and downright amusical. While pouring negative feedback on inherently nonlinear quasi-complementary circuits generated the great THD numbers that AES types (and Stereo Review) loved, it was like applying a Band-Aid to a compound fracture. As Bart Locanthi would famously note when he developed the first truly symmetrical circuit for JBL's SA-600 amplifier, an audio circuit has to be linear to begin with. Otherwise, negative feedback only exacerbates problems, rather than fixing them.

Plenty of audiophiles, weaned on the great Marantz, McIntosh, Citation, and Dynaco tube designs of the Golden Age of Hi-Fi, knew that solid-state wasn't right. Yes, it had measurably lower total harmonic distortion than tubes. But the distortion it did produce was odd-order, rather than the more pleasing even-order harmonic distortion of those disreputable glass bottles. Yes, glass audio didn't have the sheer drivability of solid-state (the current and the low output impedance and the bandwidth); yes, it ran hot; and yes, tubes eventually failed. But those tubes were fast and sweet and musical, and you didn't have to use as much negative feedback (or any) to make them work.

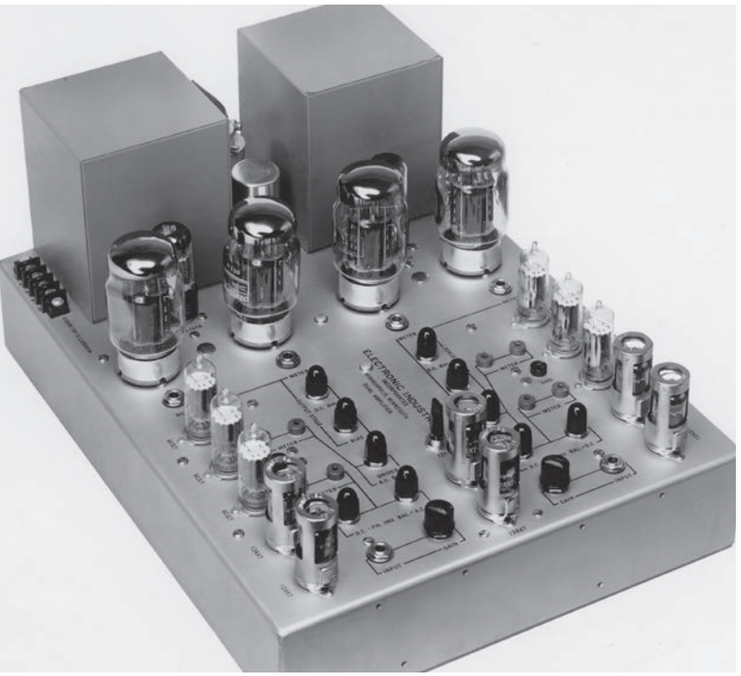
For a whole lot of us, the better "specs" of solid-state—and the reviews in the mainstream audio magazines that paraded those specs as if they were all that mattered—had failed us. The bass of solid-state was good; the neutrality was good; the resolution was good. But the overall sound wasn't. And then along came William Zane Johnson with his SP-3 and D-75 (followed by his D-76 and D76A amplifiers) to show us that tubes didn't have to sound like the fat potatoes of the past—that they could be neutral, high-resolution devices, too. And that on acoustic music they could give us a level of realism and musicality that transistors couldn't then approach, much less match.

Although I met Audio Research Corporation's founding father William Zane Johnson—who passed away in 2011, at the age of 85—at several trade shows and knew him well enough to say "hello," I didn't really have a personal relationship with him. As with a favorite author, I came to know him through his creations—the ARC amps, preamps, and phonostages that were to have a profound effect on my life as a listener, and on the lives of so many other audiophiles of my generation.

I've told the story of how I first heard Audio Research electronics (and Magnepan speakers, which were then distributed by ARC) in the magazine and in our first volume of this history. It was in the winter of 1973–74, and I was a student at the University of Chicago—a budding classical music lover who fell in with a bad crowd of audiophile grad students. I fancied myself an audiophile of sorts, too—had since I first heard Marantz 9s and a 7C driving a home-built horn system at a high-school friend's house—but like the majority of hi-fi hobbyists in the late Sixties and early Seventies I was virtually rudderless when it came to buying decisions. Oh, I was well aware that some things—Quad 57s, IMF Monitors, a hybrid electrostat from the brand-new loudspeaker company Infinity—sounded better than other things, but preferring stuff that sounded good (which is to say beautiful, sensuous, and appealing) was as close as I came to a listening philosophy.

Then came the fateful day when a couple of those grad students dragged me and my wife to a specialty hi-fi "store" (actually a flat in a brownstone apartment building) on the Near North Side run by a colorful character named Basil Gouletas. Basil was rather like the Hugh Hefner of hi-fi sales-

# Book Feature



men: I don't remember ever seeing him in anything but pajamas and a bathrobe. At the far end of his flat, Basil had a grand piano almost entirely shielded off by a pair of tall decorative screens; at the listening end he sat ensconced in a La-Z-Boy recliner with a turntable well within arm's reach.

As soon as Kathy and I sat down on a couch nearby him, someone began to play the grand piano behind the decorative screens. "Who's playing your piano?" I asked. Basil smiled and said, "Rubinstein."

Of course, those screens weren't screens—they were Magneplanar I-U loudspeakers. (No one in our crowd had seen or heard Maggies before.) And the electronics that made the I-Us sound so realistic that both Kathy and I were fooled into thinking that someone was actually performing a Chopin Ballade were the Audio Research SP-3 preamp and D75 power amp.

In all my years, that was the most unforgettable hi-fi demo I've ever experienced. And it was a turning point—a genuine epiphany. I didn't know who William Zane Johnson was, didn't know that he'd started a little hi-fi repair shop in Minnesota to modify Dyna gear and to home-brew his own electronics, or that (after a false step with a holding company called Peploe) he'd started his own electronics-manufacturing firm, the Audio Research Corporation, and shocked the hi-fi world by introducing tube gear that sounded unlike any tube gear before it.

What I did realize immediately—and what has stuck with me to this day—was that metal boxes full of electronic parts could not just make recorded music sound "good"; they could (with the right speakers) make it sound real. Suddenly, I had a philosophy that went beyond cosmetics, measurements, and euphony. I had a grail quest: the sound of the real thing. More than any other figure, William Zane Johnson put me—and thousands of other music lovers—on the road to audiophile enlightenment. As with so many of my generation, he and his creations are the high end to me—and always will be.

# Book Feature


## James Bongiorno Great American Sound, Sumo, Ampzilla 2000

Robert Harley

**James Bongiorno's long and storied** career spans two entirely distinct eras, from Hadley, Dynaco, Marantz, and SAE in the 1960s, to Constellation in the second decade of the 21st century. Bongiorno designed amplifiers in six different decades, working alongside other industry legends such as Richard Sequerra, Sidney Smith, David Hafler, Morris Kessler, John Curl, and Bascom King.

But Bongiorno will best be remembered for Great American Sound (GAS), the company he founded in 1974 after leaving SAE. The GAS Ampzilla power amplifier was an instant classic, outperforming many much more expensive amplifiers and sending ripples through the industry. This was the dawn of the high-end renaissance, right about the time of Phase Linear and Audio Research, when the demand for relatively high-powered amplifiers was exploding. The 200Wpc Ampzilla was the first to feature a full dual-differential complementary amplifier circuit, a topology that is the basis for nearly every modern solid-state power amplifier. The Ampzilla not only sounded terrific and sold in huge numbers, but Bongiorno exemplified the maverick entrepreneurial designer who created his company from nothing but talent, a dream, and (literally) a kitchen table.

Great American Sound was like a star that burns brightly but briefly; after selling part of the company to fund an expansion, Bongiorno was forced out and the company folded a few years later. Bongiorno quickly founded a new company, Sumo Electric Company, Ltd., to bring his circuits to moderately priced products. In typical Bongiorno fashion, Sumo's launch was announced with a full-page ad in *Audio* magazine that depicted an ape (the GAS company symbol) hanging on a crucifix, accompanied by this inscription, in French: "The end of an era." As with GAS, disputes between business partners led to Sumo's premature demise.

What Bongiorno and his two companies left behind, however, is a rich legacy of innovative designs and a loyal following that continues to this day. There's a cadre of audiophiles who still venerate the Ampzilla and GAS's legendary preamplifier, the Thaedra. In fact, a company called Bettinger Audio Design is dedicated to restoring and refurbishing GAS and Sumo products with modern parts.

In 2008 Bongiorno launched a new company, Spread Spectrum Technologies, and another Ampzilla amplifier, the Ampzilla 2000. The new Ampzilla was widely praised and commercially successful, although the amp was entirely different from the original.

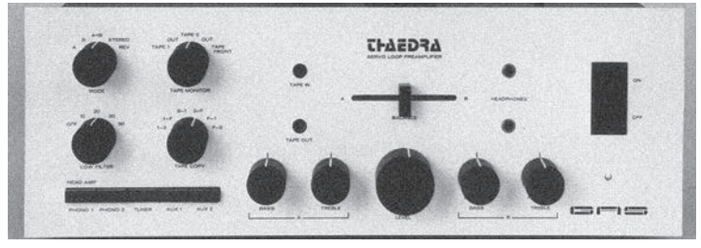
To call Jim Bongiorno a colorful character is not only a monumental understatement, but both figuratively and literally true; the accompanying photo reflects his daily dress. Audacious and flamboyant in the extreme, any encounter with Bongiorno was bound to be a memorable experience. He had a penchant for making sweeping pronouncements such as "I haven't seen a single preamp in the history of the world that I would ever consider using other than my Thaedra." When asked about the merits of specific transistor types, he replied, "It doesn't matter whether a product is made with donkey manure. The only thing that is important is the final performance." In responding to a negative review (of the Son of Ampzilla in TAS Issue 10), Bongiorno questioned the reviewer's qualifications: "Our industry's attempts may be compared to violin-making. Unfortunately, the performance of a Stradivarius can be clouded by the abilities of a questionable virtuoso."

As passionate as Bongiorno was about designing amplifiers, he was even more passionate about playing the piano. He was torn throughout his entire life between amplifier design and working as a professional musician. Bon-

# Book Feature

giorno was an accomplished jazz pianist who performed semi-regularly, and made four recordings that were released on CD. A journalist colleague of mine who visited Jim in the 1980s reported finding a house virtually devoid of furniture along with an empty refrigerator, but a living room filled with an audio system, a massive music collection, a stockpile of fine wine, and a 90-year-old, $100,000-plus, 9' Steinway concert grand. The man's priorities were writ large in his decor.

Bongiorno's life and career is all the more remarkable when you consider that he was diagnosed with liver cancer at the age of 34 and told that he had just months to live. He fought that disease valiantly for an astonishing 35 years before succumbing to it in January 2013, at the age of 69. He lived and breathed amplifier design, contributing right up to the end as part of the team that created the Constellation Reference Series electronics, which launched in 2010. Jim Bongiorno was one-of-a-kind amplifier (and tuner) designer, and a one-of-a-kind human being.

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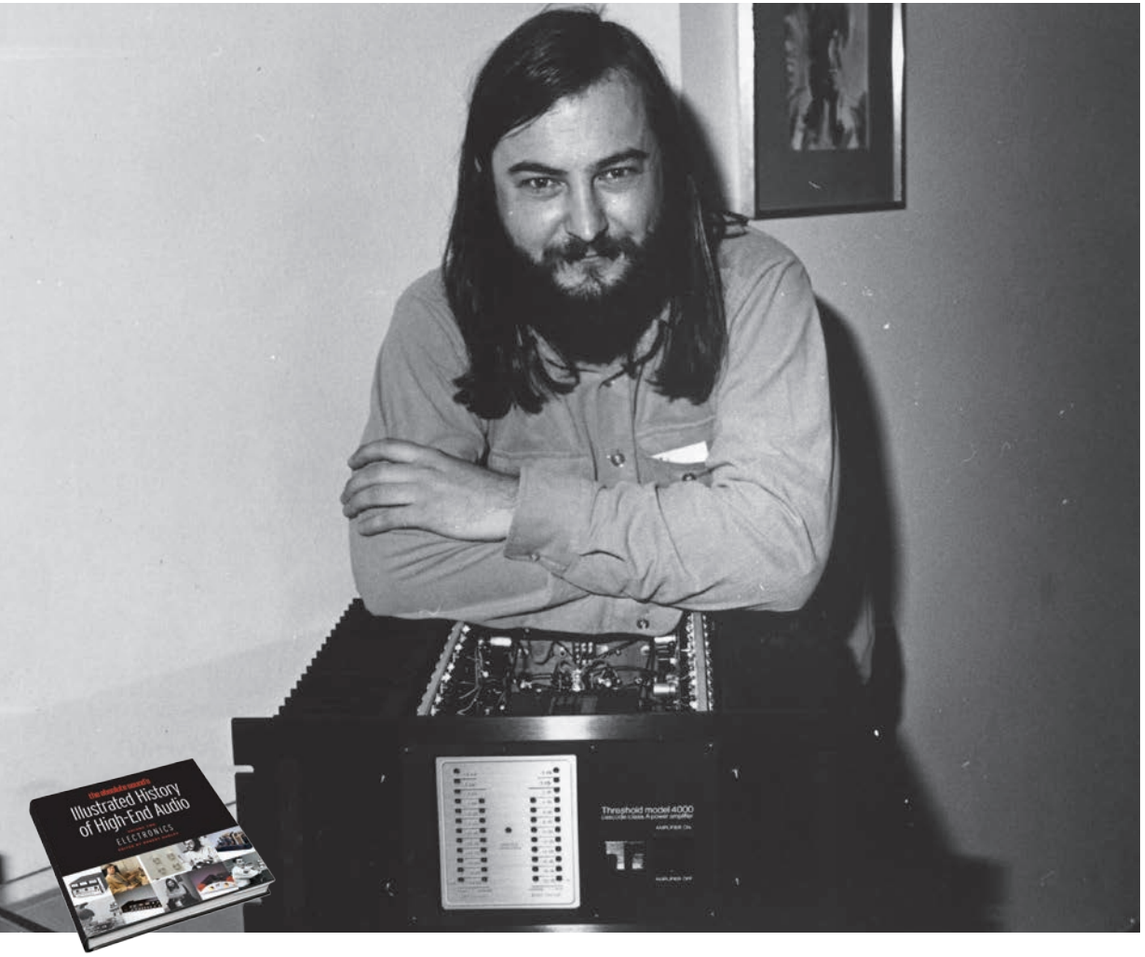



## Nelson Pass
## Threshold, Pass Labs, First Watt

Greg Weaver

**A case could be made that no other** amplifier designer more clearly embodies the philosophy and spirit of simplicity of design than Nelson Pass. From the introduction of his first commercial product in 1975, he has continuously pursued the often flaunted but rarely realized "less is more" goal. Following a decidedly different direction than some other successful manufacturers of that time—companies such as Phase Linear, Harman Kardon, and Crown, who were revisiting the status quo (based on original published Class AB or Class B RCA circuits)—Nelson's work started to blaze in new and uncharted directions.

Those early days of Class B and AB amplifiers were a time when measurement was king. Looking at the distortion of a Class AB amplifier on an oscilloscope, you could clearly observe that distortion actually increased as the output level decreased, where the crossover notch got bigger and bigger in proportion to the size of the diminishing signal. This was due to the failure of the plus and minus halves of the amplifier to mate up cleanly.

Most designers were using more complex circuits and large amounts of feedback to achieve better bench measurements, but the sluggishness of more complex circuits created problems with TIM (transient intermodulation) distortion. In addition, heavy feedback had a tendency to dry up an amplifier's harmonic character, leaving it sounding a little sterile.

By the mid 1970s, Nelson recognized that as distortion numbers were driven down further and further through feedback, the sound was not seeing a corresponding improvement. He saw the inherent linearity of Class A amplifiers, whose traditional low efficiency had limited them to low power output, as an alternative. Since Class A eliminated switching, it removed the offending notch distortion of the waveform and allowed for a monotonic distortion character, diminishing as the level went down—the opposite of Class B and AB designs.

These insights would provide the jumping off point for what has been one of the most celebrated and illustrious careers in the industry. Pass founded Threshold with the strategy of developing a more efficient complementary Class A circuit. Even this early in his career, a pervasive theme had begun to emerge: select quality parts, put them in simple circuit, run heavy bias current, and use minimal (or no) feedback.

Threshold was extraordinarily successful on a number of levels, creating some of the first high-output Class A amplifiers, as well as delivering an incontrovertibly better sound than many other designs. Using bipolar transistors, Nelson pursued this line of development at Threshold throughout the 1980s, engineering one improvement after another—next building amplifiers with cascoded gain stages and then extending the concept to amplifiers having "current bootstrapped" output stages (and collecting a number of patents along the way).

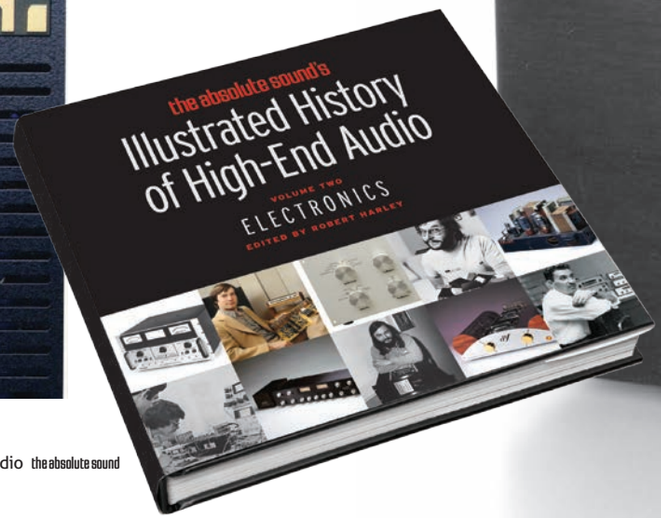
By the early 1990s, Pass felt the urge to leave bipolar devices behind and explore the benefits of FETs, which offered output curves much like those of tubes, and sounded more musically natural. Over the next two and a half decades, his work at Pass Labs led to progressively simpler circuits and increasingly superior sounding amplifiers.

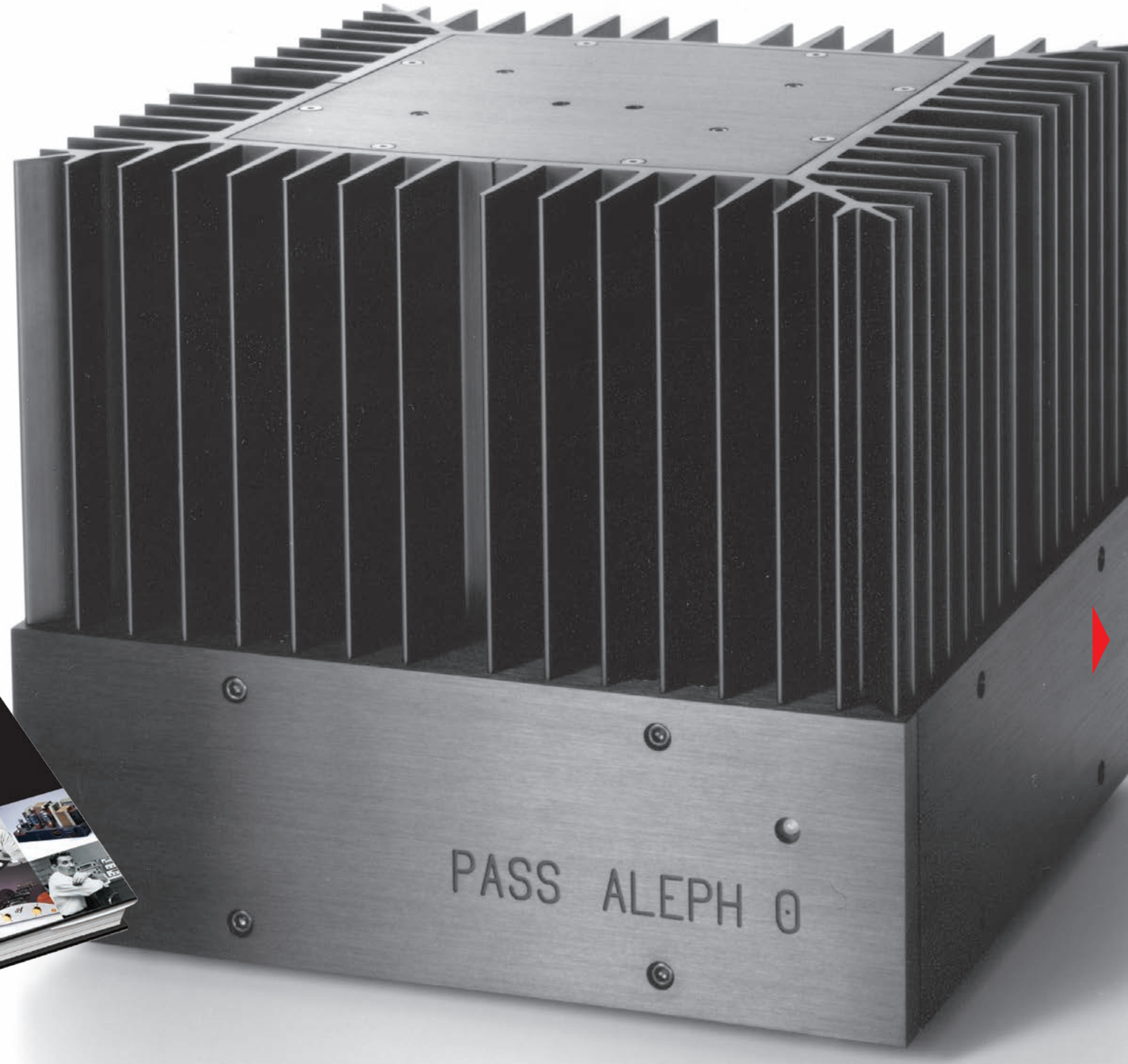
# Book Feature

Pass has continuously advanced his craft with series after series of exciting and engaging products, including the breakthrough Aleph design in 1992 (the Aleph 0 was honored as "amplifier of the decade" by one magazine).

Whether making major advancements in circuit topology and performance with products like the revolutionary X (SuperSymmetry) and XA series, or simply refining and honing those already exquisitely performing circuits with revisions like the ".5" and ".8" enhancements, Pass has relentlessly employed minimalism in his pursuit of better sound.

A gifted and driven creator holding seven U.S. patents related to audio circuits, Nelson is likely not finished rewarding music lovers with his insightful and exciting work. Unlike many others in his field, he still believes that listening tests remain invaluable to advancing the discipline and that electrical measurements alone do not fully characterize the sound of an amplifier. His body of work demonstrates that just pursuing diminishing zeroes does not necessarily lead to better sonic performance, and positions him at the forefront in the Pantheon of High-End Audio Designers. tas

# Sneak Preview

## NAD C 368 Hybrid Digital DAC Amplifier

### Smart Design at Work

Vade Forrester


**NAD's reputation for producing** high-value, innovative products should get a further boost from the introduction of the C 368 hybrid digital DAC amplifier. A "hybrid digital DAC amplifier" is an integrated amp with both analog and digital inputs and outputs. Rated at 80Wpc, the $900 C 368 has a Bluetooth aptX digital input, along with a moving-magnet phono input, two unbalanced analog inputs, and a built-in headphone amp. There is no standard USB input, which means you can't use your computer as a source, and with a limitation of 96kHz sampling rate/24-bit word length, it won't play the highest resolution digital files. However, although I was initially inclined to sneer at NAD's yesterday DAC section, I quickly realized that it's a very smart choice; given the incredibly fast advances in DAC technology, keeping your serious digital playback equipment separate from your amplifier lets you pursue the latest capabilities without exposing your otherwise perfectly good amp to inevitable rapid obsolescence.

The C 368's faceplate sports a central multicolor display window that I could read clear across my listening room. The remote control offers flexibility: It works not only for the C 368 but also for NAD's FM tuners and CD players. The C368's medium-sized black enclosure has a single large volume knob on the right side of the display window; left of the display is a 1/4" unbalanced headphone jack.

The rear panel has the two analog inputs, the digital inputs, a preamp output for a subwoofer or other external device, and binding posts to connect two sets of speakers. There are also two slots on the left end, covered by protective covers labeled MDC, or Modular Design Construction, which allows certain expansion modules to be inserted. More about those later.

Using an Audiolab 8000CD CD player as a transport connected to the C 368's coaxial SPDIF input and an Oppo Digital Sonica DAC together with an SOtM sMS-200 mini network media player to play high-resolution files, via KEF Q700 speakers the C 368 produced a punchy, robust sound free from any solid-state etch or peakiness. If anything, the tonal quality leaned towards sweetness. The soundstage was full and solid, if perhaps lacking the precise definition I sometimes hear with much more expensive gear. When I played an AIFF rip of Delos' CD [DE 3137] of Gerard Schwarz leading the Seattle Symphony in Alan Hovhaness' Symphony #22 ("City of Light"), I was pleasantly surprised at the weight and solidity the C 368 afforded the sound, as well as the harmonic density of its orchestral reproduction. Fortunately, it was solidity without stolidity—the orchestra brimmed with energy. On several pieces I auditioned, I noted the C 368 had a special way with strings, lending a glowing sheen to their reproduction. Accurate? Maybe. Beautiful? Definitely. Switching to the CD player, I played "Folia: Rodrigo Martínez, 1490" by Jordi Savall and his band on AliaVox 9805. Although the bass extension of the small-ish KEF speakers didn't match my larger system with its two subwoofers, little else was missing from the reproduction. The C 368 captured the continuously changing dynamic level with noteworthy precision, delivering the spirited percussion part with abundant transient detail. There was a dynamic exuberance typical of NAD equipment, which usually has tons of dynamic reserve.

Although the C 368 is an excellent conventional amplifier, its available MDC plug-in modules make it special. The DD HDM-1 HDMI input module makes it easy to integrate the C 368 into a system that's used for both music playback and a theater system—the type of setup found in many apartments where you can't install a full surround system. Most integrated amplifiers force you to use analog inputs to connect into a theater system; the HDMI interface makes the C 368 more usable in a modest music/theater system with only stereo or 2.1 speakers.

The review unit had an optional MDC BluOS module installed, so I was able to try it with a Bluesound $699 Pulse 2 wireless loudspeaker, a powered stereo speaker which reminded me of a single Bose 901 transducer. But since it connects wirelessly to the MDC BluOS module in the C 368, you can place it anywhere—in the kitchen? The bedroom? And it's perfect for the small-apartment dweller who doesn't have room for a larger speaker. I didn't try it, but I'd bet the Pulse 2 speaker would make a fantastic replacement for stock TV speakers.

With its innovative design, excellent sound, ease of use, and reasonable price the NAD C 368 explodes the notion that today's hi-fi gear is too expensive. Many listeners may never need a better amplifier. **Price: $900. nadelectronics.com** tas

# Sneak Preview

## Etymotic ER4SR and ER4XR In-Ear Monitors

### It's All in the Fit

Steven Stone


**Ten years ago I acquired my** first in-ear monitor. It was a slightly used Etymotic ER6i I bought at a Colorado Audio Society swap meet. I liked the way the triple-flange "deep-insertion" tips fit so much that they became my regular workout earphones for the next couple of years. Except for having to replace the filters, which clogged regularly every two or three months, the ER6i in-ears were trouble-free. A year after I got the ER6i I began using a pair of Etymotic's flagship ER4 in-ears as my reference in-ear monitors. They remained in my primary kit for location recording until the Ultimate Ears In-Ear Reference Monitors came along in 2011. Since that time the ER4s have seen less ear-time, not because I don't enjoy them, but simply because I've had so many other earphone options available.

At the 2016 AXPONA show in Chicago I had the chance to see and hear the replacement—or replacements—for the now-venerable Etymotic ER4, called the ER4SR and the ER4XR. These two new in-ear designs look identical to each other except for the SR and XR markings on their barrels; SR stands for Studio Reference and XR for Extended Response. As the latter's name suggests, the only difference between the two lies in their frequency-response curves. The SR is close to Etymotic's original response curve for the ER4 while the XR has a subtle and intentional lift to its bass response. Both are priced identically at $349—only slightly more than the original ER4's $299.

Both the ER4SR and ER4XR come with a detachable five-foot-long cable, five pairs of ear tips (two foam and three triple-flange,) a filter removal tool, additional filters, a ¼" stereo adapter, a cable clip, and a hardshell zippered case. The case is large enough to hold the ER4 and a player, such as the new Astell&Kern AK70. The new ER4 in-ears also come with something that I haven't seen included with many earphones: a complete set of test results for each ER4 capsule. One last detail that isn't common for under-$350 in-ears—each capsule has its own unique serial number.

#### Technical Description

The ER4SR and XR both use the same driver technology that employs a single full-range balanced-armature driver. Etymotic declined to name the company who built the driver, but did admit that it was OEM'd for them by a firm that specializes in the manufacture of balanced-amature drivers. Using a single full-range driver eliminates crossover and phase issues at the crossover point because there is no crossover! But according to many earphone designers, making a single full-range balanced-armature driver with even response throughout its entire frequency range is nearly impossible. Etymotic eliminates the most egregious frequency anomalies by creating a tuned enclosure with a specific volume, shape, and composition to minimize the peaks and bumps in its frequency curve. Even the replaceable filter at the front of the ER4's barrel is designed to do double duty: to protect the ER4's innards from moisture and debris, and to serve as a high-frequency smoothing filter.

The Etymotic ER4SR's characteristic curve was first developed through in-house proprietary testing done in the late 1970s and further refined in 1987. According to Etymotic, because the ER4 was designed for a deep-insertion fit that eliminated many of the characteristic colorations imposed by the beginning of the ear canal, the ER4SR and XR have an intentional boost at 2.7kHz and 5kHz, which simulates and recreates the boost that your ear (due to its shape) normally supplies to all aural stimuli. Because the ER4's deep-insertion fit bypasses this part of your ear these colorations must be reintroduced.

Every in-ear monitor I've reviewed has had a particular "house" frequency curve that each manufacturer claims is a result of its own in-

# Sneak Preview Etymotic ER4SR and ER4XR In-Ear Monitors

house, proprietary, and rigorous testing. One might assume that if the testing gear were set up identically all manufacturers would have the same curve, but that is certainly not the case. Sonic differences most likely stem from the fact that the manufacturers do not all use identical test methods or equipment, and often these exact test methods are carefully guarded secrets. During a headphones panel discussion at an audio show an audience member asked, "Why can't manufacturers come up with an absolute standard (and accurate) frequency curve for all earphones?" Several manufacturer representatives explained that each company feels that its own methodology is the best one and none felt any urge to collaborate with their competitors for a new standard. This is why earphones from various manufacturers sound different—because they are intentionally "voiced" based on what each manufacturer's R&D team feels is right, not any universally-recognized, codified standard.

Included with every ER4 Etymotic is a sheet with the test results—originating from a G.R.A.S. RA0045 ear simulator—for that particular pair of earphones. Test info includes each unit's actual sensitivity and its total harmonic distortion in addition to individual channel levels. My own mono sinewave sweep tests showed me that the vast majority of these minor channel imbalances were inaudible. The ER4SR had the best channel balance, but the ER4XR had the least amount of total harmonic distortion, with one driver producing an astonishingly low .15% while one of the SR drivers had the highest THD at .81%.

## The ER4 Fit

The one fundamental truth of all in-ear monitors is that if you can't get the right fit, you won't get the right sound. While the ER4SR and XR "deep-insertion fit" isn't unique to these in-ears, it is the primary difference between Etymotics and the vast majority of other reference-level in-ear monitors. Some audiophiles will find that a deep-insertion in-ear monitor is not comfortable, no matter what size triple-flange ear tip they employ. Etymotic does offer a foam-tip option for the ER4, but for most listeners the foam's fit will be quite different from the triple-flanges—it will not be as deeply inserted into the canal. For me the foam tips are slightly more comfortable but less sonically successful in that they do not have the same ability to seal my ear canal or get their barrel as far inside it.

Using the triple-flange tips the isolation level of the ER4SR and XR is probably the best of any, including custom-fit in-ears, that I've experienced. Clapping my hands together as crisply as I could was completely imperceptible when music was playing through the ER4s at a "normal" listening level. With the foam tips, isolation wasn't as complete and I could hear that clap, albeit muffled. If you need in-ears with maximum isolation, so you can listen to Led Zep as loudly as you can stand it in the "quiet" section of your local library, the ER4 with triple-flange tips is the way to go. Also if you are a musician who needs a highly isolating monitor for performing or recording purposes, I found that you can even sing (or jump around) with the ER4 triple-flanges in your ears and they will stay in place.

During the first couple of weeks I had the ER4SR and XR, I went back and forth between the large foam and smallest triple-flange tips. I finally settled on the triple-flange for both versions because they stayed in place better, requiring far less adjustment after the initial installation. The triple-flanges also had better isolation, more fully extended bass response, tighter imaging, and finally, reduced chances of catching the cables on something because the triple-flanges stuck out about ½" less. [*Etymotic says that when inserted correctly, the foam tips provide greater attenuation than the three-flange tips, and that the foam tips don't protrude from the ear canals. The company refers readers to the video on their website showing the correct insertion method. —RH*]

## The Sound

According to Etymotic and its supplied frequency curves the ER4SR and ER4XR have identical response above about 200Hz. Below 200Hz the ER4SRs are flat until about 80Hz, at which point they have a slight 1 to 2dB roll-off by 20Hz. The ER4XRs are flat until about 150Hz, at which point they have a slight rise in their bass response that increases their response by 3 to 4dB by 25Hz. My listening confirmed that, indeed the ER4XR does produce additional bass energy compared to the ER4SR. Which of these seems more correct will depend more on your personal preferences and musical choices than any other factor. My own tastes pointed me more toward the ER4XR than the SR. Initially I was concerned that the XR would have a muddier and less refined mid and low bass, but the upper bass or lower midrange wasn't obscured by the additional bottom-end energy. Also on much of what I regularly listen to I felt that the ER4SR didn't have that last dollop of lower-octave en-

# Sneak Preview Etymotic ER4SR and ER4XR In-Ear Monitors

ergy that I get from other reference earphones and loudspeakers.

The ER4SR's overall harmonic balance was much closer to that of the original ER4 than the ER4XR. If you've been using ER4s as your reference you will find the ER4SR delivers a very similar but less mechanical and more relaxed overall sonic character. Both of the new ER4 in-ears under review deliver a larger and more precise soundstage and imaging than the original; the differences weren't huge, but they were noticeable.

With their published sensitivity of between 104 to 106dB with 200 mV drive and 45-ohms impedance the ER4 in-ears were easy for all my portable players, including the new Astell&Kern AK70, to drive to satisfying volume levels. I did hear a small amount of background hiss when attached to the Mytek Brooklyn and Grace m9xx DAC/pre's, but the Auralic W2000 DAC/amp was silent.

Soundstage size can vary mightily with in-ear monitors. Some, like the Westone W60 and the Empire Ears Zeus, can produce very wide soundstages that seem to extend a good ways outside the confines of your ears. Others, like the Ultimate Ears Reference Remastered and the Astell&Kern AKT8iE, produce a three-dimensional soundstage that may not extend outside of your head's boundaries but create a state-of-the-art level of image specificity. The SR and XR's dimensional characteristics are closer to the Ultimate Ears Reference Remastered, with a between-the-ears soundstage that placed each instrument with precision.

## Summary

The Etymotic ER4 has, since its original inception, been an in-ear that prospective users either love or hate, not because of its sound, but due to its fit. If you are not comfortable with the ER4's deep-insertion fit you probably won't enjoy your time with the SR or XR. You could opt for the foam tips, but unless you get the ER4's tip firmly in your ear canal you won't be hearing these in-ears at their best.

If you are comfortable with the ER4's deep-insertion fit you will be rewarded with category-leading isolation levels and precise imaging with excellent depth recreation. Whether you opt for the SR or the XR, you can either have an earphone that has a nearly ruler-flat bass response, or one that gives you a bit more low-frequency punch. With either, you get an extremely well-designed and constructed in-ear that, like the original version, should stand up to any abuse that a traveling audiophile or musician can dish out. tas

## SPECS & PRICING

**Type:** Balanced-armature, in-ear
**Impedance:** 45 ohms
**Sensitivity:** 98dB with 100 mV drive, 104dB with 200 mV drive
**Weight:** .9 lb.
**Price:** $349

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# Sneak Preview

## Syzygy Acoustics SLF870 Subwoofer

### Technology Serving Music

Vade Forrester

**All Syzygy Acoustics' subwoofers** make subwoofing easier by addressing two major problems. First, they eliminate the need for unsightly and expensive interconnect cables, and second, they automatically equalize their output to your room. Syzygy also includes a neat app for your smartphone that serves as a comprehensive remote control.

Syzygy solves the connection problem by using a proprietary wireless link. You no longer have to run an interconnect cable to wherever you decide to place your sub; you can put it anywhere without tripping over the cable. (Make that *almost* anywhere. You can't place it behind furniture; apparently, that blocks the wireless signal.) A power cable is still required.

Room equalization is a harder nut to crack, but Syzygy solves that even more brilliantly by providing an iPhone/iPad app that purportedly EQs the sub for your room with the push of a button. How does the Syzygy app accomplish this noteworthy feat? The company's website says that "using unique SoundSculpt Technology, each Syzygy subwoofer essentially makes a 3-D sonic map of its space, and then adjusts its output to smooth out the aural peaks and valleys. It sends out a series of tones that measure the shape and size of your room, the position of the furniture, and how your décor absorbs and reflects sound. This rich acoustical data is captured by your smartphone and sent back to the subwoofer where it is corrected then perfected, ensuring that the sub-bass from the Syzygy subwoofer integrates seamlessly with your speakers and the low-frequency sound arrives at your ears at the correct time. All with a tap of an app." That reminds me of another quote, from author Arthur C. Clarke: "Any sufficiently advanced technology is indistinguishable from magic." Whether it's magic or technology, if it works, I like it. Maybe now they'll figure out a way to automate setting up a tonearm. Why is that so hard? Or a wireless power connection for something more demanding than a smart watch—that should make someone rich.

The $999 SLF870 subwoofer tops Syzygy's line of four subwoofers. Housed in a 15" cube, the driver uses a 12" proprietary woven-cellulose-fiber diaphragm (pretty fancy for a subwoofer at this price-point) driven by a 1200-watt BASH amplifier. The sealed enclosures are acoustic suspension designs, which use the air trapped inside them as the spring to restore the cones back to their equilibrium position. Compared to a ported enclosure, a sealed system is more linear and has better transient response, but is less sensitive, since it doesn't use the output from the back of the cone. But with 1200 watts of amplifier power, sensitivity is not a problem. Depending on where you screw on the feet, you can aim the driver forward or downward.

The SLF870 is rather plain to look at, but since you probably won't want to look at it, that shouldn't matter. Its rubber feet are less fancy than the metal spikes found on most expensive subwoofers, but I appreciated the protection they afforded my hardwood floors. (They also provide proper spacing from the floor if you orient the drivers facing down.) You can swap them out for spikes as a later upgrade.

To connect the SLF870 to your system, you connect a wireless transmitter to your preamp or integrated via RCA unbalanced cables. The transmitter is a 3½" x 3½" x 1¼" black fuzzy box, with two RCA input jacks and a jack for a wall-wart power supply. One transmitter can communicate with and control up to eight subwoofers wirelessly via the subs' built-in receivers. If for some reason, you actually like interconnect cables, you can use them instead of the wireless connection, though that seems like buying a Ferrari and signaling for turns by using hand signals—a simile that's probably wasted on younger readers.

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Compared to most subwoofers, the back panel of the SLF870 is very spare, comprising an RCA jack and some status lights. That's because all its controls are on the smartphone app. Weighing just less than 40 pounds, the SLF870 should be easy to place in your room. You can try it in different locations for maximum output, minimum intrusiveness, or best integration with your main speakers.

The SLF870 uses a fixed 24dB/octave crossover. In my experience, a sharp crossover slope like that makes it easier to match the output of a subwoofer with a main speaker, keeping midrange frequencies out of the subwoofer and the bass out of the speaker's midrange driver. The crossover frequency is adjustable via the smartphone app. It's very handy to be able to sit at your normal listening position and fine-tune how the SLF870 sounds.

## Setting Up and Using the SLF870

Like a tonearm, much of the success of a subwoofer depends on how you set it up. Since the SLF870's technology is new and unfamiliar, I started by reading the well-written and well-illustrated 11-page manual. Most subwoofer set-up suggestions are based on home-theater applications, where the goal is to flex the walls and dump as much bass energy as possible into the room. For an audio system, what's important is seamlessly merging the output of the subwoofer with the output of the main speaker. You shouldn't be able to tell there's a subwoofer in the system; instead, it should sound like the main speaker has just added an extra octave or two of bass. If the subwoofer's response isn't relatively flat, the challenge of matching its output to that of the main speakers is a lot harder. Then there's the matter of speed. I tried for years to find a subwoofer that would integrate with my Affirm Audio Lumination horn-loaded main speakers, which start to roll off below 50Hz. It wasn't until I tried the original JL Audio Fathom f110 subwoofer that I found an adequate match for my Luminations. In choosing it, I went for speed and integration rather than bass quantity. I initially used two f110s, but found I could get a better integration with a single subwoofer.

The SLF870's truncated rubber cone feet came screwed to the bottom panel, so that the drivers faced forward, which is how I wanted them. I placed the two subwoofers just inside my main speakers, a position dictated by available space more than anything else. My JL Audio subwoofers have a continuously adjustable phase control, which I can use to compensate for different positioning, and I was pleased to find that the SLF870s also have adjustable phase, built into the app. The relative lightness of the SLF870s made the cabinets easy to manhandle into the desired positions. The transmitter offers a choice of either right and left channel inputs on RCA jacks, or a single combined low-frequency effects (LFE) input for amps or receivers designed for 2.1-type speaker systems (two main speakers and one subwoofer). Syzygy thoughtfully provides a set of RCA interconnects, though I suppose an audiophile will toss them and the flimsy power cord in the drawer and use audiophile-approved cables/cords. I did. My linestage provides right and left channel outputs, so that's how I connected it to the transmitter. I checked to be sure my preamp's output impedance could drive the transmitter's 20k-ohm input impedance. It could, just barely. (How hard would it be to design, say, a transmitter with a 50k-ohm input impedance that would be compatible with a wider range of equipment? Just asking.)

Now came the opportunity to try the Syzygy set-up technology. I downloaded the Syzygy sub app from Apple's App Store onto my iPhone 6. An Android version of the app is available from Google Play. I made sure the transmitter was plugged in but not connected to the output of the linestage—that would come later. I ran into several problems setting up the stereo pair of SLF870s, and finally had to call for help from Paul Egan, President of Syzygy Acoustics. It seemed that the manual's instructions were probably OK for a single SLF870, but connecting to a pair of them was more involved. The secret proved to be setting them up one at a time. Plug one SLF870 in and set it up; then unplug it and go through the same set-up routine for the other. The subwoofer you unplug will retain the set-up information. Next, pair the transmitter with the subwoofers, which involves pushing buttons on the subwoofer and the transmitter. If that sounds easy, it is, but it could be even easier if the amplifier controls and connection weren't underneath the subwoofer when the driver is pointing forward. Finally, use the app to mute the subwoofers and plug the RCA interconnects from your linestage, preamp, or integrated amp into the transmitter. I'd strongly suggest buying SLF870s from a dealer who can help install them. Once installed, all you have to do is play music, not fiddle with the subwoofers. They can be set to turn on when a signal is received, or can be left on at all times—they only consume ⅓ watt when quiescent. If you set them to turn on when a signal is received, the SLF870s will emit a very low frequency *whomp* when they turn on, pressurizing the listening room. It's not loud, but it gets your attention. I rather liked the reminder that the SLF870s were operating.

After the SLF870s are set up to work in your room and are connected to your main system, you still have to match their output level with the output of the main speakers. Although Syzygy doesn't provide a tool to help with that task, I again turned to my iPhone, using an app called OctaveRTA. This is a spectrum analyzer which uses the iPhone microphone to pick up the sound from your room. I played a recording of pink noise from audiocheck.net, and also a low-frequency sweep, which covers the frequencies from 10Hz to 200Hz. Final tweaking of the adjustments was done by ear. The Syzygy Sub app serves as a really flexible remote control, allowing you to adjust levels, crossover frequency, phase adjustment, and several other parameters. It also lets you apply a DSP adjustment, so even after the app has equalized the response for your room, you can still adjust it if you want a different bass response. Think of the DSP adjustment as a super tone control.

Syzygy recommends 25 hours of break-in, but that's 25 hours playing bass notes, not just turned on. That's one break-in process I don't want running 24/7! They do loosen up after breaking in.

I found the subwoofers matched my main speakers when set for a level of around 50. Other speakers and rooms will require different settings. Adjusting the level with the app was easy—just move a slider. When I adjusted the

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level for one subwoofer, the other one was also adjusted to the same level. Of course, my initial setting was too high, but I confess I listened to several albums that way, just enjoying the bass energy washing over me. (Does that mean I'm a closet bass-head?) Anyhow, after enjoying the surfeit of bass for a while, I forced myself to act like a responsible reviewer and dialed the bass level back to match the output of the main speakers. You should be aware that the SLF870's internal crossover is just a low-pass crossover, which keeps the higher frequencies out of the subwoofer. It has no effect on the main speaker, which continues to run full-range. It would be interesting to use an external crossover like the JL Audio CR-1 reviewed by Jonathan Valin in Issue 254. A fully active crossover like that will also filter low frequencies from the signal driving the main speakers, relieving the speakers of reproducing bass and thus increasing the speaker's dynamic range.

## Sound

If you had just installed new subwoofers in your system, what would you play first to show it off? Being a classical music geek, I thought of organ music, specifically Saint-Saëns' Third Symphony (*Organ* Symphony). Although my local symphony orchestra doesn't enjoy a concert hall that sports a pipe organ, a few years ago they managed to stuff the orchestra pit with an electric organ on steroids, which could and sometimes did easily generate a 32Hz note that shook the concert hall and occasionally overwhelmed the entire orchestra—a memorable experience. Anyhow, I selected an album that contained the Organ Symphony and Poulenc's Organ Concerto, as well as Barber's *Toccata Festiva*, with Christoph Eschenbach leading the Philadelphia Orchestra, ripped to AIFF format from the CD layer of Ondine ODE 1094-5. Although it's probably not my favorite recording of the Organ Symphony (I still prefer the one by Charles Munch and the Boston Symphony on Living Stereo), it's the best-sounding recording of the symphony I have. I played the last movement, the Maestoso-Allegro, which has lots of spectacular organ fireworks. The SLF870s didn't quite flex the walls of my room, but they still shook me. There's a passage about 5:15 into the movement where the orchestra, which has been pretty rowdy, drops off into silence leaving the organ playing a *very* low sustained note. The SLF870s did full justice to that note, reproducing it with excellent pitch and lots of power. Yet the SLF870s validated the success of my efforts to integrate them seamlessly with the main speakers—I never heard them sounding like separate speakers.

Since it has bass extending to the mid-20Hz range, of course I had to try "Folia: Rodrigo Martínez" from *La Folia 1490-1701*, played by Jordi Savall and his band of Renaissance music specialists and ripped to AIFF from Alia Vox AFA 9805. The SLF870s projected substantial impact and power, yet integrated with the main speakers to project an impression of a realistic drum. Since the main speakers were still being powered by the normal amplifier, from the midbass upwards the system still sounded the same.

Another fave is Shelby Lynne's album of Dusty Springfield covers *Just a Little Lovin.'* On the Acoustic Sounds DSD64/DSF download, there's a strong bass underpinning throughout. The title track opens with the bass guitar growling menacingly. The SLF870s played those bass notes with excellent pitch, and although I suspect the bass on the downloaded track is overdone (the LP sounds more realistic), it was a kick to listen to it via the SLF870s—further substantiation that I really am a bass-head. Who knew?

## Comparison

I'm not sure how useful it is to compare two 12" subwoofers to a single 10" model, but the latter is what I've been living with for the past several years, so here goes. I was most interested in seeing how the different subwoofers integrated with the main speakers—that's what makes or breaks a subwoofer in a hi-fi system. The JL Audio Fathom f110 subwoofers sold for $2200 when last produced. They're finished in beautiful piano gloss black lacquer and rest on three very shallow conical rubber feet. Like the SLF870s, the f110 is an acoustic suspension design. Since it has a 10k-ohm input impedance, less than the minimum recommended by my linestage manufacturer, I use a Benchmark DAC with an analog input as an impedance buffer. The Benchmark has a sufficiently high input impedance to satisfy the linestage, along with a very low output impedance that has no trouble driving the JL Audio. The f110 has a very flexible assortment of controls, although you must pry your butt off the couch to manually adjust them. After lots of experimentation, it was obvious that the steepest available crossover slope, 24dB/octave, was optimum in matching the subwoofer output to the main speaker. In the SLF870, that decision was made for me—one less thing to obsess over.

Through the fast JL Audio subwoofer, the bass on "Folia: Rodrigo Martínez" integrated well with the extremely fast main speakers and projected deep bass with speed and detail, but the SLF870s went noticeably deeper and gave up little, if anything, in matching the main speakers. The Saint-Saëns' Organ Symphony recording isn't particularly detailed, so the extra energy the SLF870s projected made their portrayal of this piece much more enjoyable. When I played music with no deep bass, the SLF870s didn't intrude: There was no audible contribution at all—which is as it should be. In other words, there was no artificial boost to the bass frequencies.

It should come as no surprise that the 12" drivers in the SLF870s could project substantially more power at lower frequencies than the single JL Audio 10" driver. What surprised me is that I was able to achieve equally good integration with the SLF870s. There was no murky, lumpy bass, just powerful, punchy, detailed bottom octaves that altered (in a good way) my impression of what certain recordings sounded like. Case in point: Bass on *Just a Little Lovin'* was deeper and punchier, as the Syzygy reproduced bass guitar and kick-drums more powerfully.

## Bottom Line

The Syzygy SLF870 wireless subwoofers aren't the only wireless subs available today; they are quite popular in home-theater systems, especially those using soundbars instead of discrete channel speakers. REL offers a wireless connection in its very high-end system subwoofers, al-

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though at a considerably higher price. Several other subs offer computer-assisted setup. And in setting up the woofers, I found the technology wasn't effortless, so I had to call for help. But once the subs were dialed in, they just worked without having to diddle with them. Even when I unplugged the subwoofers to change equipment around, the subs "remembered" the settings. But all those techy features are pointless if the subwoofers don't sound good, and fortunately, they weren't just good—they were superb. I was able to achieve a seamless transition from my main speakers to the subwoofers, so that the subs sounded like a continuous extension of my main speakers. I worried that the wireless connection might cause dropouts, but although I carefully monitored the sound to detect any possible problems, I never heard a single one. That's how technology *should* work. Style-wise, they may be rather plain, but who really looks at subwoofers? Very highly recommended and a *great* value for the price. tas

## SPECS & PRICING

**Type:** Wireless subwoofer
**Connections supported:** Line-level RCA wired connection or proprietary 2.4GHz wireless connection
**Driver complement:** 12" proprietary woven-cellulose-fiber diaphragm in sealed enclosure
**Integral amplifier power:** 1200 watts BASH
**Dimensions:** 15" x 15" x 15"
**Weight:** 39.8 lbs.
**Price:** $999

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**ASSOCIATED EQUIPMENT**
**Speakers:** Affirm Audio Lumination speakers; JL Audio Fathom f110 subwoofer
**Amplifiers:** Berning ZH-230 stereo amplifier
**Preamplifier:** Audio Research LS28 linestage
**Digital sources:** Toshiba Satellite laptop computer running 64-bit Windows 10 Home Premium and JRiver Media Center Version 22 music server software; SOtM sMS-1000SQ network music player with sPS-1000 power supply; QNAP TS-251 NAS; PS Audio DirectStream DAC with Torreys operating system; Mytek Brooklyn DAC (for review)
**Interconnects:** Audience Au24 e balanced, CablePro Freedom unbalanced, Crimson RM Music Link, High Fidelity Cables CT-1
**Speaker cables:** Crimson Cables Crimson RM Music Link Loudspeaker Cables
**Power cords:** Purist Audio Design Venustas, Blue Marble Audio Blue Lightning, Clarity Cables Vortex, Audience powerChord e, Au24 SE LP powerChord
**Digital:** Audience Au24 SE USB
**Power conditioner and distribution:** Audience aR6-T

# ELECTRONICS

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# Equipment Report

## NuPrime IDA-8 Integrated Amplifier

### Smart Design at Work

Julie Mullins


**When the NuPrime IDA-8** integrated amplifier first arrived at my home, I immediately had a good feeling about it. Initially, that positive impression was based on its packaging. The outer shipping box the amp came in was not any larger than it needed to be, and inside was a smaller box with a plastic carrying handle on top—almost like a little briefcase. More than just a cute or superficial add-on, it represented smart design for those who would be handling the amp—from the distributors to end-users. It also came in handy because I needed to repack the amp before moving house a couple of months ago.

As I'm a relative newbie to the hi-fi scene (though I was raised in an audiophile household) and a fan of great design in all its forms, I appreciate this kind of attention to detail. But the real point here is that those outer elements reflect the care and thoughtfulness that went into the IDA-8's design on the inside.

First, a bit about NuPrime's heritage. Its recent history is slightly complicated, so I'm going to borrow a couple of key points from Steven Stone's review of NuPrime's DAC-10H DAC/pre and ST-10 power amp (Issue 255). In 2014, NuForce's cofounder, Jason Lim, with backing from the OEM factory, bought the assets of NuForce's high-end division, obtained the rights to NuForce technologies, and formed NuPrime Audio, Inc. (Shortly thereafter the NuForce company was sold to Optoma.)

Since NuPrime's founding, Lim has continually sought to improve sonics through the application of innovative technologies—in addition to offering high performance and value with respect to pricing. The IDA-8 exemplifies this approach. Here's how Lim summarizes the IDA-8, "It is as if we combined the 'perfect' ST-10 and DAC-10H, made it sound like a high-end Class A amp, and brought the price down to $995."

Sonically and functionally, there's plenty to love about the IDA-8. Essentially, it's a sleek-looking, small-footprint hybrid Class A/Class D integrated amplifier/DAC—that combines Class A warmth and resolution with Class D speed, power, and efficiency, and delivers both with remarkably low noise, thanks in part to ultra-low-noise JFETs in its input stage. Its DAC supports USB 384kHz/32-bit and DSD256, and is also capable of decoding DoP (DSD over PCM) via coaxial and optical inputs. NuPrime's SRC (sampling rate conversion) IC chip provides FPGA processing with ultra-low jitter and distortion.

There's also a wireless port (for which an optional dongle is available) in addition to an impressive array of inputs and outs (especially given its rather diminutive dimensions) that allows users a great deal of functional flexibility. The IDA-8 is remarkably user-friendly to boot. The best part? Not only does it work and sound great, but this petite, yet powerful amp is also a stone-cold bargain at $995.

#### Smart Design, Inside and Out

Let's take a closer look at the IDA-8's internal and external design elements and technologies. On the outside, its relatively minimalist yet modern form factor is clean, sleek, and nearly square in width and depth, and, like its box, appears to have been designed to be only as large as it needs to be. Neither too dinky nor too clunky, its scale seems suitable for almost any size listening room (even one in a small apartment). You won't need much space for this powerful little integrated (so you can go ahead and buy those bigger loudspeakers!). Available finishes include matte black (as with my review sample) or silver anodized aluminum. To provide extra damping to absorb vibration, the amp boasts unique, patent-pending isolation feet shaped a bit like shallow inverted cones.

Elegant in its simplicity, the IDA-8's front panel has only two knobs, each of which is multi-functional, as well as an alphanumeric LED display in blue. The knob on the right serves as a push-button to power on and off and, when pressed for three seconds, to access standby mode (which

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consumes very low power); when turned, it allows for five input selections (shown in codes): coaxial (C1), optical (O2), USB (U3), extension port for Bluetooth dongle or WiFi module (E4), and stereo analog RCA (A5). The left knob controls the volume functions; turning it adjusts the volume in 99 precise 0.5dB increments, and a brief press mutes and unmutes the sound. The volume control consists of an advanced, thin-film switched-resistor ladder network, with only a single resistor in the signal path at any volume setting. (This switched resistor design is implemented with an FPGA chip.) Each input features individually adjustable volume to allow for precise level-matching across various sources. In addition to the inputs mentioned, the back panel also has subwoofer and stereo speaker outputs, a slow-blow AC fuse, and an IEC power plug, plus a rather tiny toggle switch to turn the unit off and on. On the bottom of the chassis is an AC inlet voltage selector with options for 115V or 230V for use in different countries (it arrives set at 230V to prevent accidental damage). The IDA-8 comes with a power cord and two petite remote controls that could not be simpler to use—another way NuPrime makes the end user's life easier. The smaller of the two remotes is tiny—dimensionally littler than a credit card and weighing not much more.

The innovative technologies inside the IDA-8 provide clues to how it achieves such remarkably detailed, powerful, yet musical sound—not to mention very low noise—in such a compact and affordable package. It has an ultra-linear Class A module (ULCAM) in the input (preamplifier) stage—indeed, the entire amp was designed to sound like pure Class A, according to Lim—that uses discrete components to help fine-tune the signal and reduce noise. In the Class D output stage, the sonic issues that plagued early switch-mode designs have been circumvented via the use of a self-oscillating circuit to generate the PWM (pulse width modulation) signal. While most Class D amps switch at a frequency of 300kHz or lower, the IDA-8 switches at 600kHz. This difference helps eliminate old-school Class D tendencies towards bright and/or rolled-off upper octaves and a darker sonic character elsewhere. In addition to a more uniformly colorless tonal balance, this Class D power stage also seems to provide an enhanced sense of speed and transient response.

## Setup and Sound

Setup was straightforward. Indeed, The IDA-8 was virtually plug-and-play (break-in time notwithstanding). It's worth mentioning that the friendly user manual includes a line diagram that illustrates a plethora of possible source options and where they should be connected on the back panel. This is in addition to some technical diagrams showing signal path and amplifier stages. The inclusion of both kinds of illustrations leaves the impression that the IDA-8 is intended for both neophytes and longtime audiophiles. The manual also offers detailed step-by-step instructions for how to set up the IDA-8 for PCM or DSD playback on both Windows and Mac platforms.

Although the IDA-8 is designed primarily for digital sources, I found myself in my usual habit of spinning LPs, though naturally I also did some digital listening too. Interestingly enough, it turns out that I was in effect listening to digital even while listening to analog. Here's why: The analog input signal gets digitized by an A-to-D.In general, Mr. Lim says the design of IDA-8 maximizes the performance of digital inputs instead of the analog one. But had I not inquired, I might have been none the wiser—nor would I have enjoyed listening to my LPs any less. And I listened to scores of records throughout the review timeframe; the IDA-8 was my go-to amp across a range of musical genres. I became hooked not only by its ear-pleasing, easygoing sound, but also on its ease of use.

How did it sound? In short, beautiful and inviting. I was first struck by its effortlessness, remarkable resolution, and incredibly dark background. This integrated amp sounds much more expensive than it is. Speaking of darkness, I did notice a touch of it in the timbre overall—no doubt in part a factor of the IDA-8's Class D amplification stage—but it was more apparent on some recordings than others. On the superb Dream with Dean LP reissue from Analogue Productions, Dean Martin's easygoing baritone took on a touch of slight reediness, almost like a bass clarinet, and a slight sibilance, but it remained well resolved and quite lovely sounding. The bass and guitar followed suit beautifully, demonstrating the IDA-8's midrange-to-lower-midrange prowess. An impressive degree of detail and soundstaging clarity allowed me to distinguish the various mike setups across the first three cuts on the recording.

Shifting to some more rocking tunes, tracks on the Mobile Fidelity LP reissue of Dire Straits' *Brothers in Arms* were reproduced with surprising power and gusto. On "Money for Nothing," bass

## SPECS & PRICING

**Type:** Class A/Class D hybrid integrated amplifier
**Power output:** 100Wpc into 8 ohms, 100Wpc into 4 ohms
**Inputs:** USB PCM up to 384kHz/DSD up to DSD256; coaxial SPDIF (PCM up to 192k supporting DoP format DSD64); optical SPDIF (PCM up to 192K supporting DoP format DSD64); Bluetooth or WiFi receiver module (optional); analog, stereo RCA (analog input will be digitized)
**Outputs:** One pair of stereo speaker (binding posts); one pair of stereo RCA (line-level)
**Peak output power:** 280W
**Frequency response:** 10Hz–50kHz
**THD+N:** < 0.005%
**SNR ratio:** 95dB
**Dimensions:** 235mm x 55mm (including feet) x 281mm
**Weight:** 4.3kg
**Price:** $995

**NUPRIME AUDIO**
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**ASSOCIATED EQUIPMENT**
**Loudspeakers:** Raidho D-1, Monitor Audio Gold 300
**Subwoofer:** JL Audio e110 (pair)
**Sources:** George Merrill GEM Dandy PolyTable with Jelco tonearm and Air Tight PC-7 cartridge; MacBook Pro with 2.3GHz Intel Core i7 processor running OS X 10.9.5 with Audirvana Plus
**Phonostage:** Walker Audio Procession
**Power conditioner:** Ansuz
**Cables and interconnects:** AudioQuest Fire, Shunyata Research Venom series

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and kick-drum had plenty of slam, while Knopfler's guitar licks pulsed through my speakers (first Raidho D-1s with a pair of JL Audio e110 subs, then later, Monitor Audio Gold 300s, review forthcoming) with exciting dynamics and long decays. The bells on "So Far Away" sounded, well, a touch far away (as in, slightly receded), but the balance of percussion and guitars was crisp, with more than satisfying speed and attack. Class D's high damping factor is known to benefit the bottom end, but the lower midrange is arguably even more of a strength in the IDA-8.

A listen to Buena Vista Social Club's *Lost and Found*, a captivating collection of previously unreleased studio and live tracks, presented thrilling speed, snap, and detail—particularly on the wide range of percussion instruments from cowbell to tablas and beyond. The sharp transient attacks, lifelike vocal layers and vibratos, gorgeous horns, and overall high-octane musical energy made me want to jump out of my seat and dance around the room (OK, I did). The IDA-8 conveyed the music's richly woven textures as well as its individual parts. Soundstaging was deeper and wider than I expected for an amp in this price category, with precise instrumental placement. Background noise was also shockingly low; the IDA-8 boasts an impressive 95dB signal-to-noise ratio.

Somewhat to my surprise, I found largely similar sonic characteristics when I shifted to digital sources—a MacBook Pro from mid-2012 with 2.3GHz Intel Core i7 processor running OS X 10.9.5 with Audirvana Plus, wireless streaming via Tidal, and even some run-of-the-mill Red Book tracks ripped from CDs way back when via Bluetooth (using the dongle provided). Perhaps the IDA-8's digital conversion of the analog signal accounts for some of this, but the zeros and ones delivered the great-sounding goods! I still prefer vinyl for most of my critical (and fun) listening, but the IDA-8 brought warmth to its clean and clearly resolved presentation of digital sources too.

In my experience, the downsides to the IDA-8 were few. Upon occasion, the upper treble thinned out a touch, but not much. Can fans might well miss a headphone input option. The only moments I felt something was missing occurred when the sound of the digitally converted analog signal softened ever so slightly due to A-to-D processing; the effect is quite subtle and hard to describe, but once in a while, it seemed some of the raw impact on my LPs was lost. I want to stress that the instances when I noticed this were few and far between and never detracted from my musical enjoyment. Perhaps digital devotees would not register this. The tradeoff here, I would say, is the IDA-8's consistently lovely and uncannily liquid presentation.

In summary, the IDA-8 is a winner, and a force to be reckoned with in its category (and beyond it). Though a touch dark in character (à la Class D), it delivers substance and warmth with speed, resolution, and plenty of gusto—and does so from an astonishingly quiet background. It has a slightly digital-like sound in its detail resolution but doesn't cross the line into the overly analytical. A well-conceived Class A/Class D hybrid that doesn't want for power or clarity, the IDA-8 ought to find itself on the audition short list of a wide range of hi-fi hobbyists, from newbies to more experienced audiophiles. I'm considering purchasing my review sample. Highly recommended. tas

# Equipment Report

## Audio by Van Alstine Vision Phonostage

### Little Marvel

Dick Olsher

**Visually, the Vision phonostage** appears to be a pretty simple affair: a small black box powered by an external transformer. The latter is a small 15V AC "wall wart," which by virtue of its location manages to decrease internal AC-induced hum. The chassis interior is dominated by a large main audio board and 15V regulated power supplies. Its compact size and low cost ($499) are made possible by the use of operational amplifiers. Being integrated chips, op-amps are the product of intensive research and development by major semiconductor manufacturers. The end result typically offers superb and repeatable technical performance in a sub-five-dollar part that fits neatly into an eight-pin socket. Historically, high-end audio has shunned op-amps in favor of discrete circuits, and while that made sense some 30 years ago there's no longer a valid rationale for it. In fact, op-amps have become ubiquitous in the recording chain. A typical mixing console used to master multi-track recordings may contain dozens of op-amps, as do mike preamps, mixers, limiters/compressors, and eq and reverb effect devices. Even so, op-amp-based audio products are still rare on the high-end scene. One notable exception has been Junji Kimura of 47 Lab, who has elevated op-amp designs to new sonic heights.

Enter Frank van Alstine. Since op-amps can never be discrete, his vision was to keep them as sonically inconspicuous as possible. And Frank has successfully accomplished that with the Vision. I should note that the Vision phonostage is also available as an option that can be included in all-new AVA preamps, at $329 for the moving-coil version and $250 for the basic moving-magnet stage. The design is based on a schematic he drew up in the 1970s during the Jensen's Stereo Shop days. He says that the original version never saw production because the integrated circuits of those days just weren't quiet or linear enough, and that trying to null DC offset for each IC using trimming resistors would have been a nightmare in production. Frank decided to revisit that old circuit because of its potential, this time with much better modern ICs. The Vision uses a split, passive, RIAA de-emphasis network. One section provides the necessary 20dB of bass boost between 500 and 20Hz, while the second section provides the required treble cut above a frequency of 2.21kHz. Both of these frequency-shaping networks are


first-order 6dB/octave types, and each uses a single WIMA polypropylene capacitor.

Frank relates that weeks were spent rolling in and listening to almost all the modern linear ICs available, including some surface-mount chips, before finalizing the design around a pair of gain stages per channel using the highly regarded (and rather expensive) Burr-Brown OPA627 op-amps, the first OPA627 being selected for low noise. There is no third gain stage; instead, a National LME49600 current amplifier—featuring a high slew rate of 2000V/µS, THD of 0.0003%, and an output current capability of ±250mA—is used as an output current buffer to isolate the circuitry from the outside world. The Vision's

# Equipment Report Audio by Van Alstine Vision Phonostage


overall gain is a tad below industry standard at 38dB for moving-magnet and a nominal 58dB for moving-coil cartridges, as measured at 1kHz. The mc gain can be boosted by an additional 6dB, but even so, plan on mating the Vision with a line preamp with at least 15dB of gain.

Because of the OPA627's exceptionally low DC offset and bias current, it was possible to direct-couple the circuit from input to output, meaning that no coupling caps are used. As Frank puts it, "You have no worries about which brand or type of coupling capacitors to use; there are none." But I'm not so sure that DC-coupling a phonostage is necessarily a good idea. It opens up the possibility of passing subsonic garbage downstream to the power amp and loudspeaker. In an imperfect world, there are the usual subsonic suspects to contend with, most notably record-warp energy and tonearm/cartridge resonances. But the Vision's design has addressed this issue; the active stages are driven to unity gain at DC, and have no input or output voltage or current offset, minimizing the chance of energy from very low-frequency record warps appearing at the output.

A flexible, user-adjustable mc-cartridge loading scheme has been implemented. Two dual, in-line, package (DIP) switch banks are located on the main board. Combinations of switch settings can provide various cartridge loads. Mercifully, there are only four chassis cover screws that need to be removed to access the board. You can select one of the five fixed resistors (1000, 475, 220, 100, and 47 ohms), or a parallel combination of several resistors. For example, switching all of these resistors on in tandem (positions 7, 8, 9, and 10) gives an effective 30-ohm load. Frank says that if you're not up on the algebra involved in calculating the loading of several resistors in parallel, AVA will be glad to assist. [*The total resistance is the reciprocal of the sum of the reciprocals of the individual resistances.*—RH]

Being able to experiment with and optimize cartridge loading is a big deal sonically. The Technics EPS-310MC moving-coil I use in my Technics SL-10 linear-tracking turntable is specified at an internal impedance of 30 ohms. I experimented with loadings of 475, 100, 47, and 30 ohms. Not only did the gain increase with decreasing loading, but the sense of space, image focus, and dynamics were also significantly enhanced when I finally settled on a loading of 30 ohms. Incidentally, the Vision easily outclassed the SL-10's built-in mc pre-preamp.

It was a similar experience with the Clearaudio da Vinci V2 cartridge currently taking up residence in my Kuzma Reference phono front end. Although Clearaudio recommends a minimum impedance of 300 ohms, I found that setting on the Vision a bit too bright for my taste. I eventually settled on 47 ohms, which gave the most gain and best overall tonal balance.

The Vision pretty much met my preconceived notion of what a solid-state phonostage would sound like and lived up to the promise of its objective technical specifications. I expected plenty of low-level detail resolution and a strong bass range, and I wasn't disappointed. Transient speed and control could only be described as excellent. Alas, I expected a dead-quiet noise floor, but the Vision didn't quite get there. On the purely subjective side, dynamic contrasts impressed with a rare ability—for solid-state gear, that is—to bloom and boogie. This miniature phonostage was able to light a fire under the soundstage. The biggest impediment to total musical bliss turned out to be somewhat muted tonal colors through the upper midrange. For example, violin tone was lacking requisite sheen. This was a persistent impression, though its degree of severity was a function of the associated cartridge and linestage. The Vision seemed happiest being mated with a romantic-sounding tube preamp.

With its smooth textures and precise transient control, the Vision was able to hold its own in the company of far more expensive gear. Partnered with the new Audible Illusions L3A line preamp it did not embarrass itself, despite the nearly 10:1 price ratio. On balance, I find the Vision to be a well-engineered little marvel. However, what you think of it will depend on the associated line preamp and cartridge. It needs a tube preamp in the mix to approach reasonable fidelity in fleshing out tonal colors. In such a context, Van Alstine's Vision makes for an easy recommendation, and in view of its asking price, it rises to the level of a godsend for audiophiles on a budget. tas

## SPECS & PRICING

**Gain:** 38dB (mm), 58dB (mc)
**Input impedance:** 47k ohms (mm); adjustable (mc)
**Dimensions:** 7" x 2.5" x 5"
**Weight:** 2.5 lbs.
**Price:** $499

**AUDIO BY VAN ALSTINE, INC.**
2665 Brittany Lane
Woodbury, MN 55125
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avahifi.com

**ASSOCIATED EQUIPMENT**
Analysis Audio Omega loudspeaker; VTL Manley Reference 200/100 monoblocks; Kuzma Reference turntable; Kuzma Stogi Reference 313 VTA tonearm; Clearaudio da Vinci V2 phono cartridge; Technics SL-10 and Revox B795 turntables; Audible Illusions L3A and Atma-Sphere UV-1 preamps; FMS Nexus-2, WireWorld, and Kimber KCAG interconnects; Kimber silver speaker cable; Sound Application power line conditioners

# Equipment Report

## Exposure 3010S2D Integrated Amplifier

### Outer Purity, Inner Beauty

Neil Gader


**A life lesson that we all learn: Looks** can be deceiving. It's also an axiom that applies to the high end—it's what's inside that counts. An amp like the Exposure 3010S2D is a case in point. Visually its nondescript design conveys classic component minimalism and purpose. British reserve, if you will. Only a purist volume control, input selector knob, and power switch occupy the forthright aluminum front panel, which eschews the dozens of flashy pushbuttons and infotainment-style LED displays common to many designs. Operationally it cuts to the chase by getting right down to the critical business at hand—high-performance amplification in the form of a clean, direct circuit design, a robust power supply with plenty of headroom, and rigid construction to thwart EMI as well as acoustic and airborne resonances.

These qualities weren't born overnight. Exposure was founded in 1974 by John Farlowe, whose early passion for recorded music led to building guitar and PA amps and later working in recording studios rubbing elbows with the likes of David Bowie and Pink Floyd. Since the company's inception, expert engineering combined with a philosophy geared to "real hi-fi at real-world prices" has been its stock-in-trade. All current Exposure products are designed by Brighton-based chief designer Tony Brady (see his Back Page interview, Issue 265), and final assembly still takes place in the United Kingdom.

The 3010S2D represents the fourth generation of Exposure's top-tier integrated. It outputs 110Wpc of solid-state power. Like its predecessor it comes equipped with six line-level inputs, but now also includes an AV input for integration with a multi-channel system. A preamp output permits the addition of a separate power amp for system bi-amping. There are dual sets of speaker terminals (banana only). A remote control is included as well.

Internally, Exposure uses high-quality capacitors in the signal path, and has carefully mapped its circuit topology to keep signal and power-supply paths short. Cascode circuitry is used for improved power-supply immunity. The 3010S2D preamp stage now sports a new circuit board with all discrete components (rather than op-amps), while the power amp boasts a fast bipolar transistor output stage (four bipolar devices per rail) and the new power supply adds extra stages of regulation. The volume control is a fine Alps potentiometer.

Owners can also select from a pair of options: an mm or mc phonostage, or a plug-in DAC board. My review unit came equipped with the latter. The board is capable of up to 192/24-bit PCM and DSD64, and comes with two inputs: USB and BNC, with auto-switching between them. For my Apple TV I ran a SPDIF into the BNC via a superbly crafted Cardas Audio adapter. Using my MacBook via Pure Music/iTunes, I linked to the 3010S2D with the excellent Audience USB interconnect. Setup was a snap and performance was even snappier with very good transparency, smooth quick transients, and solid dynamics. A world-class DAC on the order of a Berkeley or a dCS? Well, maybe that's a stretch, but considering the price segment that this package competes in, adding the $595 DAC option is a virtual no-brainer.

Generally my sonic impressions begin to gel when listening to solo instruments—vocals, piano, cello, guitar—and then I move on to smaller ensembles and ultimately the "big guns." This protocol permits me to isolate certain criteria first: the ambient silence in and around the instrument, image integrity, decay patterns, harmonic sustain, and so forth, without the soundfield being clouded by the complexities of added instrumentation. However, like many of you, my *other* impulse is to grab all the symphonic heavy-hitters in my record collection and throw the whole sonic kitchen sink at the product. It was difficult to hold back with the Exposure—right out of the box, its clarity, tonal authority, and timbral authenticity immediately captured my attention.

The sonic lynchpin of the 3010S2D's performance was the stability and musical

# Equipment Report Exposure 3010S2D Integrated Amplifier

foundation it reproduced. From the opening salvos of Copland's "Fanfare for the Common Man" to the angelic vocal of Alison Krauss' "You're Just a Country Boy," the amp established a stable soundspace in which each image was positioned with sure-footed specificity. There was a superb combination of poise, densely textured midband detail, and dynam-ically authoritative overall energy. Plus the Exposure's very low noise floor led to an appreciation of the ambient riches that reside between musical passages. Images, such as Russ Kunkel's signature tom-tom fill during Carole King's "Home Again" from *Tapestry*, stood out as they suggested genuine weight and dimensionality rather than appearing as flat cardboard cutouts.

As for a distinctive sonic signature, neutrality prevailed for the most part, though at times the 3010S2D's character conveyed warmer, darker shadings, reminiscent of a walnut wood grain.

## SPECS & PRICING

**Power output:** 110Wpc at 1kHz into 8 ohms
**Frequency response:** 20Hz–20kHz ± 0.5dB
**Dimensions:** 17" x 4" x 11.8"
**Weight:** 25 lbs.
**Price:** $2795 (Options: mm or mc phonostage, $495; DAC, $595)

**EXPOSURE ELECTRONICS USA, INC.**
2993 Sandy Plains Road, Suite 125
Marietta, GA 30066
(508) 596-9892
exposurehifiusa.com

Female and male vocals had realistic body in a distinct sense of place—with both feet on the ground, so to speak. On his *Mule Variations* Tom Waits' voice had the requisite chest resonances and throatiness I've come to expect; Leonard Cohen's vocals from *Old Ideas*, closely miked and darkened with age, seemed to emerge from a subterranean underworld. During violinist Anne-Sophie Mutter's performance of the Tchaikovsky Violin Concerto, her violin's top end was nicely extended, but not overly detailed or etched.

Could the sound have used a bit more top-end air? I think so, but importantly, there was a sweetness to the 3010S2D that was especially pleasing on full-bodied, resonant, acoustic instruments such as cello and bass viol. Bass response was equally musical and balanced with hints of tube-like warmth but all the while maintaining the tautness, pitch stability, and control that are the essence of a modern solid-state performer.

In my review of the B&W 805 D3 compact (in this issue) I point out the chameleon-like character of its brilliant diamond tweeter, a transducer so finely polished in its resolution that it doesn't let any texture, distortion, or harmonic slip by. It also doesn't suffer poor amplification lightly and will reveal grit and grain or any hint of treble artifacts. It was love at first sight for the B&W and the Exposure, and as I listened to Respighi's *Brazilian Impressions* [BiS] the 3010S2 handled the delicate percussion cues with sensitivity and finely honed resolution.

While the Exposure is suitable to power most compacts and smaller floorstanders I always recommend auditioning an amp while listening at typical volume levels to the loudspeakers you'll pair with it. (Considering your room size is also important.) For example, my own ATC SCM20 compacts and their very naughty 83dB sensitivity elicited a bit of compression, and caused this 110Wpc amp's bass grip to loosen slightly; an acoustic bass or a kick-drum lost a bit of the sheer, ball-fisted dynamic energy that a larger amp imparts with that power-hungry speaker.

In sonic colorations, the Exposure kept its nose clean. It didn't hype treble frequencies, etch transients, or evince any pernicious tonal peaks or bumps. Its minor sins were subtractive at best. It could drive a speaker like the Vandersteen Treo CT beautifully across most of the frequency spectrum, and only when really pushed *hard* did the Exposure's sound tend to relax and soften in the lower midbass; the potency of deep percussion dynamics was slightly reduced, and sustains were less discernable. Substituting the likes of a Pass Labs or an MBL Corona C51 restored a soundstage dimensionality and harmonic authority which the Exposure had backed off slightly. On the other hand, substituting either of these well-regarded amps could also send a carefully crafted audio budget swirling down the drain.

Don't let the simple façade of the Exposure 3010S2D integrated amp fool you. It may not have outer glitz and glamour but it's a real standout when it comes to inner beauty. The Exposure 3010S2D is an honest and classy piece of work that honors the finest traditions of the high end. tas

# Equipment Report

## Rotel A14 Integrated Amplifier/DAC and CD14 CD Player

### The Tradition Continues

Vade Forrester


**As Rotel has been manufacturing hi-fi gear** for over 55 years, it's surprising I'd never heard any of its components. The 14 Series gear reviewed here falls towards the entry level of the Rotel line. In today's market, however, that doesn't mean it's stripped of extras. The A14 amplifier in particular is chock full of features—it has a moving-magnet phonostage, a very capable DAC that can play DSD and PCM music files, an aptX Bluetooth connection, a front-panel USB connection so you can play the music stored on your smartphone, and a headphone amplifier to listen to through your favorite cans. Rated at 80 Class AB watts per channel, the A14 sells for $1299. The $599 CD14 CD player follows the example of many recent CD players—it doesn't try to be anything other than a CD player. Actually, I probably shouldn't have said "many" CD players, since there aren't "many" CD players on the market. I have no data to support this, but I'd venture a guess that there are far more turntables than CD players in current production. But if you need a DAC to use with a music player, there's one in the A14. Since these two Rotel components are part of the same family and look alike, I'll review them together. When connected together via Rotel's proprietary Rotel Link, they can be controlled by an app on your iPhone. Each unit comes with its own remote control, as well. As parts of the 14 Series, they share the same styling—simple black or silver faceplates slightly beveled at the top and bottom with a small display window in the center.

Hard to believe, but we get a few letters and e-mails griping about the prices of high-end components, and it's true—some are quite pricey. But you don't have to pay a fortune to get acceptable sound; budget gear is better than ever. These units, especially the A14 amplifier, exemplify how good budget can be. And if the A14 is above your financial comfort zone, there's also a the very similar A12 amplifier for $899 with a less advanced DAC and "only" 60Wpc—not much to give up for $400 savings.

It's actually easier to list the features the A14 lacks than the ones it has. It has no moving-coil phono input (the phonostage's gain is suitable for moving-magnet cartridges only), but I doubt that most people who buy an amplifier like the A14 will invest in expensive moving-coil cartridges, and even if they do, a step-up transformer or headamp can add support for moving coils. The A14's power output should suffice to drive quite a few speakers, but if you need more power, there are preamp outputs on the rear of the amp that could be used with an amplifier like Rotel's massive 350Wpc RB-1590. There are plenty of analog inputs and enough digital inputs for almost any digital source you're likely to use. So you're giving up very few options at the A14's price. Of course, this assumes everything works fine, a subject that this review will explore.

I've heard several industry pundits proclaim that the CD is a dead or dying format, but that's baloney; many new recordings are still released on CD, and there are tons of used CDs available—just check eBay, or your local used bookstore. Lots of audiophiles and music lovers already have large CD collections, so saying the CD is dead makes as much sense as saying the LP is dead.

The CD14 uses a highly regarded Wolfson DAC chip, which is capable of sampling rates up to 192kHz. Of course, as the sampling rate of CDs is 44.1kHz, the DAC's capability is overkill. The CD14 will also play MP3 files, but you'd need to burn those onto CDs first (there's no USB input that would allow you to play them off a USB flash drive). Analog output is on unbalanced RCA jacks—there's no balanced XLR out. Front panel layout is pretty standard: a power on/off button on the left side, a slide-out CD drawer underneath a digital display window in the center, and standard operational buttons

# Equipment Report Rotel A14 Integrated Amplifier/DAC and CD14 CD Player

on the right. The remote control duplicates the button functions, and more. On the rear panel, the RCA output jacks are on the left side; the 12-volt trigger jacks and the Rotel Link jacks are in the center, along with a digital SPDIF output on an RCA jack. On the right side of the rear panel is the connector for the power cord, which uses no ground connector. (Though IEC-terminated power cords will fit the socket, the ground wire won't be connected.) The SPDIF output lets you connect the CD14 to the A14's SPDIF input or to any DAC with a SPDIF input, and bypass the CD14's internal DAC. Would that sound better? We'll find out.

The A14 amplifier's internal DAC uses an AKM DAC chip to play PCM files up to 384/32 and DSD256 files. However, there's no MQA capability, and with Tidal now streaming MQA files, that's become more important.

But wait, there's more. By pressing the Menu button, you can access bass and treble controls, a balance control, and a dimmer control for the display window. Analog inputs for the mm phono section, CD, tuner, and aux are so labeled on the back of the amplifier, and also on the selector buttons on the front panel. Then there are the digital inputs: two sets of SPDIF inputs (both coaxial), two more on optical (TosLink), a USB Type B, and a Bluetooth. There's also a front-panel USB Type A connector where you can plug in your iOS Apple smartphone or tablet. You can select each analog and digital input by pressing buttons on the front panel and on the remote—much nicer than having to scroll through the entire list of inputs as you have to do on some preamplifiers. Direct access to inputs is also available on the remote control. There are two sets of speaker output terminals, which you could use to biwire a speaker or drive speakers in two zones.

## Setting Up and Using the CD14 and A14

The first things you'll notice when you unpack the shipping boxes are huge "Getting Started" instruction sheets, almost as large as the boxes themselves. It's pretty hard to ignore or lose such instructions, which have good illustrated directions for installing the equipment. Inside the box is something you don't often see: a complete assortment of cables needed to operate the units—power cords, RCA cables, SPDIF cable, USB cable, Rotel Link cable, and 12-volt trigger cables. These are not audiophile-grade wires but are still plenty good enough to get started. There's also a CD with each unit, which has the Windows driver for the A14, and the full manuals for both devices in PDF format. The CD14 comes with a remote, as does the A14.

Since it's doubtful lots of users would immediately run out and buy new power cords and RCA interconnects for units priced like the A14 and CD14, I used the supplied cables.

A photo on the Rotel website shows a CD14 stacked on top of an A14. That looks good, and the big, soft feet used on both units should protect whatever they sit on, but I'm not keen on stacking anything on top of an amplifier, which needs ventilation space—the A14 manual says four inches on all sides. Stacking the units would put the CD14's CD drive right above the A14's heat sink, which radiates heat. To make matters worse, there's a section of the CD14 that hangs down below the rest of the enclosure. Located in the center, beneath the drawer, it provides space for the laser assembly that reads CDs. As you definitely don't want to heat that section up, don't put the CD14 atop the A14—or any other amplifier.

After you install the batteries in the remote and cable up the CD14, you're ready to listen. When you pop in a CD, you'll see its status in the front window displayed with black letters on a white background. However, the display is rather small, so you may need a magnifying glass to read the smallest text. The large black plastic CD14 remote is well designed and easy to use, with a numeric keypad that enables you to jump directly to any track on a CD rather than having to scroll through them one at a time. Some of the lettering on the remote appears in grey, which is a bit hard to read on the black background. Most functions on the CD14 remote are repeated on the A14 remote, so you can use the A14 remote to control both machines. (If your coffee table suffers from remote control overload, that's a valuable feature.) The CD drawer can be operated either from the remote or the front panel. The only quibble I had with the CD14's operation was with taking CDs from the drawer; it was hard to remove them since the usual indentations were not cut out on the sides of the tray. I had to either reach underneath the drawer and poke the disc upward from below, or stick my little finger into the center hole from above to lift the disc that way—both methods were annoying.

The Rotel Link cable that connects the A14 to the CD14 is the one with the stereo mini-plug and white connectors. That's spelled out in the A14 manual but not the CD14 manual. If you use the Rotel Link, don't use the 12V trigger connection (the cable with the mono mini-plug and black connectors).

The A14 should be broken in from "two to four weeks of listening enjoyment" per Rotel's Tech Support. I wasn't sure what "weeks of listening enjoyment" meant, so I gave it three weeks of 24/7 break-in. Incidentally, Rotel Tech Support's Tim Wyatt was very prompt and helpful in responding to my questions, which should be the norm but isn't always.

I connected my KEF LS50 speakers using Wireworld Helicon OCC speaker cables. The KEFs are small stand-mounted speakers with a low 85dB sensitivity and limited bass response. Above the bass region, their response is fairly flat, certainly not peaky by any stretch of the imagination. I normally augment them with a subwoofer, but of course using subwoofers or other forms of powered woofers when testing an amplifier is *verboten*, since you're listening to the subwoofer amplifier in the bass, not the amplifier you're reviewing. This is not a quibble so much as an observation. The volume level for the A14 had to be set at what appeared to be a very high numeric level (between 60 and 70, with 96 being the maximum) to achieve my normal listening volume, and I'm no head-banger. There was still plenty of headroom left, so it's just a matter of convention what level is shown on the front panel. At least the numeric volume level is displayed in a large font, easy to see from my listening chair.

I wanted to get the best sound from the digital inputs of the A14, so in addition to the CD14, I connected my SOtM network music player as an external source. That way, I could explore the A14's ability to play high-resolution PCM

# Equipment Report Rotel A14 Integrated Amplifier/DAC and CD14 CD Player

and DSD files. Hint: When you're using a source that has a USB output, select the PC-USB input on the A14, not the USB input. The USB input refers to the USB connector on the front panel, where you can plug in your smartphone.

To check out the A14's phono input, I connected my turntable to the A14—not directly, though. Since I have a moving-coil cartridge, I used a Rothwell Headspace headamp to boost the cartridge output to a level that the A14's moving-magnet phonostage could handle. (If you're not familiar with a headamp, think of it as an amplifier that performs the same duties as a step-up transformer, boosting the signal level of an mc cartridge to that of a mm cartridge, but not applying RIAA playback equalization.)

Some of the files I use for component evaluation are high-resolution, so to evaluate the CD14, I converted a few of them to 44.1kHz sampling rate/16-bit WAV files and then burned them to a CD-R. I prefer black CD-R blank CDs, which may reduce scatter of the laser beam. Some CD players won't read these, but the CD14 read them without a hiccup. I also used these converted files to test the Bluetooth connection. Both the CD14 remote and the A14 remote have numeric pads that let you access a track directly; without this feature you must advance through tracks manually to reach the one you want to hear—a real pain when your CD has lots of tracks.

To check out the headphone input, I plugged my HiFiMan HE400s into the front panel jack. These planar-magnetic headphones are moderately low in sensitivity, and usually need a fairly hefty amp. I needed an adaptor to fit the ¼" plug into the 3.5-mm jack in the front panel of the A14. When I plugged in the 'phones, the speaker output did not cut off, so I had to turn off the speakers via the front panel. The A14's internal headphone amp had plenty of power to drive the HiFiMans, and sounded very good doing so. If you're a serious headphone listener, you'll want a separate headphone amplifier, but the A14 is good for occasional headphone use.

Balance and tone controls were once commonplace, but lately have almost disappeared from the hi-fi scene. Now they're making a comeback in integrated amplifiers. On the A14, these controls are accessible either through the menu or from the remote control. The remote control is really the only useful way to access the tone controls. First you have to press the bypass button to engage the tone controls (normally they are bypassed). The bass and treble controls both work as you would expect, with fairly gradual action in their respective regions. The balance control is also accessible through the remote control, and is always engaged. This system works and minimizes the number of controls on the front panel, but for serious use it isn't as handy as actual knobs on the front panel. However, if you don't need or want to use these controls, you'd probably rather they didn't clutter up the faceplate.

## Sound

For a variety of reasons I do most of my listening these days to digital music streamed from a central NAS drive over my home network and rendered by a network music player, either a laptop computer running a program like Roon or JRiver Media Center or a dedicated music player like the SOtM sMS-1000SQ, converted to an analog signal by a DAC. Control of my music playback is through the appropriate app installed on my iPad. Although I have a lot of ripped CDs, I also listen to many downloaded high-resolution files. To establish a familiar benchmark for comparison, I started listening to digital music, using the SOtM network music player connected to the A14's internal DAC via its PC-USB input. (I'm using a limited number of musical selections in this review since we need to evaluate the A14's many inputs.)

## SPECS & PRICING

**CD14 CD Player**
**Formats supported:** CDs, MP3s
**Output:** Unbalanced, fixed-level on RCA jacks
**Dimensions:** 17" x 3.8" x 12.3"
**Weight:** 13 lbs.
**Price:** $599

**A14 Integrated Amplifier and DAC**
**Power output:** 80Wpc into 8 ohms
**Analog inputs:** Moving-magnet phono, line level (4)
**Analog outputs:** Preamp out, speakers out
**Digital inputs:** USB, SPDIF on coaxial (2) and optical (2), aptX Bluetooth, RJ45 network
**Digital formats supported:** PCM 384kHz/32-bit, DSD256
**Headphone output power:** 90mW @ 16 ohms
**Dimensions:** 17" x 3 5/8" x 13 1/2"
**Weight:** 18 lbs.
**Price:** $1299

**ROTEL OF AMERICA**
54 Concord Street
North Reading, MA 01864-2699
(978) 664-3820
rotel.com

**ASSOCIATED EQUIPMENT**
**Speakers:** KEF LS50
**Preamplifier:** Rothwell Headspace MC head amp
**Analog source:** Linn LP-12 turntable on a custom isolation base, Graham 2.2 tonearm, Van den Hul Platinum Frog cartridge
**Digital source:** SOtM sMS-1000SQ network music player with sPS-1000 power supply; QNAP TS-251 network drive for music file storage
**Interconnects:** Crystal Cable Piccolo unbalanced interconnects, CablePro Freedom unbalanced interconnects, Crimson RM Music Link interconnect cables
**Speaker cables:** Wireworld Helicon OCC
**Power cords:** Purist Audio Design Venustas power cords, Clarity Cables Vortex power cords, Audience powerChord e, Au24 SE LP powerChord power cords
**Digital cables:** Wireworld Platinum Starlight 7 USB cable, Audience Au24 SE SPDIF cable
**Power conditioner:** Audience aR6-T

# Equipment Report Rotel A14 Integrated Amplifier/DAC and CD14 CD Player

"Folia Rodrigo Martinez" from the album *La Folia 1490-1701* was ripped from the CD Alia Vox AFA 9805 as an AIFF file. Played by Jordi Savall and a small band of Renaissance music specialists, it's a lively, energetic piece. Most Renaissance music doesn't have much bass, but this piece has a drum that extends into the mid-20Hz range. Of course, the tiny KEF speakers can't begin to play that low, but driven by the A14 they actually surprised me with how much upper-bass impact they had. They also captured percussionist Pedro Estevan's very light brushes of his sticks on the drum—something that often disappears beneath the noise floor. Throughout the piece, the many percussion effects were plainly audible, more so than with many more expensive components. What was not done as well was the reproduction of Savall's *viola da gamba*—a cello-like instrument from the Renaissance and Baroque eras. The *viola da gamba* plays the main tune, but unfortunately it was slightly muffled, without the harmonic richness that's a part of this recording.

The Tallis Scholars' "Miserere" from their album *Allegri's Miserere & Palestrina's Missa Papae Marcelli* is a 96/24 FLAC file. "Misere" is an *a capella* work, with a small choral group in the front, a solo tenor narrator, and a small solo group at some distance behind the main group. The A14 projected the piece with a huge soundstage; when the solo group behind the main group entered, the rear of the soundstage was illuminated more brightly than I've heard it before. The solo tenor was portrayed without any brittleness, a trait I sometimes hear from lesser components. His vocal shadings were quite expressive, including the barely detectable vibrato he uses at times. The echo of the solo group was realistically integrated into the overall soundstage about as well as I've heard it. The A14 widely spread the soundstage between the speakers, with the solo tenor firmly positioned in the center.

Shelby Lynne's album *Just a Little Lovin'* is a DSD64/DSF recording sourced from Acoustic Sounds. The title song was reproduced with excellent detail across the frequency spectrum. The A14 captured delicate inflections of Lynne's voice, so that I could easily understand her phrasing as she strove to project meaning and emotion. Although the KEF speakers don't go too deeply into the bass, the A14 made the LS50s sound like much larger speakers, projecting lots of punch and impact that almost made me forget there's a lot of deeper bass in this song. The A14 was particularly good at reproducing percussion; at one point, the percussionist taps a cymbal very lightly, and the A14 reproduced the barely audible cymbal ever so convincingly. It was all there—the initial transient as the cymbal was struck, the sustain, and the decay as it gradually faded into inaudibility. This track, recorded at a low level, needed a volume setting of 81 to achieve normal playback level, leaving plenty of headroom. OK, so that's our benchmark for these pieces, let's see how they sound through other inputs.

A configuration I imagine will be popular with many readers would be the combination of the CD14 driving the A14. So I popped the test CD-R into the CD14 and started listening, first with the CD14's internal DAC. This is what you'd hear if you buy the CD14 to use with an amplifier that lacks an internal DAC.

"Just a Little Lovin'" lacked all the bass impact and slam I've heard from the high-resolution file. Lynne's vocals were mostly smooth and breathy, but, a couple of times, had a very slightly edgy sound.

On "Miserere" I heard more of this edginess when the main choral group sang. I had expected to hear it, if at all, when the solo tenor entered, but his part was clean as a whistle. The solo group was imaged at a greater distance behind the main group and the reverberant echo that occurs when they sing was more smeared. The soundstage was not as well defined as it was with the high-resolution file.

On "Folia Rodrigo Martinez" I again heard a slight edginess, and the bass had less impact than the original file.

Next, I switched to the DAC in the A14, connected to the SPDIF coaxial output from the CD14. In this configuration, I used the CD14 as a transport, connected via the digital output to the A14. I played the same CD.

On "Folia Rodrigo Martinez" the first thing I noticed was an increase in bass impact over the CD14 with its internal DAC. Then I noticed there was less edginess. Finally, I noticed that the piece sounded more open and spacious than the CD14 with its internal DAC.

Switching to "Miserere" the story was similar: less edginess for the main choral group, noticeably less smear in the reverberant echo when the distant solo group sang, and an overall more open soundstage, though not as well defined as on the high-resolution file.

On "Just a Little Lovin'" the bass descended deeper, though not as deeply as heard with the high-resolution file playback. There was a smidgen of the edginess left, but less than with the CD14 by itself. Percussion instruments were still realistically reproduced. I think these results tell us the DAC in the A14 sounds better than the one in the CD14.

Finally, I listened to files played from my laptop computer through the Bluetooth connection. I used the JRiver playback software, and instead of installing a driver for the DAC I installed a Bluetooth driver. The A14 then paired with that setup easily. Since Bluetooth wouldn't support high-resolution files, I converted the files to CD-quality WAV files using the dBpoweramp music-converter program.

On "Folia Rodrigo Martinez" I was surprised at the high quality of the sound. Previous experiences with Bluetooth playback using other components have left me unimpressed. But I heard very respectable sound quality from the Bluetooth connection, so much so that I wondered if part of my previous unfavorable impressions had stemmed from using an iPhone to play music. Could the use of the high-end JRiver software have made that much of an improvement? I heard powerful, impactful bass, as deep as any other source. Instrumental harmonics were accurately portrayed, and dynamics were accurately tracked. A very good experience.

Then I switched to "Miserere." As much as I'd like to report an equally good listening experience, I can't. Vocals sounded very slightly rough—first the main choral group, then the solo tenor. The solo group behind the main group sounded unfocused, and the reverberant echo was a bit smeared.

Wanting to hear another vocalist, I played "Just a Little Lovin'" and again heard a bit of

# Equipment Report Rotel A14 Integrated Amplifier/DAC and CD14 CD Player

roughness. As before, bass reproduction was quite respectable, and the instrumentals were fairly realistic, but once again Lynne's voice had an unfortunate edge or roughness. So I think Bluetooth has a way to go yet before it's equal to wired connections, though I was still amazed at how far it's come in the couple of years since I first tried it.

I also wanted to try the A14's mm phono section, but unfortunately, a couple of the evaluation tracks had no equivalent LPs; however, Shelby Lynne's *Just a Little Lovin'* did, so, of course, I used it. It exhibited the smooth, continuous sound typical of an LP, but also had a few pops and clicks, also typical of LPs. Although the bass did not extend as deeply as with the DSD version, it somehow sounded more realistic; although it's exciting, the digital recording probably overdoes the bass. The LP's bass seemed better integrated into the midrange. Microdynamics seemed to pop with a bit more energy. Lynne's vocals benefited from the analog smoothness.

Next I played a recording by the Emerson Quartet augmented by Mstislav Rostropivich of Schubert's String Quintet in C (Deutsche Grammophon Stereo 00289 479 4384) to get a feel for how the A14 handled a small instrumental group. The string sound was very smooth and continuous, harmonics were rich and accurate, and microdynamics were just right.

I'm not so sure I really determined how the phono input sounded so much as how LPs sound compared to digital. That said, I thought the phono section sounded deliciously expressive.

## Comparison

I don't have anything available remotely similar to the A14, so going on memory I tried to compare it to the Yamaha A-S801 integrated amp I reviewed in Issue 263. The Yamaha was physically larger than the A14 and generated 100Wpc. Like the A14, it had an mm phono section and an advanced DAC. I used it with Yamaha's YBA-11 Bluetooth wireless adaptor, which gave it Bluetooth capability similar to the A14. Like the A14, the Yamaha had a built-in headphone amp, and similar features such as tone controls and a balance control; additionally, it had a loudness control, useful for maintaining frequency extension when listening at low volume levels. It also had direct connections for a CD player, bypassing all those features. But unlike the A14, which has all its features accessible through the menu, the Yamaha had separate knobs for each of those functions—which I found easier to access than a menu. And it only cost $899, $400 less than the A14—almost 30% less, for 100Wpc. I used only file-based playback to evaluate the Yamaha.

On "Folia Rodrigo Martinez" the Yamaha exhibited similar bass performance, but didn't quite capture the very light taps on the drum as well as the A14. The percussion instruments blurred into the background more than on the A14, but the *viola da gamba* was clearer on the Yamaha.

On "Miserere" the Yamaha was similarly free of brittleness, but the A14 was noticeably better at depicting the soundstage of this piece. On the A14, the small solo group behind the main group was reproduced with less smear in the reverberant echo. The Rotel's soundstaging was way above the norm.

"Just a Little Lovin'" saw the Yamaha produce an equal amount of detail and bass impact, but the A14 was a bit better at reproducing the delicate cymbal. The extra power of the Yamaha could be useful if you used it with less sensitive speakers, but both drove the KEF speakers easily. My memory of the Yamaha's sound is that it was more matter-of-fact than the A14's, which was delightfully tuneful.


## Bottom Line

Rotel's CD14 CD player and A14 integrated amplifier show us that Rotel still deserves its reputation for affordable high-quality audio equipment. In these days when lots of manufacturers are talking about building their "last CD player," the CD14 is a fine performer at a modest price. Sounding good as a stand-alone unit, it showed even more promise as a CD transport. Because many integrated amplifiers now include high-quality DAC circuitry, using the CD player as a transport is a good way to step up the player's sound quality—just plug its digital output into the SPDIF input of the integrated. Rotel even supplies the SPDIF cable.

I was hugely pleased with the A14 integrated amplifier. One of the crop of modern integrated amplifiers with a very capable internal DAC and Bluetooth connectivity, it's ready to support virtually any source you might choose, even an mm phono cartridge, which sounded utterly delightful. With power a-plenty to drive most of the speakers you'd likely partner to, it's a superb choice for a modest audio system, whether for a beginner, an office, or a bedroom, or even for a main audio system. While I appreciated its long list of features, what really impressed me the first time I heard it was its sweet, musical sound which encouraged long listening sessions. Highly recommended. tas

# Equipment Report


## Hafler PH60 Phonostage

### Small Wonder

Julie Mullins

**As every audiophile knows, David** Hafler is a hi-fi legend. Among other advances, he's known for his work, along with Herbert Keroes, on Blumlein's ultra-linear circuit. In 1954 he founded Dynaco and soon became a household name. The Dynaco ST-70, one of the best-selling amplifiers of all time (it sold more than 350,000 units in its lifespan)—and considered one of the greatest classic amps—needs no introduction. Ditto the beloved Dyna-Kits, affordable ready-to-assemble kits for building preamplifiers and power amps that also proved very popular, even ubiquitous, during the 1950s and 60s. (ST-70 fans, rejoice: A newly updated version of the ST-70 will be reviewed in TAS soon.) In 1977, he founded the David Hafler Company, which pioneered the use of MOSFETs; certain models such as the swarthy DH-500 stereo amp became successful in both home audio and studio applications. Such consumer hi-fi and pro-audio overlap would presage the brand's future—and present.

Fast-forward to 2014: Hafler has been reintroduced to the hi-fi market under the auspices of Radial Engineering Ltd., a Vancouver B.C.-based company widely known for its pro-audio presence that acquired the Hafler brand in 2014. Because Radial had served as the former Canadian distributor for Hafler, it already had intimate knowledge of the Hafler brand and its products. Although the company has also released a line of headphone amps this year, its new compact phonostages and step-up transformers are the inaugural products in the Dynaco-Hafler relaunch. In addition to the PH60 moving-coil phonostage under review here, the PH50 moving-magnet phonostage and two phono step-up transformers, the PH34 (31dB gain) and PH44 (20dB gain), comprise the rest of the first offerings. Interestingly, the marketing materials for these components contain testimonial quotes and endorsements from a number of high-profile recording engineers who have worked with world-famous musicians. There's that pro-audio crossover again!

All told, it's fitting that Radial is striving to continue Hafler's heritage of high quality, reliability, and affordability. Oh, and unlike a majority of price-friendly gear that's manufactured overseas these days, all of these components are made in Canada to Radial specs. But let's get back to the worthy entry-level mc phonostage, the small wonder known as the Hafler PH60. As you read on, you'll see it has a lot to offer sonically and functionally for its quite reasonable $599 retail price, including a three-year transferable warranty.

#### What's Inside and Out

The PH60 is a small-scale, if basic, well-made little box—this is one component that won't cause concerns about equipment rack space! An active phono preamp, it combines a 100% discrete Class A transformerless head-amp design with a well defined RIAA curve "to preserve and transmit the original program material with minimal coloration." The solid-state circuitry is through-hole soldered onto a military-grade circuit board for durability. (A bird's-eye-view photo of the board actually appears on the Hafler website.) Although its surface area is small, careful attention has been paid to parts positioning to minimize noise and crosstalk—it's certainly trickier business to amplify the lower output signal of a moving-coil cartridge than that of a moving magnet. Additionally, in its drive circuit the PH60 uses metal-film resistors and full-sized capacitors that are inserted by hand. As for mc cartridge loading options, you can choose between 25 ohms, 50 ohms, 100 ohms, and a custom load (a custom-calibrated resistor can be ordered from the manufacturer for a nominal fee, then soldered into place). However, to access the cartridge-loading jumpers you must remove the PH60's cover. (The user guide includes a diagram and instructions for this.) Given that the vast majority of mc carts have a recommended loading of 100 ohms, the PH60 comes factory set for that. While I appreciate the clean simplicity of the chassis design—with only two push-buttons in front (power on/off and a low-cut filter option) and just enough room in back for the RCA inputs and outputs (which are gold-plated), power in, and ground—I would have preferred the flexibility of being able to experiment more readily with my cartridge loading. But this is a minor personal quibble.

As for the outside, the PH60's form follows its basic, no-nonsense functions. The chassis is the same one used across this series. It's made of virgin steel "folded" into a U-shape for solidity. And there are no decisions to be made about finish: Black *is* the color. But I was surprised by the *red* cord that connects to the 15V outboard power supply that comes with the PH60. By design it's meant to be "plug-and-play" and indeed it is (with the possible exception of accessing

# Equipment Report Hafler PH60 Phonostage

the internal jumpers to adjust load settings). So let's talk about playback and its sound.

## How Does It Sound?

As I get spoiled by the many opportunities to listen to ultra-high-end gear, the PH60's intended place within the market had to be kept in mind. So I tailored my critical listening more or less to the parameters I deemed reasonable for a $599 phonostage—though most of the ancillary gear I had on-hand was not true entry-level (see Associated Equipment).

Before I delve into specific musical examples, here are some general observations. Not unexpectedly, a lot depended upon the quality of the source material. The more well recorded an LP was, the more true-to-life/how-I'm-used-to-hearing-it-on-reference-systems it sounded. Less-than-terrific source material varied more widely in playback (and to mixed results at times). Broadly speaking, there's an emphasis on the power range, which would please a good many listeners. In general, horns, strings, and vocals were outstanding and often the most realistic in tone and texture. More often than not, the PH60 seemed to tilt towards the darker end of the sonic spectrum. However, across assorted LPs I found timbre and detail to be among the most variable of the PH60's characteristics, especially (as noted) with less-than-stellar discs. The listening examples below would be considered recordings of good-to-excellent quality.

A listen to Buena Vista Social Club's self-titled soundtrack album [World Circuit] filled with layers of rhythms and instruments galore delivered remarkable detail on strings, shakers, and various hand-drums on "Chan Chan." The moody mournfulness of slide guitar and the acoustic laúd (Cuban guitar) were captured with finesse and longish decays. On "De Camino a la Vereda" timbre seemed a shade brighter than what I'm used to—Ibrahim Ferrer's tenor seemed slightly higher-pitched, as did the trumpet—and pacing seemed a touch laid-back, yet still fitting for a scorching afternoon in the Havana sun. However, I felt the essential and compelling *qualities* of the musicians' performances shined through despite these inaccuracies. It's not the last word in resolution, but the sense of presence was pretty pleasing overall.

I keep returning to the fabulous-sounding El Vy LP *Return to the Moon* [4AD]. The catchy title track was one of the best on playback, with lively energy matched by fairly realistic solidity. Interestingly, I noticed remarkable clarity on Matt Berninger's vocals, as if he were delivering better diction on the lyrics that day. On the offbeat, off-color spoof "I'm the Man to Be," a heavier rocking track chock-full of bass (and some naughty lyrics), there was an upper-mid-range emphasis, while the mids seemed to step back slightly. Overall, the cut's solidity and muscle were delivered with appropriate funkiness and impressive detail even on the quirky samples that popped out! Next, I tried the low-cut filter option on this same song, which resulted in more forwardness of cymbals and lead guitar, while the bass stepped back (though it became a bit better defined). Timbre tipped to a more top-down presentation, growing slightly lighter and brighter. On the plus side, more detail was uncovered (more squeaks on strings, for instance). But for me, the tradeoffs weren't worth it. It took away too much anchoring bass power, and I also missed the deeper edges of Berninger's baritone.

Switching genres completely, I spun a reissue of Joni Mitchell's *Blue* [Reprise]. Her vocals sounded gorgeous and quite natural, particularly on "All I Want" (aside from a bit of sibilance on the "so blue" lyric, no biggie) and the title cut, which also boasted quite lovely and lifelike resonance on piano. "Carey" conveyed impressive transient attack and detail on dulcimer strings and hand drums. Once in a blue moon (pun intended) I noted a slight thinness to the presentation, but on such a spare recording, it hardly mattered.

As for downsides, it's hard to complain given the commendable quality/cost ratio here, but I'd say soundstaging could have used more depth, and generally there wasn't a strong sense of the location of instruments—although left and right placement coordinates seemed on target. But most importantly, all the elements in the mix were there and audible. The few issues I had were more about the way timbres and details were sorted out (or not, in some cases). Some instruments jumped to the front while others took a back seat. If was as if someone had laid out a bunch of marbles, and your attention was drawn to those that were bigger or brighter or in a better shooting position; you saw them all, but your focus shifted to those most prominent. In its own way, this made for compelling listening.

## Conclusion

The PH60 faithfully carries on the Hafler tradition of sonic value. Judged within its entry-level category, it delivered the musical goods, and seemed to keep improving the more I listened. Based on my experiences, the PH60 represents a solid choice for vinyl lovers in the market for a smartly engineered, well-made, *and* affordable phonostage. tas

## SPECS & PRICING

**Type:** Transformerless Class A phonostage
**Gain:** 70db @ 1kHz
**Cartridge loading:** 25, 50, 100 ohms, and a custom option (manufacturer will calculate and supply for a small fee)
**Dimensions:** 4½" x 1¾" x 6"
**Weight:** Not provided
**Price:** $599

**HAFLER CORPORATION**
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hafler.com

**ASSOCIATED EQUIPMENT (FOR THIS REVIEW ONLY)**
**Amplifier:** Air Tight ATM-1S stereo amplifier
**Source:** Acoustic Signature Challenger III with TA-1000 tonearm, Air Tight PC-7 cartridge
**Loudspeakers:** Air Tight Bonsai, Raidho D-1
**Preamplifier:** Soulution 525
**Power conditioner and power cords:** Ansuz
**Cables and interconnects:** Shunyata Research Venom series, AudioQuest Fire, Crystal Cable Absolute Dream
**Equipment racks and amplifier stands:** Critical Mass Systems Maxxum

# Equipment Report

## Optoma NuForce STA200 Power Amplifier

### Depth and Dimensionality Aplenty

Steven Stone


**A good power amplifier design is a** good power amplifier design whether it was created in 1950, 1960, 1970, or anytime thereafter. Given how long audio has been around, you can expect any list of all-time great amplifiers to have 100 entries and there would be still some worthy examples that would not make the roster. Depending on whom you ask, and who answers, the Goldmund job 225 power amplifier ($1499) could very well be one of the amps that would make it onto that list. Recently Optoma NuForce (along with Goldmund's knowledge), introduced a new amplifier that is based on the Goldmund job 225 amplifier, called the STA200 ($1299).

How did collaboration between Goldmund and Optoma NuForce come about? According to Optoma NuForce, years ago Goldmund used to offer its customers Optoma projectors. When merger discussions between Optoma and NuForce began, the leaders of the emerging company-to-be considered how to move forward and how to expand or refresh the NuForce portfolio. At the same time Goldmund was curious to see whether younger audiophiles and audio enthusiasts would be interested in affordable high-performance equipment, and whether its own brand awareness could be expanded through NuForce. For Optoma NuForce, introducing a Class AB amplifier was a way to test the market and see whether this was a direction the company should pursue. So the STA200 power amplifier is an experiment for both firms.

#### Technical Tour

While the STA200 has many similarities to the Goldmund job 225 power amplifier, it is not identical. The primary difference is the power output specification. The job 225 puts out 125 watts into 8 ohms while the STA200 has only 80 watts of output into 8 ohms. This difference in power output was instituted so that the STA200 would not be a direct competitor for the job 225 (it could even be argued that for the $200 difference the job 225's additional power offers a better value). Another difference between the job 225 and the STA200 is the latter has a slightly lower gain (34.4dB) that's closer to a more standard figure, as opposed to the job's 36dB gain.

According to a review by Brent Butterworth of the job 225, that amp's Class AB design "was taken from an amplification circuit originally used in a Tektronix oscilloscope in the late 1960s." Michel Reverchon, Goldmund's CEO, said that the circuit has since been refined by nine generations of Goldmund engineers, and variations on the circuit were used on all of that company's amplifiers.

The STA200 has the same wide bandwidth as the job 225, spanning the range from 10Hz to 100kHz. The STA200 also extends its high-frequency response up to 900kHz (at 3dB down). The reasoning behind such a wide bandwidth design is to eliminate phase shifts caused by the high-frequency roll-off effects.

#### Setup

The STA200 has all the controls you normally find on a basic power amplifier, which are not many. The only input option is a pair of single-ended RCA connections. For output the STA200 has one pair of five-way binding posts. The only other features on the back panel are the IEC AC line connection, a heatsink that takes up three-quarters of the back panel, a 115/230V AC switch, and a power output connector that can deliver power to the Optoma NuForce WDC200 streamer. The STA200's front panel is an unadorned expanse populated by a single power on/off button located on the right side next to a small red power indicator LED.

Dimensionally the STA200 ranks as a ¾-sized cabinet. It's 14 inches wide, only 8 inches deep, and 3¼ inches high. Even when it's left on 24/7 the chassis only gets warm to the touch—the heatsink on the back does a good job handling all the serious heat dissipation duties.

I used the STA200 extensively during a two-month period while I was listening to and reviewing the Mytek Brooklyn DAC/preamp. The STA200 was installed in both my nearfield

# Equipment Report Optoma NuForce STA200 Power Amplifier

desktop monitoring system where it was connected to the Audience 1+1, Dali Opticon 1, ATC SCM7 II, Role Audio Sampan FTL, and Role Kayak; and in my room-based system where it drove the Spatial M3 Turbo SE loudspeakers. I did not connect the STA200 to any especially difficult-to-drive loudspeakers since I do not currently have anything with a sensitivity of less than 87dB on hand. I did find with the high-sensitivity Spatial M3 loudspeakers that the STA200 did not generate any more hiss from the tweeters than the more standard 27dB gain specification of the Bel Canto REF M600 power amplifier.

Given STA200's extremely wide bandwidth specification I was curious if there would be any noise issues. As mentioned, during the review period I had the amplifier in two systems, and neither displayed any noise issues that could be attributed to amplifier instability or to RFI/EMI issues affecting the amp's performance.

Another potential sonic issue was the STA200's higher than usual gain specification. With some preamplifiers, the STA200's higher gain could mean that the preamplifier could be operating in a less than optimal gain range. With the Brooklyn DAC/pre I rarely got above -45 on the Brooklyn volume scale of -100 to -0). The last potential downside of an amplifier with higher gain is it can amplify the basic noise levels in an audio signal chain from inaudibility to unfortunate audibility. When the sound was muted, I had no issues with added noise from my loudspeakers in either of the systems where I used the STA200.

## Sound

For the last couple of years I've been listening primarily to systems using switching (Class D) power amplifiers, so it was illuminating to go back to a linear solid-state design. I hesitate to make any gross generalizations, but listening through the STA200 provided a more organic and less coolly objective view of the music than most switching amplifiers I've used recently. Near the end of the review period, my venerable Pass Labs X150.3 power amplifier (circa 1996) was returned fully restored and updated by Pass Labs. Harmonically the STA200 had far more in common with the Pass X150.3 than any of the switching power amplifiers I use regularly. Perhaps there's something to the idea that amplifiers that employ similar technologies share a certain intrinsic characteristic sound.


The STA200 displayed exemplary dimensionality. Lateral image placement was as precise as I've heard from any amplifier. Depth delineation was equal to the Pass Labs X150.3, and on some selections I felt the STA200 did a better job of defining the edges of each instrument or vocalist than the Pass could. The Bel Canto REF M600 did an even slightly better job of defining image edges and produced an even larger soundstage, but it did not better the STA200 in overall dimensionality. The REF M600 was slightly inferior in depth recreation compared to the STA200. In comparison, the REF M600's soundstage was wider, but less deep than the STA200's.

The STA200 had a darker than absolutely neutral harmonic balance that is quite similar to the Pass X150.3. Depending on the other components in your system you might find, as I

## SPECS & PRICING

**Type:** Solid-state, Class AB
**Output power:** 80Wpc into 8 ohms
**Input:** RCA analog (single-ended)
**Input impedance:** 51k ohms
**Output impedance:** 30m ohm

**Dimensions:** 14" x 3.4" x 8.8"
**Weight:** 13 lbs.
**Price:** $1299

**OPTOMA USA**
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optomausa.com/soundproducts

**Associated Equipment**
**Source devices:** A 2013 MacPro Desktop with a 3.7GHz Quad-Core Intel Xeon E5 processor with 16GB of memory and OS 10.11.5, running iTunes 12.4 and Amarra Symphony 3.3, Pure Music 3.0.1, Audirvana+ 2.5, Roon 1.2, and Tidal 1.3.
**Analog sources:** VPI TNT III w/Graham 1.1 tonearm and ClearAudio Victory II cart; VPI HW-19 with Souther SLA-3 tonearm and Denon 103/van den Hul cartridge
**Phono preamps:** Vendetta Research SCP-2B and Vinnie Rossi LIO
**DACs:** Mytek Brooklyn, PS Audio DirectStream Jr. DAC, Cary Audio DMC-600SE Music Hub, Grace m9xx
**Amplifiers:** Bel Canto REF M600, April Music S-1 monoblocks, NuPrime ST-10, Pass Labs X150.3
**Speakers:** Spatial M-3 Turbo SE with two JL Audio Fathom f112 subwoofers; Audience 1+1, Role Audio Sampan FTL, Dali Opticon 1, ATC SCM7 II, with one Velodyne DD 10+ subwoofer
**Cables and accessories:** WireWorld Silver Starlight USB cable, WireWorld Eclipse 7 balanced interconnect, AudioQuest Carbon USB cable; AudioQuest Colorado single-ended RCA interconnect, Kimber KCAG single-ended and balanced interconnect, Audience Speaker Au24e speaker cables, PS Audio Quintet, Dectet, Octet, and Premier power conditioners

# Equipment Report Optoma NuForce STA200 Power Amp

did, that I preferred this less spotlighted upper midrange on modern pop, but on some classical and vintage jazz I preferred the Bel Canto REF M600's slightly brighter harmonic rendering. I must stress this wasn't a radical difference, but it was enough be readily identifiable.

One particular performance area where the STA200's sonics were closer to those of the Bel Canto REF M600 than the Pass X150.3's was dynamic speed and agility. Here the Pass seemed a bit less fleet. It lacked some precision in its transient attack and decay that both the REF M600 and the STA200 had little trouble traversing. Perhaps this sonic difference could be attributed to the REF M600's and STA200's S/N figures, which both bettered those of the Pass.

In bass control and definition the STA200 displayed a nimbleness that matched the best amplifiers I've heard. The bass rendition was definitely tighter and better defined in the STA200 than in the Pass X150.3, where the lower octaves were fluffier and slower by comparison. Once more I found the STA200's basic low-frequency personality closer to that of the Bel Canto REF M600.

Currently I have the Spatial M3 Turbo SE loudspeakers set up so they receive a full-range signal with no crossover-set bass roll-off. This system also has a pair of JL Audio Fathom f112 subwoofers configured for a 45Hz, 24dB-per-octave crossover slope. Both the STA200 and the Bel Canto REF M600 generated fast, tight bass that melded well with the Fathom f112.

On my own recordings played back through my nearfield system I found the STA200 was among the more truthful amplifiers I've used. I did some A/B testing where I compared it with the NuForce ST-10 amplifier. I found the NuForce produced a bit larger soundstage, but it was a dead heat between the two amps in image specificity, low-level detail, dynamic contrast, and bass extension.

## Conclusion

Basic solid-state power amplifiers are not, due to their essential nature as boxes with parts inside, sexy objects that inspire a lot of audiophile lust. Perhaps that is why so many manufacturers feel the need to tart up their basic power amplifiers with thick front panels, cool meters, or artistically sculpted, rad-colored enclosures. The STA200 will never be accused of looking sexy or especially stylish—unless you are into stark minimalism. But if sound quality and solid-state reliability are your primary purchasing criteria, the STA200 should be on your radar. You may not be blown away by the STA200's looks, but its sound turns it into one sexy beast. tas

# Our Top Picks Electronics

## NAD D 3020 Hybrid Digital Amplifier

**$499**

Truly a design for our times, the D 3020 is improbably small and portable and *loaded*. The 30Wpc D 3020 offers 24-bit/96kHz resolution USB computer audio and aptX Bluetooth music streaming. For all its humble size and appearance it's pure NAD. Firmly midrange-centered, it never over-reaches in the sense of growing shrill in one direction or tubby in another. Yes, its lighter overall balance is due to some bottom-octave attenuation, but the D 3020 retains an essential *presence*, a midrange integrity, that sculpts the body of a performance and makes it *live* in the listening space. Although there's a little bit of a shaded ceiling over the top end, the D 3020 need make no apologies. The other argument is, hello, $499—making it by most standards a small miracle of packaging and portability, and with a few exceptions a delight to use and listen to. (239)


## Audio by Van Alstine Vision Phonostage

**$499**

This little marvel's compact size and low cost are made possible by the use of operational amplifiers. Frank Van Alstine's vision was to select the best-sounding modern ICs and he eventually settled on the highly regarded Burr-Brown OPA627 op-amps. The circuit features a flexible mc-cartridge loading scheme. Expect plenty of low-level detail, a strong bass range, and superior dynamic contrasts. Transient speed and control can only be described as excellent. Tonal colors are somewhat muted through the upper mid- range, suggesting that the Vision should ideally be matched with a romantic-sounding tube preamp. (260)

## NuPrime IDA-8 Integrated Amplifier

**$995**

The IDA-8 is a single-chassis integrated stereo amplifier with a DAC capable of decoding USB PCM 384 and DSD256, in addition to a 100Wpc power amplifier in a 8.5"-wide chassis. The IDA-8combines the substance and warmth of an Ultra-Linear Class A Module (ULCAM) in the preamp stage with the extraordinary speed of NuPrime'sproprietary Class D power stage for a spacious, transparent, dynamic, and textured soundstage. The amplifier switches at a frequency of 600kHz while achieving a system efficiency of up to 93 percent. The IDA-8's frequency response extends to 50kHz. (263)


## Rotel A14 Integrated Amplifier

**$1299**

Rated at 80 Class AB watts per channel, the A14 amplifier in particular is chock-full of features—it has a moving-magnet phonostage, a very capable DAC that can play DSD and PCM music files, an aptX Bluetooth connection, a front-panel USB connection so you can play the music stored on your smartphone, and a headphone amplifier to listen to through your favorite cans. There are plenty of analog inputs and enough digital inputs for almost any digital source you're likely to use. With power a-plenty to drive most of the speakers you'd likely partner to, it's a superb choice for a modest audio system, whether for a beginner, an office, or a bedroom, or even for a main audio system. While I appreciated its long list of features, what really impressed me the first time I heard it was its sweet, musical sound that encouraged long listening sessions. Highly recommended. (273)

# ANALOG

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# Equipment Report

## Pro-Ject Debut Carbon Turntable with Ortofon 2M Red Moving-Magnet Cartridge

### A Chicken in Every Pot

Wayne Garcia

**It's not exactly a secret that over** the past decade turntables have gained popularity with the young and hip—okay, they're also popular with the not-so-young and not-so-hip—appearing in movies, fashion spreads, and newspaper articles. As such, record players are more than mere tools to spin LPs on; they've also become something of a design statement that can be purchased outside of traditional brick-and-mortar stores and on-line audio retail sites.

And there's nothing wrong with that. After all, even veteran audiophiles experience gear obsessions triggered by the way a component looks—before we've heard a single note from it. Who among us has not ogled or, to conjure Jimmy Carter, lusted in his heart for the latest and greatest from any number of manufacturers reported on in these and other pages?

Although some of these objects of desire are unattainable—my credit line can't quite cover $89k for the latest Walker Proscenium Black Diamond—almost anyone can afford something like Pro-Ject's latest Debut Carbon. For $399 mounted with Ortofon's 2M Red it represents the audio equivalent of Henry IV's notion of "a chicken in every pot"—analog sustenance for the common man.

Though the basics remain the same—MDF plinth, cast-steel platter with felt mat, a belt-drive synchronous motor with simple Sorbothane "suspension," and a choice from among seven gloss colors for the plinth—the Debut Carbon's most significant upgrade over the Debut III can be found in the model's name, which refers to the lighter, more rigid, single-piece 8.6" carbon-fiber arm tube that replaces the III's aluminum arm.

The Debut Carbon comes pre-mounted with Ortofon's 2M Red moving-magnet cartridge, which sports an elliptical stylus and a healthy 5.5mV output, making it compatible with essentially any built-in or outboard phonostage. If you want to use the Debut Carbon to transfer your LPs to a music server, it can be ordered with a built-in phonostage and analog-to-digital converter (with a USB output) for an additional hundred dollars. Either version of the 'table is available in seven high-gloss colors (black, red, green, blue, yellow, silver, and white).

Ease of setup is an especially important consideration for today's entry-level 'tables, which, as noted, are frequently sold by non-audio specialists. In other words, the buyer will need to do it him- or herself. After unpacking, all that's involved in this case is fixing the drive belt, attaching the platter, threading the counterweight to 1.75 grams tracking force, attaching the ant-skating weight, plugging in the arm leads and wall-wart power supply, and you're ready to play your first LP.

I do have one minor gripe: The arm's finger-grip is a bit stubby, which makes it somewhat difficult to grasp. Combine that with a U-shaped armrest that sits higher than the arm's "neutral" zone at queuing level, and what happens, until one's motor memory kicks in, is an awkward and repeated bumping of the arm into its resting place. It took about a week before I got used to this and automatically remembered to raise the arm over and into its cradle. Presumably the younger audience the Debut is likely to attract will have greater elasticity in the cranial cavity than I.

As an entry-level design the Debut Carbon nails the basics: dynamic shading and speed constancy. The essentials of what we call "rhythm and pace" are impressive. Without this

# Equipment Report Pro-Ject Turntable

foundation a turntable is going to fail at its most important job—drawing us into the music.

Queuing up Glenn Gould's recording of Bach's Partita No. 1 in B-Flat Major [Columbia] I immediately heard a very nice sense of interplay between Gould's overlapping hands and interspersed digits as he dances his way through this remarkable piece. Though one might accurately note a tad of smearing or lack of ultimate precision with those notes, this is really something that will only be heard by comparison with more costly designs.

Coltrane's *Crescent* [Impulse] reinforced my sense of the Debut Carbon's overall poise. Though the widest dynamics are not exactly explosive, there is, nevertheless, a natural balance between the peaks and valleys that works well at delivering the tunes. With the Ortofon, Coltrane's tenor sounds throaty but not as meaty as it might, as does McCoy Tyner's piano. But Jimmy Garrison's bass is nice and tuneful with an impressive texture and feeling of wood, and Elvin Jones' drum kit delivered good punch combined with a cymbal sound that was naturally shimmering and not too splashy. The soundstage was likewise good with more than a decent sense of air and space, and good instrumental focus.

Playing ORG's excellent 45rpm edition of Marianne Faithfull's *Strange Weather* revealed a hint of thinness in her mostly well-recreated vocal, but again an impressive overall balance, a sweet sounding violin, and the ability to pull listeners into the album.

Rock—from Jack White's *Blunderbuss* [Third Man] to Nick Cave and Co.'s *Grinderman 2* [Anti] to the Stones' *Sticky Fingers* [RS Records]—showed that the Debut Carbon can also deliver the punch, textures, and gritty edge required to bring home the goods.

Whether for first-time turntable buyers or anyone wishing to enjoy high-quality LP playback without spending a lot of money, Pro-Ject's Debut Carbon is a great way to go. It doesn't excel in any one area but gets the basics so right that it's hard to criticize what's lacking—because, after all, that's what good entry-level models should provide, a solid foundation for musical pleasure. tas

## SPECS & PRICING

**Type:** Belt drive, unsuspended turntable
**Speeds:** 33.3, 45 (78 rpm pulley adaptor optional)
**Dimensions:** 16.35" x 6.33" x 12.66"
**Weight:** 12.4 lbs.
**Price:** $399

**SUMIKO AUDIO** (U.S. Distributor)
2431 Fifth Street
Berkeley, CA 94710
(510) 843-4500
sumikoaudio.net

**ASSOCIATED EQUIPMENT**
Rega P3-24 and RP3 turntables; Rega Exact 2 moving-magnet and Lyra Delos moving-coil cartridges; SimAudio 310LP/320S phonostages; Electrocompaniet PL 1 integrated amplifier, PC 1 CD player, and EBS 1 loudspeakers; AudioQuest Diamondback interconnects and Type 2 speaker cable

# Equipment Report

## Clearaudio Concept Turntable

### An Affordable Turntable

Wayne Garcia

**For me, the analog versus digital** debate is similar to one in the wine world, where "Old" versus "New" World advocates often engage in passionate arguments in defense of not only their preferred regions, but styles, winemaking techniques, and flavor profiles. And though I enjoy many New World wines, I'm a strong advocate of the Old World. Because to me, if you really want to understand what pinot noir or chardonnay are all about, then you need to know Burgundy; or for the cabernet lover, Bordeaux; or for sangiovese, Tuscany. After all, these regions have been making wine and cultivating these same varietals in the same vineyards since the Middle Ages, and are where these grapes have consistently achieved the greatest possible expression.

When it comes to music reproduction, as advanced technologically and sonically as digital currently is—and one assumes that progress will only continue—there remains, to these ears, a degree of expressiveness, call it heart or soul, to analog that continues to elude even the best digital. I'm not saying that I don't enjoy listening to digital recordings, but that over time, I, like other audiophiles I know, have drifted back to playing mostly vinyl LPs.

But since this issue is all about analog, we thought a look at one of today's more sophisticated yet still reasonably affordable turntables would be of interest not only to potential first time buyers, but also to those who have loved analog in the past and are now looking to re-engage with the vinyl medium.

#### Clearaudio Concept with MC Concept Cartridge

Let's get this out of the way right now—Clearaudio's new Concept turntable and cartridge combo offers a hugely rewarding analog experience at a very attractive price. The 'table alone sells for a reasonable $1400, and the cartridge goes for $800. Bundle them together, as many other manufacturers are also doing, and you save a few hundred bucks: Importer Musical Surroundings sells the pre-set-up package for an even $2000.

Made in Germany, the Concept is a sleekly handsome, low-profile design that, as with designs from companies like Rega, relies on a low-mass, non-resonant plinth and carefully designed working parts to make its musical magic. Moreover, for those who want an audiophile-grade playback system without having to futz with the sometimes nerve-wracking job of setting the thing up, the Concept is about as "plug-and-play" as you can get. The cartridge is pre-mounted at the factory, and critical issues such as overhang and offset angle, tracking force, VTA, and azimuth are all pre-adjusted. All you need to do is level the unit via the three tiny spiked feet, mount the belt and platter, and you're ready to go. Note, however, that the factory settings are worth double-checking. For instance, although the basics were just fine, in transit the tracking force had shifted upward from 2.0 to 2.5 grams, and the azimuth was off a few degrees. For something meant to track groove walls measuring mere hundredths of an inch, these are not insignificant differences, as I would hear (and easily correct).


The 30mm (approximately 1.18") thick Delrin platter rests on a lightweight sub-platter that is belt-driven by a decoupled DC motor. A handy control knob allows you dial-in speeds of 33.3,

# Equipment Report Clearaudio Concept Turntable

45, or 78rpm. The latter may not be something many of us will use, but for vinyl lovers whose record collections span the decades it is an unusually welcome touch.

The new Verify tonearm features a "friction-free" magnetic bearing. It too, is a handsome thing that exudes the same quality of construction found throughout this design. The arm, like unipivots, takes a little getting used to because, unlike fixed-bearing arms, it feels as if it might float away once it's left the armrest.

Excited to hear what the Concept sounded like, I did what most consumers are likely to: After getting the 'table leveled and the motor spinning, I started to play a favorite record. But the arm felt a bit off. That was verified—oops, no pun intended—by the first few seconds of Dylan's "Tangled Up In Blue," from 1974's *Blood On The Tracks* [Columbia], which sounded tonally unbalanced and lacking in rhythmic drive. This was when I discovered the shifts in the arm setup noted above. So while the Concept is *close* to ready to go out of the box, be sure to check any factory settings to ensure that they haven't been affected by transport.

Once tweaked, "Tangled Up In Blue" came back to life. The midrange—Dylan's voice, the acoustic rhythm guitars—was naturally balanced and musically involving. The brushed cymbal and snare and the kick-drum added dynamic momentum and punctuation, aided by good clarity, transparency, and a solid overall balance. With Jascha Heifetz's recording of Bach's Unaccompanied Sonatas and Partitas [RCA], the Concept brought a convincing sense of the instrument's presence, and the great fiddler's legendarily masterful technique—a tribute to the design's dynamic nuance and rhythmic precision. And as I heard with the Third Tableau from *Petrushka* [Athena/Decca], the same Ansermet-led performance I used in my cartridge survey elsewhere in this issue, the Clearaudio setup did an impressive job reproducing the air and space from which the orchestra emerges. While other, more costly designs, may better it by comparison, this $2000 rig will not leave you wanting for much. The same goes for the loudest dynamic peaks, which come close, if not all the way, to being as explosive as those I hear from my reference TW Acustic turntable, Tri-Planar arm, and Transfiguration Phoenix cartridge. Pizzicato strings, cymbal crashes, thumped bass drums, and fluttering winds were effortless sounding and engaging, with a very fine sense of depth and detail, as, say, when the solo trumpet reverberates off the rear wall of the hall during the "Ballerina's Dance."

To put this in perspective, the cartridge in my reference vinyl playback system sells for $500 more than this entire package—and my entire setup costs six times as much. Although I'm not going to tell you that the Clearaudio Concept equals that performance, what I will tell you is that it is good enough in all the ways that count—resolution, dynamics, low-noise, and that hard-to-pin-down thing I'll call musical involvement—that I enjoyed the hell out of my time with it. Couple that with its terrific German build and finish, and the Concept strikes me as a hands-down bargain. tas


## SPECS & PRICING

**Type:** Belt drive, unsuspended turntable
**Speeds:** 33.3, 45rpm
**Dimensions:** 16.5" x 5" x 13.8"
**Weight:** 28 lbs.
**Price:** $1400

**MUSICAL SURROUNDINGS**
5662 Shattuck Avenue
Oakland, California 94609
(510) 547.5006
musicalsurroundings.com

**ASSOCIATED EQUIPMENT**
TW-Acustic Raven One turntable; Tri-Planar Ultimate VII arm; Transfiguration Phoenix moving-coil cartridge; Artemis Labs PL-1 phonostage; Cary Audio SLP-05 preamp & 211-FE monoblock amplifiers; Magnepan MG 1.7 loudspeakers; Tara Labs Zero interconnects, Omega speaker cables, The One power cords, and BP-10B Power Screen; Finite Elemente Spider equipment racks; Feickert universal protractor; AcousTech electronic stylus force gauge; Musical Surroundings/Fosgate Fozgometer azimuth adjust meter; Analogue Productions Test LP

## Equipment Report

# Excel Sound Corporation Hana E and S Series Moving-Coil Cartridges

### Three Very Good Values and One Overachiever

Andre Jennings


**The four Hana cartridges reviewed** here (EL, EH, SL, SH) are designed and manufactured by Excel Sound Corporation of Japan. According to its website, this 45-year-old company has more than 50 years of cartridge-making experience, much of it OEM work for other companies. To protect its OEM partners, the company and its U.S. distributor, Musical Surroundings, provided little information beyond the cartridges' technical specifications. Although not the subject of this equipment report, an Internet search of available cartridge databases shows that Excel cartridges of the past very closely resemble some offerings of certain major brands.

According to Musical Surroundings, the Hana series is a meeting of old and new, in which modern manufacturing techniques developed at Excel are combined with "classic materials" such as alnico magnets, elliptical styli (E series), and Shibata styli (S series). Musical Surroundings goes on to state that "the classic alnico magnet is found in many vintage loudspeaker drivers and some ascribe a sonic signature to it. Alnico is 'less powerful' than more modern cartridge magnets such as samarium-cobalt or neodymium, but still allowed the Excel designers to create a very low distortion generator. This Hana generator design exhibited such linear performance that the designers developed a higher-output version as a nod to moving-magnet phonostages of the 'alnico era.' The aluminum cantilever plays a key role in the mechanical behavior of the generator with its 'lossy quality.'"

The nomenclature for the Hana (EL, EH, SL, SH) cartridges uses an "e" to signify elliptical stylus, an "s" to signify Shibata stylus, an "l" for low output, and an "h" for high output. The four models in the series are the Hana-EL (elliptical stylus/low output), Hana-EH (elliptical stylus/high output), Hana-SL (Shibata stylus/low output), and Hana-SH (Shibata stylus/high output). The biggest price differentiators for the Hana cartridges revolve around the choice of stylus: $475 for the elliptical stylus or $750 for the Shibata.

Digging a bit further into the specifications shows that all four cartridges have cross-shaped armatures, aluminum cantilevers, a recommended tracking force of 2 grams, 70µm tracking ability, and a 5-gram total weight. The E series has >25dB channel separation, <2dB channel balance, and a frequency response of 15Hz–25kHz. The S series has tighter tolerances of >28dB channel separation, <1.5dB channel balance, and an extended frequency response of 15Hz–32kHz. The high-output versions have a coil impedance of 130 ohms at 1kHz and a recommended load impedance of 47k ohms. The low output versions have a coil impedance of 30 ohms at 1kHz and a recommended load impedance of >400 ohms.

Evaluating a single cartridge can sometimes be a challenge. Evaluating four cartridges can trigger a cerebral hemorrhage. Fortunately, having some structure with setup (employing consistent routines for installation and adjustments) helps maintain focus. The particular setup procedure used for these cartridges has been documented in the pages of TAS (Issue 244 and online at http://www.theabsolutesound.com/articles/setting-up-a-phono-cartridge-1/). Multiplying this procedure for four cartridges on two different turntable/tonearm combinations, while also allowing for multiple hours of run-in time for each cartridge, gives some idea of the behind-the-scenes commitment involved in evaluating the Hana E and S series cartridges. Using four different phonostages (Ayre P-5xe, Musical Surroundings Phonomena II+, Lamm LP2 Deluxe, and a custom-designed and modified unit called The Raptor) allowed further isolation of cartridge performance characteristics from a specific phonostage. While it's nearly impossible to parse cartridge performance without considering the associated components, some effort was made to account for those variables by using a variety of equipment.

A general approach to cartridge setup resulted in measured performance meeting published electrical specifications. With some additional attention to setup, as per the procedures mentioned above, there was an improvement in measured performance, which correlated with listening results. One example of this was the azimuth setting. With a level headshell, the Hana cartridges (EH, EL, SH, SL) all met their minimum channel separation and channel balance specifications, which is a very good sign

# Equipment Report

## Excel Sound Corporation Hana E and S Series Moving-Coil Cartridges

of quality control. Further refinements to azimuth in 'arms that allow these adjustments in most cases yielded improved measured performance for the Hanas. Singling out the Hana-SL cartridge, the baseline measurement in the Clearaudio Performance DC Wood with Satisfy Carbon Fiber 'arm resulted in a channel separation of 31.2dB (left) and 28.4dB (right) with channel balance remaining at 0.5dB when referenced to 1kHz. Electronically adjusting azimuth improved the measured results for channel separation to above 31dB in both (left) and (right) with a steady 0.5dB difference in channel balance, resulting in better subjective performance. Moving the Hana-SL to the Basis 2800 Vacuum 'table with Vector IV 'arm produced an impressive channel separation of 36.7dB (left) and 35.9dB (right) with channel balance remaining at 0.5dB. These are excellent numbers for *any* cartridge at *any* price.

While measured performance by itself is no indication of exceptional personal engagement with music playback, there are some strong correlations that overlap in many cases. The key is carefully considering what to measure and what to listen for during fine adjustments, even after measurements are complete. Both are essential to long-term satisfaction in my opinion. The rubber hits the road, so to speak, when the listener is engaged with the music engraved in the grooves, and that satisfaction doesn't come from a piece of measuring equipment—it's what the ear collects and sends to the brain.

The only 'tables I had in-house for use during the Hana cartridge evaluation were my reference Basis Audio 2800 Vacuum and Basis Audio Debut Vacuum models (both hosting Basis Audio Vector IV tonearms). My colleague, Neil Gader, and I agreed that using a high-quality 'table and 'arm of known properties and low colorations to evaluate a cartridge is a good approach, which is what the Basis combination provides. (This is something I usually do as a matter of course when evaluating cartridges and getting at the essence of the component's performance characteristics.) However, the distributor later supplied a lower-cost 'table/'arm, the Clearaudio Performance DC Wood with Satisfy Carbon Fiber tonearm, to include in cartridge evaluations. In addition to another turntable installation this resulted in a doubling of the workload to over 16-plus cartridge installations.

After all of the installation/setups, 'table/'arm combinations, and phonostage cycling, the Hana cartridges demonstrated excellent value (EH and EL), excellent performance (SH), and exceptional all-around performance (SL) in their price categories. All of the Hana cartridges have a musically engaging presentation. There are no bothersome sharp edges on musical transients that can detract from enjoyment. There is a slight polishing (or rounding) of large bass transients that make them inviting without sounding soft or rounded to the point of being ill-defined. A contrabass still sounds correct whether plucked or bowed. "So Far Away" from the excellent Mobile Fidelity reissue of Dire Straits' *Brothers in Arms* LP still packs a strong low-end punch that creates a visceral reaction. Dynamic linearity, while not at the level of some of the much more expensive cartridges I've heard, is very even across the frequency spectrum. Overall, the cartridges are pretty solid performers. These are the kind of cartridges that you can use without wondering if you're getting good value and performance for the money.

When adjusted for output levels, the low-output versions (EL and SL) present a deep and wide soundstage that is coherent, believable, and fundamentally solid. On "I Don't Stand a Ghost of a Chance" from Linda Ronstadt's *What's New* LP, the layering is there for the orchestra, band, and singer, as expected. The ebb and flow of the orchestral strings come as a wave of motion within the recesses of the soundstage. By contrast, the high-output versions of the cartridge (EH and SH) bring much of the presentation forward, moving the listener closer to the performance. The soundstage layering is now a little more compact and diffuse but no less coherent,




### SPECS & PRICING

**Type:** Moving-coil
**Output level at 1kHz:** 0.5mV (SL and EL), 2.0mV (SH and EH)
**Channel balance at 1kHz:** <1.5dB (SH and SL), <2.0dB (EH and EL)
**Channel separation at 1kHz:** >28dB (SH and SL), >25dB (EH and EL)
**Frequency response:** 15Hz–32kHz (SH and SL), 15Hz–25kHz (EH and EL)
**Tracking ability at 2 grams:** 70µm
**Compliance:** 10
**Stylus type:** Nude diamond Shibata (SH and SL), synthetic elliptical (EH and EL)
**Cantilever material:** Aluminum
**Recommended tracking force:** 2.0 grams
**Internal impedance at 1kHz:** 30 ohms (SL and EL), 130 ohms (SH and EH)
**Recommended load impedance:** >4000 ohms (SL and EL), 47k ohms (SH and EH)
**Cartridge weight:** 5 grams
**Price:** EH and EL, $475; SH and SL, $750

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(510) 547-5006
musicalsurroundings.com

# Equipment Report

## Hana E and S Series Moving-Coil Cartridges

believable, and fundamentally sound. That ebb and flow of the orchestra are now slightly more gelatinous and forward in the mix. There is also a slight bit of blurring of the soundstage possibly due to the increased coil impedance of the high-output models. Overall, the performance is still very good.

The elliptical pair (EL and EH) have similar traits of slightly reduced high-frequency extension where bells and cymbals, while listenable, are less present and less detailed. Ronstadt's vocals take on a hint of rawness compared to the Shibata duo, which is often typical for elliptical-stylus-equipped cartridges. The Shibata Hana's (SH and SL) are models of sonic purity with very low perceived distortion. The SH and SL both make Ronstadt's vocals polished and pure even during her most dynamic passages. There is an additional level of delicate clarity with cymbals, bells, and strings that would make some high-dollar competition take notice. The level of transparency generated by these Shibata cartridges at this price point is something to admire.

The Hana (EL and EH) get a solid recommendation for their $475 price point. The Hana-SH gets an easy recommendation for the sub-$999 category and quite possibly beyond. The Hana-SL is the gem of the lineup and can easily fit in *any* 'table/'arm combination that will accommodate a 0.5mV output. With the Hana-SL, the user can rest assured the cartridge will support the next 'table/'arm "upgrade" and will provide a clear baseline from which to judge if any future cartridge "upgrade" is warranted. The Hana-SL is strongly being considered as an addition to my choices of moving-coil cartridges to use for 'table/'arm evaluations and—more importantly—musical enjoyment. Yes, it's that good. tas

# Equipment Report

## AudioQuest Conductive Fiber Record Brush

Jonathan Valin

**I've been using (the same) AudioQuest Record** Brush since I lost my Decca record brush in a move many years ago. I imagine I'll keep using it until my next big move, after which someone else will inherit it. These things last forever—certainly longer than I will—and do the job they're intended to do. (Or so I thought—foolish me.) No, they don't replace a record-cleaning machine, but let's face it: Do you really use that Klaudio or Clearaudio or Record Doctor *every* time you put a given LP on the platter? I don't. Oh, I give records a deep cleaning every half-dozen or so plays, but the rest of the time, like you, I brush them off with my AudioQuest.

Comes now a new and improved version of AudioQuest's ubiquitous carbon-fiber wonder that answers the burning question: "Does the AudioQuest Record Brush provide a 'good electrical path between the fibers and the handle?'" Apparently the answer is: "No," according to AudioQuest's Bill Low.

Enter AudioQuest's Conductive Fiber Record Brush, which has "ideal conductivity from the Carbon Fibers, through the internal parts of the brush, to the conductive Gold Contacts placed right where your fingers need them." The result: Static electricity (and the clicks and pops it can cause) is grounded at your hand, rather than being sent back into the vinyl through the brush. Additionally, the new AudioQuest uses "a far greater quantity of new smaller fibers in order to more effectively sweep away micro-dirt, not just the less relevant visible dust."

Well, ok, maybe. I dunno. On first acquaintance, the only change I noted was that the brush feels different (lighter and a bit flimsier) than the original. But who cares? You're going to buy one; I'm gonna buy one; anyone who listens to vinyl is gonna buy one. And if Bill Low says it's improved, so much the better.

Not just highly recommended—the thing is indispensable. tas

**SPECS & PRICING**

**AUDIOQUEST**
(949) 585-0111
audioquest.com
**Price:** $19.95

# Equipment Report

## Record Doctor V LP Cleaning Machine

### The Doctor Is In

Julie Mullins

**Some months ago I was astonished to come** across an app called Dust 'n Scratches—a sounds generator that *adds* the background effect of unclean vinyl's crackles, hisses, ticks, and pops to digital music playback. For nostalgia's sake, apparently. (Yes, I know there's an app for everything, but still....)

Audiophiles know better. And we analog hounds are well aware of the harm dust and dirt can cause—not only to the sonics but also to the longevity of an LP. Yet record cleaners often get left in the dust—considered the "final frontier" of gear purchase priorities. Not only are they a "mere" accessory (albeit an important one) but their price can also go up very quickly. Enter the Record Doctor V, the latest model of the affordably priced and quite effective Record Doctor cleaning system. For those who love and care for their vinyl but don't want to break the bank on a cleaner, the Record Doctor offers a smart design compromise that keeps its (and your) costs down: Most of its functions are performed manually, as the system eschews the complex mechanics and motors that upper-tier record cleaning machines employ for each cleaning step. But the Record Doctor still uses a powerful motor-driven vacuum to handle the final step of fluid, dust, and dirt extraction.

Setup and operation are a snap. The Record Doctor V kit comes with everything you need, a black leatherette dust cover is optional. Additionally there's a smallish handheld two-sided brush (with plastic cover) for fluid distribution and sweeper-strip cleaning, a small record platter (about the size of an LP label) that fits over the spindle atop the main unit, a round record-turner (of similar size to the small platter) that has a wooden top with three rounded, carved-out areas where your fingertips go and a thin layer of rubber on the bottom, and a 4-oz. fluid applicator bottle of Record Doctor RxLP cleaning solution. The main unit's features include a high-performance vacuum motor (the same as the ones found in more expensive record cleaning machines) with felt cleaning strips around the suction tube; it also has an attached 6-foot power cord.

How does the Record Doctor work? First, you place the LP on the platter (on the unit's spindle) and put the record-turner on top of the record's label. Next you apply a thin line of cleaning fluid from the LP's outer edge to its central label. With one hand you hold the brush (shift-

# Equipment Report Record Doctor V LP Cleaning Machine

ing as needed) as you slowly turn the record three or four rotations to distribute the fluid and prepare the surface, a process that co-mingles the debris and fluid, making the extraction process more effective. Then you flip the record over (on the platter) so the clean/damp side is on the bottom, and put the record turner back on top. Flip the toggle switch to start the vacuum, then rotate the record a few more times to dry it. Repeat the process for the other side—and *voilà*! Clean, shiny vinyl.

The user's guide with illustrations identifies all parts and details step-by-step instructions, along with some helpful hints. I found that I needed even less cleaning solution than I thought. Also, I'm right-handed and used my right hand to turn the LP and my left hand to brush but you could reverse the unit's orientation to switch hand functions. One minor quibble: For some longer-playing records (i.e., those with grooves extending over more of the vinyl's surface area), it would be nice if the brush had been just slightly longer to span the LP's entire radius from label to edge. On certain records I simply adjusted brush placement and added a couple more rotations to clean the whole surface—no big deal. The manual says the vacuum noise is loud, and it is: I clocked 90dB sitting directly in front of it. But you only need to have it switched on (via the toggle switch on top of the unit) for a short time to dry the LP. It does the job quickly.

Sure, this machine requires a little more hands-on effort than more expensive record cleaners, but the process didn't seem to take any longer. This easy "manual labor" might even be appreciated by those (like me, along with others on our staff) who enjoy more traditional hands-on interactions with other possessions like manual-transmission cars, watches you wind, and audio components with buttons you push and knobs you turn.

Overall, the Record Doctor performed even better than I expected it to. And the sonic benefits were also noticeable—smooth sound minus the crackles, and it was goodbye to most ticks and pops thanks to less static. Naturally the Record Doctor V does not compete with ultra-high-end sonic or fully automated vacuum record cleaning machines—nor is it meant to. A worthy, easy-to-use accessory, the Record Doctor V is an effective, handy, and affordably priced cleaning system for vinyl aficionados who would rather allocate more budget dollars to other hi-fi gear—and to records, too (clean ones!). tas

## SPECS & PRICING

**Type:** Manual operation with an electric-motor vacuum
**Dimensions:** 12.5" x 7" x 7"
**Weight:** 9 lbs. 1 oz.

**Price:** $199 (230V European version available for $249)

**Pangea Audio Distributing, LLC** (U.S. Distributor)
(866) 984-0677

# Our Top Picks Analog

## AudioQuest Record Brush

**$19.95**

The The new and improved version of this perennial classic record brush even impressed JV. It's a very inexpensive carbon-fiber small wonder that according to AudioQuest has "ideal conductivity from the Carbon Fibers, through the internal parts of the brush, to the conductive Gold Contacts placed right where your fingers need them." The result: Static electricity (and the clicks and pops it can cause) is grounded at your hand, rather than being sent back into the vinyl through the brush. Simply indispensible, and a bargain to boot. (274)

## Record Doctor V LP Cleaning Machine

**$199**

This, the latest Record Doctor model offers a reasonably priced and quite effective LP cleaning system that keeps its price down thanks to mostly manual operation, save the drying step, which features a powerful vacuum of the same type used in far higher-end LP cleaning machines. Overall, the Record Doctor performed even better than reviewer JM expected it to. It comes with everything you need (brush, fluid, dust cover, etc.), and the sonic benefits were also noticeable—smooth sound minus the crackles, and it was goodbye to most ticks and pops thanks to less static. Naturally the Record Doctor V does not compete with ultra-high-end sonic or fully automated vacuum record cleaning machines—nor is it meant to. A worthy, easy-to-use accessory, the Record Doctor V is an effective, handy, and affordably priced cleaning system for vinyl aficionados who would rather allocate more budget dollars to other hi-fi gear—and to records, too (clean ones!).

## Pro-Ject Debut Carbon

**$399**

The most significant upgrade to Pro-Ject's latest Debut is found in the model's name, which refers to the lighter, more rigid, single-piece 8.6" carbon-fiber arm tube that replaces the Debut III's aluminum tube. Pre-mounted with Ortofon's 2M Red moving-magnet cartridge, the Carbon offers all one expects from a modestly priced 'table. It doesn't excel in any one area but gets the basics so right that it's hard to criticize what's lacking. (226)

# Our Top Picks Analog

## Hana E and S phono cartridges

**$475/$750**

Excel Sound Corporation, a 45-year-old Japanese cartridge manufacturer who has produced many famous designs for other companies, now offers its own cartridges under the Hana name. The nomenclature (EL, EH, SL, SH) uses an "e" to signify elliptical stylus, "s" to signify Shibata stylus, "l" for low output, and "h" for high output. The four models in the series are the Hana-EL (elliptical stylus/ low output), Hana-EH (elliptical stylus/high output), Hana-SL (Shibata stylus/low output), and Hana-SH (Shibata stylus/ high output). The biggest price differentiators for the Hana cartridges revolve around the choice of stylus. The specifications and measured performances are superb, particularly for cartridges of this price. The Hana EL and EH get a solid recommendation for their $475 price point. The SH gets an easy recommendation for the sub-$999 category and quite possibly beyond. The Hana-SL, however, is the gem of the lineup and can easily t in *any* 'table/'arm combination that will accommodate a 0.5mV output. (270)

## Acoustic Signature WOW XL

**$2395**

The Acoustic Signature WOW XL is the perfect base turntable around which to build one superb analog front end. Weighing in at a massive 35 lbs. (fourteen of which is the platter), the WOW XL is the kind of turntable that allows you to continually upgrade 'arms and cartridges as money permits, without needing to worry that your base 'table might be the cause of any sound degradation. Though this turntable will benefit from a good rack with vibration control, the 'table itself is its own giant vibration absorber, as its mass cancels many of the ill effects of poor-quality racks. To sum it up, this is the turntable you want to own if you're looking for a serious analog front end, without the serious analog price. (244)

# DACs & DISC PLAYERS

## Contents

Click any product name to read that review

oppo

# An Inside Look... Literally.

Instead of telling you what makes the UDP-205 a revolutionary new step in home theater excellence, we've decided to crack open one of the units ourselves and show you just how it achieves its incredible audio and exceptional video.

Two ES9038PRO DAC chips— one for 7.1 channel analog audio, one for balanced XLR & RCA stereo output. These top-of-the-line DACs set a benchmark for audio excellence with best-in-class 140dB of dynamic range.

A custom-made 4K disc loader with an optimized laser mechanism loads discs quickly, keeps errors at bay, and plays nicely with a wide range of optical media, from UHD Blu-rays to SACDs and much, much more.

A massive toroidal power supply sends robust, clean power to the audio components throughout the UDP-205, with less exterior magnetic field influence compared to traditional laminated steel core transformers.


A specialized, high-stability and high-precision HDMI jitter reduction circuit reduces jitter and eliminates timing errors for accurate audio when using the audio-only port.

Dedicated stereo output with balanced XLR and RCA connectors transmit a pair of differential signals, providing better common-mode noise rejection and improved signal quality.

Also included in the UDP-205 is one of the most advanced 4K UHD Blu-ray processors, Dolby Vision compatibility, support for several 4K video codecs for user generated media, and HDR to SDR conversion for older displays.

UDP-205 is available for $1299 from oppodigital.com or from select retailers, resellers, and custom installers nationwide.

OPPO Digital, Inc. | www.oppodigital.com | Menlo Park, CA @oppodigital

# Equipment Report

## Oppo BDP-105D Audiophile Blu-ray Disc Player

### Flexible & Unflagging Firepower

Neil Gader


**Do you ever think you've lost control** of your audio system? I know the feeling. Yes, it was a simpler time back then in BC (before computers). Digital sources were mostly limited to compact-disc players, and perhaps a DVD player to liven things up during family movie night. But the dawn of high-resolution music and computer audio changed all that. New partnerships were formed as network audio and cloud storage and Internet streaming encroached on the territory normally reserved for traditional source components. They also brought with them controller apps via smart devices, and an expansion of formats and options perhaps unparalleled in audio's history. Ultimately, it has become a really deep dive trying to keep up with the blitz of gear and peripherals and then making them all play nicely together. That's where Oppo Digital comes to the rescue—providing hope for the hard to cope.

The actual idea of a universal-format player is not new, but in actuality most were known for their multi-format audio capability or their video chops—rarely for both. It was at this intersection of audio and video that Oppo made its name. The BDP-105D is the latest expression of its philosophy. The brand's top-line multi-format audio and Blu-ray disc player is, like they say in the car biz, "Loaded, baby!" Like its lower-priced sibling, the BDP-103, the new 105D offers hi-res stereo and multichannel audio, as well as a panoply of cinema surround-sound options like DTS-HD Master Audio and Dolby TrueHD. Its Blu-ray video side comes with 4k upscaling and 2D-to-3D conversion, and sports a plethora of inputs and outputs that includes dual HDMI.

However, it is at this point that the BDP-105D diverges from the rest of the Oppo line. Oppo has seen the writing on the wall regarding the decline of the optical disc. In response it has added computer-audio capability to its formidable battery of format firepower. Thus the BDP-105D is a true media player in the most widely expressive sense of the word. Its new, asynchronous USB input, feeding an ESS Sabre32 Reference DAC, now supports PCM audio up to 24-bit/192kHz and DSD in standard rate (DSD64) or double rate (DSD128). Additionally the BDP-105D courts the server/cloud crowd with hi-res network capability, allowing users the option of streaming from an external NAS drive. There is also wireless capability and media support for Tidal, Netflix, Pandora, Vudu, and Rhapsody.

In keeping with its recent entry into the personal-listening market with acclaimed planar-magnetic headphones and headphone amps, Oppo has also included an internal headphone amp, accessible from the front panel via a ¼" input jack. The headphone amplifier is connected directly to the DAC, which offers a unique performance advantage over many stand-alone headphone amplifiers. There's a nicely graduated volume control on the remote for level control.

The Oppo's front panel is spacious but spare. The front-loading disc drawer in the center separates the player-control buttons on the right and the fluorescent display on the left. At the bottom right edge of the front panel resides a USB port, an HDMI port, and the headphone jack input.

True to its roots, the BDP-105D also remains a physical media lover's dream. Beyond DVD, Blu-ray, and Red Book CD with HDCD decoding (quick show of hands—anyone remember Pacific Microsonics?), the Oppo continues to support hi-res formats like DVD-A and SACD. (Dang, I *knew* I shouldn't have sold my Donald Fagen *Nightfly* DVD-A.) Now, I won't belabor the fact that these two hi-res formats didn't gain much market traction. (I have never met a non-audiophile who didn't look at me cross-eyed when I exclaimed, "Wow, did you know this is a hybrid-CD/SACD disc?") However, the simple fact remains that with a player like the Oppo we can all still enjoy the terrific audio quality of these moribund formats. I do, and in the case of SACD, I continue to add to my modest collection.

After connecting the Oppo directly to my flat panel using the HDMI 1 output, I found the on-

# Equipment Report Oppo BDP-105D Multiformat Disc Player

screen menus extensive and well laid out. It's well worth the time getting to know the myriad set-up options and preferences on both the audio and video side. Connectivity on the whole was excellent. Once the unit was linked to my home network via the LAN input, I downloaded the Oppo MediaControl app to my iPad, and it promptly identified my external NAS drive, and wirelessly I was off to the races. The app itself was visually workmanlike, not very sexy, but stable and intuitive to navigate. Personalizing the GUI layout wasn't in the cards, however—it's a one-size-fits-all proposition. Operationally, the BDP-105D was a screaming-fast disc loader. SACDs, even data-heavy Blu-ray discs booted up to their respective home pages in well under ten seconds or less.

I'm embarrassed to admit that it crossed my mind that this player could be a jack-of-all-trades and a master-of-none. Thankfully, that thought couldn't have been further from the truth. The sonic character of the Oppo was persuasively musical with all media. It conveyed a slightly cooler sound—one that placed a greater priority on catching the leading-edge transients of wind instruments—but was of a refinement that consistently wore well throughout my listening sessions. The extension of Edgar Meyer's acoustic bass was weighty with resonance and good pitch definition. During Copland's "Fanfare for the Common Man," there was a hint of added bloom to the kettledrums and bass drum but overall the player's control and grip remained solid. Its SACD performance maintained a clear sonic advantage over well-recorded Red Book discs by permitting micro-dynamics to emerge, enlivening tonal color, expanding ambient space, and breathing more timbral realism into the bass. Compared to a top-notch player like the dCS Puccini, the Oppo narrowly missed the mark in its noise floor and its ability to reproduce the physical dimensions of a venue. There was just a hint of digital sheen that glossed over inner detail and reduced the tactile elements of musical instruments—sonic cues like the skin of a kettledrum.

Functioning as a media player over my home network, the BDP-105D stepped up its game considerably by digging into high-resolution PCM titles like The Eagles' *Hotel California* and Yes' *90125* with a harmonic ease and dynamic pop and explosiveness that CD playback couldn't match. During "Hotel California," it captured the personality of the flexing drumhead from Don Henley's loosely tuned tom fills and the ringing drone strings from the lead 12-string acoustic. On Yes' "Owner of a Lonely Heart," a track filled with ear-popping acoustic and electric contrasts and channel-pinging effects, the sound cues were pristinely defined and layered. A couple of other noteworthy sonic impressions would be the Oppo's ability to reproduce tiny volume gradations from the delicate hi-hat figures that open Shelby Lynne's "Just A Little Lovin'" or the fragility of a concert harp or triangle or the pastel colors from a mark tree. Still, in comparison to the more costly dedicated media player like the Cary Audio DMS-500 (review forthcoming), the BDP-105D didn't capture the full spatiality of a recording, such as the air flaring outward from a crash cymbal, or fully differentiate the subtle timbral distinctions of an electric bass and a kick-drum beat.

The headphone amp was musically solid and satisfied the extended demands of the Audeze LCD-X and the less finicky HiFiMan Edition X planar-magnetic designs I had on hand. The sound was quick, extended and tonally neutral. During Vanessa Fernandez's cover of Led Zeppelin's "The Lemon Song," the Oppo slightly attenuated the bottom-end air and skin impact of Jim Keltner's anchoring kick-drum patterns, and the articulation of the acoustic steel vamp was less individuated. During the Rutter *Requiem* there was also a sense that the boundaries of the venue were closed in, and the vast chorus and hall ambience sounded somewhat congested as a result. Finally, the BDP-105D couldn't quite match the crystalline resolution and depth of focus of a stand-alone headphone amp like the formidable Pass Labs HPA-1, but as is the case with most of my observations about the flexible Oppo player, the unit performed far better than a typical pre-packaged headphone amp.

For the cineastes among us, Oppo equips the BDP-105D with Darbee Visual Enhancement or DVP. Although TAS doesn't cover video technology *per se*, as a movie enthusiast I would be remiss in failing to lend my own seat-of-the-pants impressions of the Oppo with and without DVP. While purists might think of this enhancement in the same way that audiophiles fret about the use of tone controls, DVP, as I understand, is not to be confused with the broader brushstrokes typical of television's global sharpness or contrast controls. We've all experienced the pronounced digital artifacts these leave in their wake. DVP is said to be a great deal more measured and to operate narrowly on a pixel-by-pixel basis. Indeed it does sharpen picture detail where it appears to need sharpening, gently refocusing soft, mushy backgrounds and strengthening edge detail. Since it's easy to adjust or disengage using the on-screen menu, I tended to use it selectively. You can overdo it, but applied conservatively it's a nifty tool in the Oppo's set-up box.

For the devotee who likes his audio/video just like he likes his pizza—with everything on it—the BDP-105D makes quite an impression. Of course, depending on your tastes and listening habits, Oppo's "everything *and* the kitchen sink" approach may not appeal. However, if you're looking to regain control of an unruly system while adding A/V formats (old school and new), Oppo's affordable, one-box, crossover solution should get a lot of enthusiasts' mouths watering.

*The BDP-105D has been superseded by the UDP-205 player.* *See p. 7 for details.* tas

## SPECS & PRICING

**Inputs:** Digital, one USB-B, two USB-A, one HDMI, one coaxial, one optical
**Outputs:** Digital, two HDMI; analog; 7.1-channel RCA, stereo RCA and XLR
**Formats:** PCM up to 24-bit/192kHz, SACD, DSD64/128, DTS-HD Master Audio, Dolby TrueHD, Dolby Digital
**Dimensions:** 16.8" x 12.2" x 4.8"
**Weight:** 17.3 lbs.
**Price:** $1299

**OPPO DIGITAL, INC.**
2629 Terminal Blvd., Suite B
Mountain View, CA 94043
(650) 961-1118
oppodigital.com

# Equipment Report

## Linkplay Muzo Cobblestone Internet Music Player

### Money in Your Pocket

Steven Stone

**Five hundred dollars doesn't** go far in the world of high-end audio. It will get you some high-performance cable, an entry-level moving-coil cartridge, or one Sonos music player. And if $500 doesn't go that far, $50 gets you even less—maybe a couple new LPs or high-resolution downloads. But what if I told you that you could buy an Internet-savvy player for under $60 ($59 MSRP, $44.21 street) that can remake any analog receiver, preamp, or stereo system into a device capable of playing any Internet radio stream, most streaming music services, or almost any music file located on your network-attached storage device (NAS). Well, that is exactly what the Muzo Cobblestone can do. With both WiFi and Ethernet connectivity the Muzo offers "late adopters" a way to enjoy the latest in Internet music interoperability.

#### Technical Description

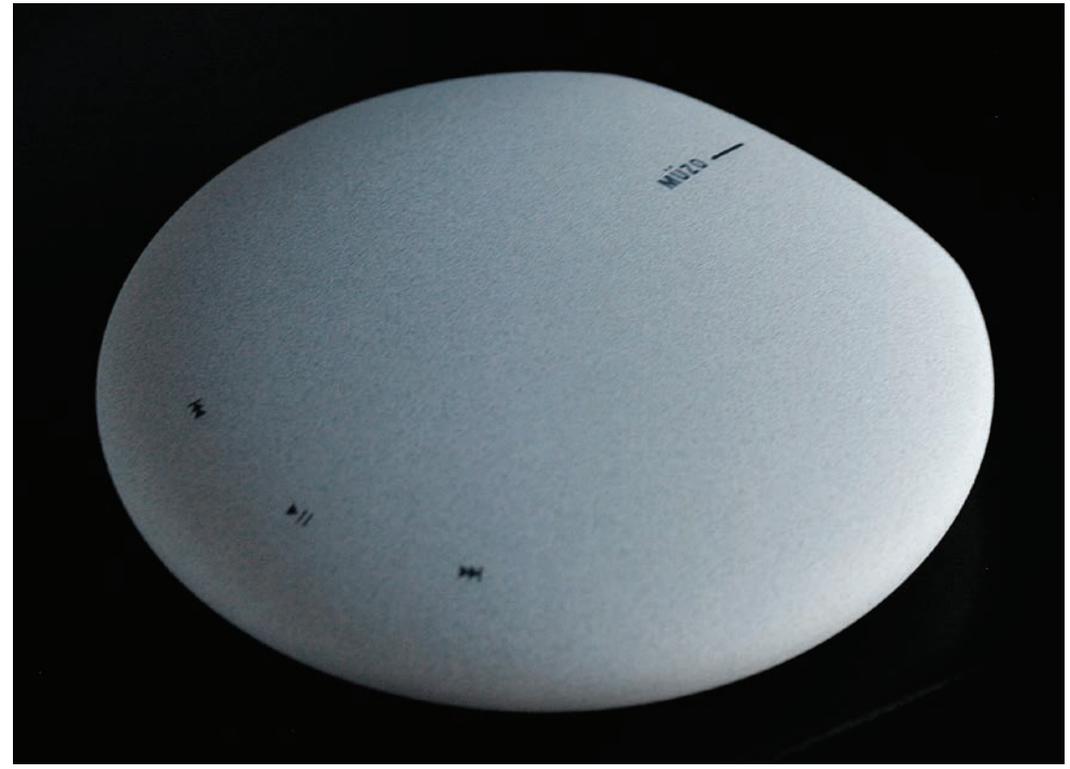
The digital heart of the Muzo Cobblestone is a Wolfson WM8918 DAC chip. While the original Cobblestone supported only up to 44.1kHz PCM files, the current version, A31, can play up to 96/24. Formats supported include MP3, WMA, ACC (ACC+), Apple lossless, FLAC, APE, WAV, and ALAC. The Cobblestone does not support the DSD format, or PCM files with resolutions above 96/24.

The Cobblestone does not have any digital outputs. The only output you will find is a 3.5mm single-ended mini-stereo analog connection located on its back. The Cobblestone's other con-nections are an Ethernet LAN port and a mini-USB power connection.

The front/top of the Cobblestone has the only physical controls, which comprise three buttons—one for moving to the previous track, a second for play/pause, and the last to skip forward to the next track. All other controls for the Cobblestone can be found on the Muzo Cobblestone app for iOS and Android devices. This app offers a myriad of features, which I'll discuss in the ergonomics section of the review.

#### Setup

Connecting the Muzo Cobblestone to a system is easy and relatively painless. You have two options, wired via the Ethernet connection or



# Equipment Report Linkplay Muzo Cobblestone Internet Music Player

wireless via WiFi. For WiFi you need to use a system that supports the 2.4GHz band instead of the higher-speed 5GHz band. I chose a wired connection for most of my review, but I did try wireless to check ease of setup. The first step, after connecting and powering up the Cobblestone, is to install and then activate the Cobblestone app. After adding a device via the opening screen, you will need to supply your network password and, once that's done, the Cobblestone will be connected to your network and will see network-connected devices such as your network-attached storage (NAS). The only tricky part of the initial Cobblestone setup is that if you want to use a music library located on a NAS drive you will need to have a music server or music-sharing app such as Twonky running on your NAS. Both Synology and QNAP NAS drives come with Twonky already installed, merely waiting to be activated.

Setting up streaming services was also a snap—all that was needed was my username and password and Tidal was up and running. IHeart radio was the same—all that was required was password and username. Tunein radio was even easier to set up since it required no username or password. It took me less than five minutes to add my seven favorite stations via the app's search function.

Once set up, the Cobblestone proved to be robust and reliable. Occasionally it would not find a musical selection on my NAS on the first try, but on the second try it always connected properly. Even sudden power outages had no negative or lingering effects.

Since the Cobblestone has only an analog output, it will connect to the rest of your system as if it were an analog source—any line-level analog input connection will do. Once it was connected, I turned the volume control setting on the Cobblestone app to full level and controlled the overall system output from my system's volume settings instead of from the Cobblestone. You could also set up your system so the device controls the volume level if you wish.

## Ergonomics

In the several months I've had a Cobblestone in one of my systems I have yet to discover any serious shortcomings in its operation. There are, however, several changes I would like to see in the next version of the control app. The first issue I had with the Cobblestone app is with its sleep function. I'm in the habit of putting on music in my bedroom as I fall asleep, and with the Sonos system when it's time for the music to turn off it does so with a gentle fade-out. At the end of the allotted playing time the Muzo shuts off abruptly with no fade-out or warning. That should be fixed.

The second minor, but at times vexing, ergonomic issue was with the Cobblestone's implementation of Tidal. Unlike the iOS and OS Tidal control apps, which allow you to display your music library in several different ways, the Cobblestone app has only one way to display "My Music" albums—alphabetically by album title. If you can't remember the title, you will find it difficult to find a particular album. On my Mac, using the Tidal app, I can choose to have my albums displayed by "newest first" which I find far more user-friendly.

Near the end of the review period I acquired a second Cobblestone to see how the system would handle multiple units. Once more the app proved to be reliable and the setup was glitch-free. It immediately recognized the second Cobblestone and walked me through the install in less than two minutes. With two Cobblestones I had the option of using them independently or ganging them so they played the same source in sync with one another.

## Sound

If you're hoping to find out the Muzo Cobblestone produces the same level of sonic excellence as even a $2k digital hub/player, I'm sorry to disappoint you, but that isn't the case. I will state, without equivocation, that the Cobblestone does sonically out-point the Sonos player's analog output sound-quality-wise. Considering that the Cobblestone is 1/7th price of a Sonos Connect that is something.

The Cobblestone produces listenable, if not riveting, sound. Lateral focus is decent, but depth and dimensionality are lacking when compared with the Sony HAP-Z1ES network


## Robert Harley on the Cobblestone

The Cobblestone sounded almost too good to be true, so I asked for a sample to try myself. It was as easy to set up as Steven described; within minutes I was streaming music from Tidal to a Riva TurboX portable system. The Cobblestone is the perfect solution for listening to music in other rooms in your house, or if you want background music or Internet radio without turning on the main system.

But the Cobblestone solves a much bigger problem for many listeners like my neighbor. He dropped by one day and saw me selecting music from my iPad via the Aurender Conductor app. My neighbor was not familiar with streaming audio, and was astounded by my ability to instantly play any piece of music he named. He immediately wanted streaming music in his life, but had no idea how to go about getting it, or making it work with his existing home-theater receiver and speakers. The Cobblestone to the rescue. For $59 my neighbor could add a Cobblestone to his theater system for music in his living room, and for another $59 add streaming music to his outdoor patio system. As Steven said in his review "the Muzo offers 'late adopters' a way to enjoy the latest in Internet music interoperability."

The Cobblestone is an amazingly simple, useful, and inexpensive device that expands the possibilities for enjoying music.

# Equipment Report Linkplay Muzo Cobblestone

player ($1995). The Cobblestone's overall harmonic balance is slightly dark, with forgiving highs and a warmish upper bass and lower midrange. Despite this forgiving harmonic balance the Cobblestone does not lack midrange detail or decipherability. Dynamics are fair, but lack contrast.

When the Cobblestone was compared in a direct A/B with the Sonos Connect's analog output, I found that Cobblestone was the Sonos' equal in every sonic respect except one—the Cobblestone could play 96/24 files while the Sonos could not.

One area where the Cobblestone's sonic performance was equal to a far more expensive player was in Internet radio. When I compared Cobblestone's TuneIn Internet radio with the Sony HAP-Z1ES TuneIn radio, I could hear no difference between them on the two stations that I listen to the most—KGNU and KOTO.

## Conclusion

Given its features and price, it would be unfair to consider the Cobblestone as a replacement for your current alpha-prime digital music source. But if you want to inexpensively add Internet radio and NAS playback capabilities to a system or if you require a source for a secondary "lifestyle" system, the Cobblestone would be ideal.

I replaced two Sonos units with Cobblestones during the course of the review. Now that the review is completed I see no reason to put the Sonos back in. The Muzo Cobblestone fills that Sonos niche with panache and leaves money in your pocket. Not too shabby for under $60. tas

## SPECS & PRICING

**Type:** WiFi/Internet renderer
**Formats supported:** MP3, WMA, ACC (ACC+), Apple Lossless (ALAC), LAC, APE, WAV
**Outputs:** One analog only
**Drive capacity:** No internal drives
**Streaming services:** Spotify, Tidal, Tunein, Dlna, Airplay, iHeart Radio, Douban (coming soon: Amazon Music, Napster, Rhapsody, NPR One)
**Dimensions:** 5.5" by 0.787"
**Weight:** 9 oz.
**Price:** $59

**MUZO**
muzohifi.com

## what i'm listening to


**Sara Watkins:**
**Young in All the Wrong Ways [DD]**
Sara Watkins was one-third of Nickel Creek. She has also released several solo records. On her third, *Young in All the Wrong Ways,* she has created an album that has a traditional Americana feel while embracing modern production techniques and sound.
**— Steven Stone**

# Equipment Report

## AudioQuest DragonFly Black and DragonFly Red DACs

### High-Flying Bargains

Robert Harley

**Back in 2012, AudioQuest** created an entirely new product category with the DragonFly DAC. With the form factor of a USB flash drive, low price, and truly amazing sound quality, the DragonFly was spectacularly successful. The DragonFly didn't just appeal to hard-core audio enthusiasts; it was just as tempting to *anyone* who listened to music from a computer. The product was simple to use and the value proposition was compelling: Rather than connect headphones or a desktop audio system to the computer, plug them into the $149 DragonFly and get better sound. The DragonFly delivered on its promise, showing an entirely new audience that investing in a better audio system could greatly enhance their enjoyment of music.

A few years ago when I was selecting a DAC for my newly upgraded desktop audio system I compared several sub-$400 models and overwhelmingly preferred AudioQuest's DragonFly. Although it was the least expensive DAC in my informal survey, the DragonFly was by far the most open, smooth, detailed, and musically communicative. I listen to a lot of music on my desktop system and have logged countless hours with the DragonFly.

AudioQuest has now retired the DragonFly in favor of two new models, the $99 DragonFly Black and $199 DragonFly Red, both reviewed here. In addition to offering better sound than the original, the Black and Red can be used with Apple and Android smartphones and tablets. The first-generation DragonFly was limited to use with computers because of its high current draw. But DragonFly designer Gordon Rankin worked with a chipmaker to develop a USB microcontroller with 77% less current draw than the previous microcontroller. Incidentally, the DragonFly is made in Ohio, and every unit is auditioned as it comes off the production line.

The revamped DragonFlys also feature new DACs—the 9010 32-bit ESS Sabre chip in the Black and the higher-performance 9016 in the Red. Both chips feature minimum-phase digital filtering. The Black includes the same headphone amplifier as in the original DragonFly, while the Red gets an ESS headphone amplifier with a digital volume control that is integral to the DAC chip. The Black's maximum output level is 1.2V; the Red's is 2.1V, allowing it to drive low-sensitivity headphones. Finally, both DACs are software upgradable for compatibility with future developments via a desktop application available from AudioQuest.

I compared the Black and Red to the original DragonFly in my desktop system as well as through PSB M4U 2 headphones ($399) and the state-of-the-art Audeze LCD-X planar-magnetic headphones ($3995). That desktop system includes the amazing Audience 1+1 V2+ speakers. A worthwhile upgrade to either DAC is AudioQuest's $49 JitterBug, an in-line USB device that fits between your computer and any USB DAC. The JitterBug isolates the computer from the outboard DAC, reducing jitter as well as noise and ringing on both the power and data lines in the USB interface. It's a brilliant, highly cost-effective product and simple to use.

The Black is a massive upgrade over listening directly from the computer's analog output jack. In fact, for someone listening to the computer's output, adding a DragonFly Black is without a doubt the greatest bang for the buck in all of audio. It's the single most important step someone can take toward better sound. The computer's audio output (a Dell XPS 8700 in my case) is flat, grainy, bright, airless, and hard, quickly inducing listening fatigue. The treble is a joke; cymbals sound like aerosol spray cans. The Black elevates the computer-listening exper-ience by delivering a much smoother, more relaxed, and warmer sound. The Black has a tonal richness and body that better portray instrumental and vocal timbre. The computer's audio output, by contrast,

# Equipment Report AudioQuest DragonFly Black and DragonFly Red DACs

sounds thin and threadbare. The treble is far, far cleaner through the Black, with a real sense of delicacy and texture rather than mere high-frequency hash. Another big improvement is the sense of space and dimensionality; where the computer's output is flat and congested, the Black is open and airy. The $99 upgrade allows you to hear individual instruments with some air and space around them. In all these regards, the Black is a step up from the DragonFly and the DragonFly v1.2, not to mention a massive improve-ment over the unlistenable computer output. For the record, the Black drove the PSB M4U 2 headphones to any listening level but it didn't have quite enough output to drive the Audeze to a satisfying volume.

But as good as the DragonFly Black is, I think that most TAS readers looking in this category will opt for the Red. Yes, it's that much better and worth double the price. This is particularly true if you have difficult-to-drive headphones; the Red's more robust output amplifier (2.1V vs. the Black's 1.2V) has greater dynamic swings and more solid bass. The Red drove the Audeze LCD-4 headphones adequately, although at the maximum output level the volume was slightly lower than I would like for some music. The Red also improves on the Black with significantly greater smoothness, ease, and warmth. In my desktop system and through headphones, the Red upped the ante in every sonic criterion. On the wonderful Gerry Mulligan album *Lonesome Boulevard*, the Red conveyed the warmth and body of Mulligan's baritone sax. The terrific piano playing (by a young Bill Charlap) was also better served by the Red, with cleaner attacks, more realistic timbre, and a greater sense of air around the instrument. The Red is also more dynamic, with greater impact on drums and a more lively and upbeat rendering.

The combination of the DragonFly Red and JitterBug turned out to sound so good that I moved the pair from my desktop system to my main system, where they were fed from an Audender W20 music server and drove my reference system. The DragonFly's analog output fed the Constellation Altair II preamplifier via a run of AudioQuest 3.5mm-to-RCA breakout cable. Putting a $199 DAC at the front end of a reference-quality system may seem crazy, but nonetheless provides a different per-spective from which to examine the DragonFly's performance.

Simply put, the Red/JitterBug combination sounded much, much better than it had any right to for $250. Even at the front end of a system that is highly revealing of source quality, the DragonFly was listenable and enjoyable. Hearing it in this context also gave me an appreciation for how cannily the DragonFly Red's inevitable tradeoffs were chosen for the most musical overall result. For example, the tonal balance is slightly skewed toward a richer and darker rendering rather than attempting to resolve the last measure of treble openness and sparkle. This has the effect of minimizing the Red's slight grain in the upper midrange and treble. I don't want this to sound like a criticism; it's inevitable that a $200 DAC will have a less-than-pristine treble. In fact, compared to any other sub-$500 DAC I've heard, the DragonFly Red has the cleanest treble. But the designers mitigated the inherent compromises in a way that best serves the music. The DragonFly Red avoids the stereotypical sound of inexpensive DACs in which the presentation is hard, bright, metallic, uninvolving, and fatiguing. I noticed these design choices only when the Red was in my big reference system and I was listening analytically. Before putting the Red in my main system, I'd been enjoying the DAC virtually every day for months as part of my desktop setup without ever thinking about the sonic tradeoffs. That's the mark of exceptional design.

The Red's bottom end was deep and extended, with a nice combination of bass heft and definition. The Red was equally adept at conveying the dynamic punch and drive of the hi-res download of Talking Heads' *Speaking in Tongues* as it was at communicating Scott Colley's nuanced acoustic bass playing on the Gary Burton CD *Guided Tour*. The bass wasn't just weighty; it had excellent pitch definition and dynamic expression. There was an odd disconnect at hearing the mighty Magico Q7 Mk IIs with their prodigious bottom end and knowing that the source was the tiny DragonFly.

I was also impressed by the Red's sense of air and space. Again, the Red miraculously avoids the inexpensive-DAC syndrome of sterile flatness and congestion. The Red, in my desktop system, through headphones, and in the reference system, presented instruments as individual objects with a nice halo of air around them (if that's how they were recorded). The group Oregon's wonderfully spacious *Beyond Words* (a Chesky release from the 1990s) was well portrayed, with a real sense of three musicians within an acoustic.

With the DragonFly Black and Red, there's simply no excuse for listening to the compromised DACs and output amplifier built into computers. At $99, the Black brings much of what high-end audio is about to just about any quality-conscious listener. The Red is significantly better sounding, and worth the price difference. Adding AudioQuest's $49 JitterBug is a no-brainer for either, allowing the Black and the Red to reach their full sonic potential. And these new models work with Apple and Android phones, bringing high-end sound to a much wider audience.

With the DragonFly, AudioQuest has created a simple and affordable path into the high end for a new generation of listeners, as well as the perfect product for an audiophile's personal-audio system. tas

## SPECS & PRICING

**DragonFly Black**
**Maximum output voltage:** 1.2V
**Maximum input signal:** 96kHz/24-bit
**Dimensions:** 19mm x 12mm by 62mm
**Price:** $99

**DragonFly Red**
**Maximum output voltage:** 2.1V
**Maximum input signal:** 96kHz/24-bit
**Dimensions:** 19mm x 12mm by 62mm
**Price:** $199

**AUDIOQUEST**
2621 White Road
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# Equipment Report

## Schiit Audio Yggdrasil DAC

### By Any Other Name

Robert Harley

**The company unfortunately** named Schiit Audio has developed quite a reputation for creating great-sounding products at bargain-basement prices. Founded in 2010, Schiit now offers 18 models of headphone amplifiers, preamps, amps, and DACs, with all but two of its products selling for less than a thousand dollars. Indeed, most are priced below $500. Schiit even offers a $99 DAC.

The company has been enormously successful in more ways than one. In addition to creating a thriving business for itself, Schiit has brought good-sounding products to an entirely new audience who may not otherwise have pursued quality-oriented audio. In fact, Schiit builds and ships more than 65,000 units per year—and the average customer age is under 30. That's a huge boon for high-end audio in general—Schiit's products are the "gateway drug," if you will. Schiit has courted the hip young audience with its irreverent name, bizarre product monikers (Mjolnir and Gungnir, for examples), and conversational promotional copy (the company slogan? "Everything Else Ain't"). The U.S.-built products are sold factory direct with a 15-day return privilege and a two-year warranty.

Behind the whimsy, however, lurks one of high-end audio's pioneering digital engineers: Mike Moffat. Beginning in the Pleistocene Age of digital audio (the early 1980s), Moffat was at the forefront of making digital sound good. Does anyone remember California Audio Labs and its highly modified CD players? That was Moffat's work. He went on to co-found, with Neil Sinclair, Theta Digital, one of the most iconic digital companies of the era. A Theta hallmark was its custom digital filter that ran on general-purpose DSP chips. At that time, virtually all other DAC manufacturers simply bought off-the-shelf filter chips. Even Theta's first DAC, launched in 1984, was built around a custom-software-based digital filter. Theta's DACs were universally praised (I reviewed many models beginning in the early 1990s). Moffat has now combined his expertise with that of Schiit partner Jason Stoddard, a long-time industry veteran responsible for designing many of Sumo's acclaimed products in the 1990s.

The Yggdrasil DAC reviewed here is an outlier in the Schiit line; its $2300 price tag positions it far above the company's other offerings. (By contrast, Schiit's Delta-Sigma DACs sell for $99, $149, $399, and $849—the company also offers three multi-bit DACs priced from $249 to $1250.) But the Yggrasil is significantly different in design from those DACs, as well as from virtually all other DACs on the market. We'll get to those technical details in a minute, but let's first look at the Yggy's features and operation.

Its rounded aluminum case is slightly reminiscent of an Airstream trailer from the 1950s. A cutout in the front panel is dominated by a round pushbutton that selects between the Yggy's five inputs (AES/EBU, BNC, RCA, TosLink, USB). Small LEDs indicate the selected input, the incoming sample rate, whether phase inversion is selected (via a smaller round front-panel pushbutton), and when the Yggy is locked to the incoming source. The Yggy proudly eschews

# Equipment Report Schiit Audio Yggdrasil DAC

DSD support and MQA decoding; its singular mission is to decode PCM (up to 384kHz) with the highest fidelity.

Moffat says that the Yggy is a "modern descendent of the first Theta DAC." Like the Theta DACs, the Yggy is built around a custom digital filter. But this time Moffat employs the Analog Devices SHARC DSP. These DSP chips are vastly more powerful than the Motorola DSP56000 devices of the 1980s. The additional DSP horsepower allows a much "longer" filter for better performance. The Yggy's 8x oversampling filter is designed to retain all the original audio samples without alteration. Many oversampling filters, as well as delta-sigma DACs or those with integral asynchronous sample-rate converters, change the sample values from those created by the analog-to-digital converter when the music was originally digitized.

To preserve this "bit-perfect" datastream, Moffatt selected an unusual DAC—a 20-bit R/2R ladder device from Analog Devices (the AD5791) that is used in applications where bit-perfect conversion is essential, such as in instrumentation, weapons systems, and magnetic-resonance imaging (MRI) machines. No one else uses these DACs for audio. You'll notice that the Yggy's DACs have 20 bits of resolution, not the "24 bits" that are typically found in today's digital-to-analog converters. That's not a shortcoming; there's no real information below the 20-bit level, and the state of the art in conversion is limited to 20 bits per balanced phase. The AD5791 is a dual-channel DAC, with two AD5791s employed in the Yggy for truly balanced operation (+L, –L, +R, –R). Shockingly in a $2300 product, the DAC chips cost a whopping $80 each (even purchased in quantity). Given the DAC architecture, it's no surprise that the Yggy doesn't support DSD. The design is optimized for CD-quality sources, which comprise the majority of most listeners' libraries.

The analog output stage is fully balanced and built from JFETs rather than op-amps. It is simply a unity-gain buffer. No gain is required in the output stage because the Analog Devices DAC has a built-in current-to-voltage converter, and outputs a voltage at the appropriate level.

The power supply is over-the-top for any product, never mind one at this price. It starts with a choke input, and regulation is realized with current-source shunt regulation followed by cascaded regulation stages. Shunt regulation is rarely used because it's so inefficient, but it delivers clean and stable DC to the circuits. Overall, the Yggy is an unusual and tweaky design from a mind that has been working on digital-to-analog conversion circuits for nearly 35 years.

## Listening

Although Moffatt warned me that the Yggy wouldn't sound good right out of the box, I gave it a quick listen anyway after an hour of warm-up. He was right; the Yggy was hard, bright, forward, and flat. I checked in with it a couple of times over the next week and heard it improving somewhat, but it was still disappointing. I decided to let it sit in my rack, powered up, for a full month before revisiting it.

When I returned to the Yggy I discovered a DAC that wasn't superb. It wasn't even good. And it certainly wasn't "good for the money." What I discovered, to my amazement, was a DAC that was stunningly great, period. Price aside, the Yggy turned out to be a world-class contender in the same league as cost-no-object digital-to-analog converters—and I've heard some good ones. How could this be?

I can't tell you how Moffatt did it, but I *can* describe how the Yggy sounds, and why its one of the three best DACs I've heard regardless of price. (The other two are the $19,500 Berkeley Alpha Reference and the $35,000 dCS Vivaldi. I suspect that the MSB Select is outstanding, after hearing it many times at shows, but I haven't evaluated it in my own system.)

For starters, the Yggy has a bold, assertive, vibrant, even vivid presentation. You'd never mistake the Yggy for a tube DAC. In this characteristic, and others, it reminded me of the Theta processors of 25 years ago, but taken to another level. The Yggy also sounded different from other DACs I've heard; it was as if nearly all those other DACs were merely variations with a common character, cut, if you will, from the same sonic cloth.

One of the qualities that makes the Yggy special is its ability to reveal, with startling clarity, individual musical lines within complex arrangements. Every instrument, voice, and sound is spatially and timbrally distinct. This had the effect of revealing each musical line with great precision, and with that precision comes a fuller, richer, and more complex presentation of the composition and arrangement, as well as the intent of each musician. The Yggy is the antithesis of congealed, homogenized, flat, confused, or thick. Many years ago I described the soundstage of a Theta DAC as "sculpted." That description applies to the Yggy as well, but in the Yggy the three-dimensionality and vividness that allow resolution of each musical line are rendered with greater naturalness and ease. The Theta processors could sound a bit artificial and overly "Technicolored" in this regard, but the Yggy presents this tremendous clarity and dimensionality in a completely organic and musically natural way.

Frankly, I was shocked to hear musical relationships between instruments or sections

## SPECS & PRICING

**Inputs:** AES/EBU, RCA, BNC, TosLink, USB
**Outputs:** Balanced on XLR jacks, unbalanced on RCA jacks
**Sample rates supported:** Up to 192kHz/24-bit for all inputs
**Digital filter:** Custom, running on Analog Devices SHARC DSP chips
**DAC:** Analog Devices AD5791 (two per channel in balanced configuration)
**Analog output stage:** Fully discrete JFET
**Output impedance:** 75 ohms
**Maximum output level:** 4V (balanced), 2V unbalanced
**THD:** Less than 0.006%, 20Hz–20kHz, at full output
**SNR:** >117dB referenced to 2V
**Power consumption:** 40W
**Dimensions:** 16" x 3.875" x 12"
**Weight:** 21 lbs.
**Price:** $2300

**SCHIIT AUDIO**
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schiit.com

# Equipment Report Schiit Audio Yggdrasil DAC

as though for the first time in recordings I've been listening to for years through some of the world's best DACs and disc players. This information was no longer buried, uncovered only through focused concentration, but rather brought to the fore with a life and vibrancy that were startling. These qualities were musically rewarding whether the music was densely layered or spare. The multiple horn parts on the track "The Jazz Police" by Gordon Goodwin's Big Phat Band were unwoven with a clarity that fostered a deeper appreciation of the arrangement and the musicianship. Conversely, Duke Ellington's understated and tasteful comping behind Joe Pass' swinging solos on *Duke's Big Four* [JVC XRCD] was revealed to me in a new way; the piano accompaniment's greater clarity and sonic "separateness" amplified the sense of swing that makes this album (with Ray Brown on bass and Louis Bellson on drums) such a classic. Yet the Yggy's resolution was never etched, analytical, or overbearing. Rather, the Yggy had that sense of effortless resolution you hear from live music—you don't have to strain to shift focus from one instrument to another.

Of course, some listeners may not enjoy such an incisive rendering. The Yggy is at the opposite end of the spectrum from, say, the tube-powered Aesthetix Romulus CD player. While I greatly enjoy the voluptuousness, expansive soundstage, and relaxed musicality that tube-based players deliver, the ways in which the Yggy musically engage the listener couldn't be more different. The Yggy has a closer perspective, is drier with less bloom around image outlines, and is more upbeat and visceral.

Another way in which the Yggy is outstanding, and very much like the sound of Theta DACs, is its rock-solid bass. The bottom end has a "center-of-the-earth" solidity and power, giving music a physicality and verve that I sensed in my body as much as in my mind. The bass not only goes low with authority but the midbass is weighty, muscular, and densely textured. Pitch definition is absolutely superb; the combination of articulation and weight is particularly satisfying. Acoustic bass in jazz is rendered with richness and body; a Fender Precision Bass has a wonderful "purring" quality; and the string bass section of an orchestra provides the music with a strong tonal underpinning.

The Yggy is different from other DACs in its reproduction of music's dynamics, particularly transients. Transient attacks, from a hard-hit snare drum to the most delicate tap on a cymbal, are startlingly fast, defined, and vivid. On the track "Never the Same Way" from Gary Burton's album *Common Ground*, drummer Antonio Sanchez plays very subtly behind Scott Colley's beautiful and extended bass solo. Although I've heard this album many times, through the Yggy, Sanchez's delicate cymbal work, fine brush strokes, and gentle rim shots came to the fore in a way that gave me a renewed appreciation of his artistry. The Yggy's reproduction of large-scale transients was just as impressive. The dynamic pop and steep attack of snare drum were extremely well portrayed, contributing to the Yggy's powerful rhythmic drive.

Sometimes an audio component will have a particular combination of strengths in which each virtue amplifies the others. When such synergy occurs, the result is particularly strong musical engagement, especially with music that triggers those strengths in the first place. One of the Yggy's many such synergies is the way the clarity it brings to individual musical lines combines with its startling transient reproduction, conveying the intricate rhythmic inflections of a complex and sophisticated band such as Talking Heads. I found myself engaged on a whole-body level, experiencing a kind of euphoria that defies analysis or dissection.

Although the Yggy has a bold and assertive character, it was never overbearing. In fact, the Yggy encouraged high playback levels, in part because of the smoothness of its upper midrange and its lack of glare in the treble. The top end was extremely clean and well rendered; cymbals had a full measure of energy and verve, yet the sound wasn't bright. I loved the way the Yggy revealed cymbal work by great drummers; the combination of the dynamic alacrity mentioned earlier with the treble's pristine quality made such detail especially engaging. The upper midrange and lower treble were a little more forward than I've heard from other DACs, giving a bit of extra presence to vocals, for example. I also heard a bit more sibilance than I do with my reference DACs.

A big factor in a DAC's sound is how well the USB interface is implemented. Some otherwise superb units are compromised by less-than-stellar performance when driven by a USB input. A good way to isolate the USB interface's contribution to the DAC's sound is to insert the Berkeley Audio Design Alpha USB converter in the digital signal path. The $1895 Alpha USB takes in USB from the source, reclocks it, isolates the output from noise at the input, and reformats the signal into AES/EBU or SPDIF (the latter on a BNC jack). The Alpha USB is the state of the art in such devices; I've heard it absolutely transform the sound quality of some DACs, turning mediocre performance into excellence. Significantly, with the Yggy the Alpha USB rendered the *least* improvement in sound quality of any DAC I've done this experiment on. In other words, the Yggy's USB input is extremely well designed.

## Conclusion

I don't know how Schiit Audio has done it, but the $2300 Yggy is in many ways competitive with any DAC I've heard regardless of price. In some criteria—transient speed without etch, clarity of musical line, whole-body involvement—the Yggy is as good as digital gets. Yet the Yggy's bold incisiveness may not resonate with listeners who prefer a more relaxed and easygoing sound. I, however, have no such reservation; this is a DAC I could listen to and enjoy for a long time. In fact, there was something different about the Yggy that pushed my buttons—I felt a musical exhilaration that was experienced not as some intellectual abstraction, but at a more fundamentally visceral level.

If you're looking for a DAC that does quad-rate DSD, decodes MQA, offers a volume control, and includes a headphone amp, look elsewhere. But if the very best reproduction of PCM sources is your goal, the Yggdrasil is the ticket. It's a spectacular performer on an absolute level, and an out-of-this world bargain. The Yggy is not just a tremendous value in today's DACs, it's one of the greatest bargains in the history of high-end audio. tas

# Equipment Report

## Mytek Brooklyn MQA-Compatible DAC

### Game Over

Steven Stone

**The Mytek Brooklyn is the first** non-Meridian-branded DAC that supports MQA. Because of that, every time it's been shown, whether at a consumer or industry event, it has generated practically standing-room-only interest. I first laid eyes on the Mytek Brooklyn DAC at the 2015 Rocky Mountain Audio Fest when it was only a passive display. As I looked through its list of features and capabilities I thought to myself, "This is one heck of a fully-featured DAC even without MQA."

I reviewed the Mytek 192 Stereo DAC, which was priced at $1595 (now discontinued, remaining stock available at $1095), in the spring of 2013; I was impressed by its sonics, ergonomics, and overall value. The Brooklyn represents Mytek's next step in the evolution of its "entry-level" yet full-featured DACs. The $1995 Brooklyn is not only a DAC, but also a preamplifier for both analog and digital sources, a headphone amplifier that supports single-ended and balanced cans, and a phono preamplifier for both moving-coil and moving-magnet cartridges. The Brooklyn also comes with its own dedicated control app that allows you to operate all the Brooklyn's functions from your computer as well as perform software updates. The Brooklyn even has provisions for linking with an Apple remote.

#### Technical Tour

Given the Brooklyn's ergonomic flexibility, its front panel is a model of minimalism. The centrally located color LCD is flanked on the left by two buttons and a pair of ¼" headphone jacks while on the right side are two more buttons and a volume/selector knob. To access the Brooklyn's settings you merely push the knob in—the display will change. The top half of the new display furnishes current volume, peak, and average levels for your program material if anything is actively playing through the Brooklyn. Near the center is a small MQA logo, which will light up when MQA material is being played. The bottom half of the display offers four setting boxes, each accessed by the corresponding pushbutton below. Once you've pushed a button the box turns blue (meaning it is available for a change of its setting), then by turning the volume knob you can cycle through the options. Once you have chosen the option you prefer, simply push the button again to save your setting.


Among the adjustments available to the end user are the choices of either line-level analog or phono preamp on the analog input. You can also set the appropriate gain for either moving-coil or moving-magnet phono cartridges. Another option lets you route the output to the headphones, main outs, both, or to auto-sensing. You can also choose a digital or analog volume control as well as a full-output-level bypass option. Input options include the aforementioned single-ended RCA analog/phono, AES/EBU, two SPDIF inputs, TosLink, and USB 2.0. The two SPDIF inputs can also be used for professional DSD SPDIF electrical interface for direct connection to professional equipment such as the Tascam D3000 DSD recorder. The Brooklyn also has provisions for word-clock input and output, as well as an optional 12-volt DC/battery, so you can use the Brooklyn off the grid or with larger dedicated external (third-party) power supplies. Outputs include a pair of balanced XLRs and single-ended RCAs, as well as the two headphone connections on the front panel.

The pair of headphone outputs can be used several ways. You can connect one pair of single-ended headphones to either output, or connect two headphones simultaneously. In addition you can, via a cable adapter available from Mytek ($159), use 'phones with a balanced connection for a true balanced headphone output.

If you use a Windows computer for music

# Equipment Report Mytek Brooklyn MQA-Compatible DAC

playback you will need to install a dedicated driver that is available on Mytek's website. If you use a Mac no additional drivers are necessary for full functionality. I used the Brooklyn connected to a MacPro desktop unit running the latest version of El Capitan with no compatibility issues whatsoever.

Mytek has developed its own application, called Mytek Control Panel, which allows you to adjust and control all the Brooklyn's functions via your computer. Many users may find the app easier to navigate than the Brooklyn's front panel. The app can also perform firmware updates as they become available. Going from firmware version 2.00 to 2.05 took less than two minutes total.

One of the unique features of the Brooklyn is the ability to turn off MQA decoding if you wish. Although I'm at a loss as to why you would want to do this on a regular basis, you can use the feature to compare any MQA-encoded file with what it sounds like with no MQA encoding. You can also compare an MQA-encoded file without MQA decoding against a non-MQA-encoded version of the same file. While this provision may be of value to recording engineers and record labels, for your average audiophile it's not a feature that needs to be used, except when he or she is driven by extreme boredom.

Another of the more exotic (but useful for professional engineers) options includes the ability either to use an external clock, or to use the Brooklyn's internal clock to sync with multiple Brooklyn DACs for multichannel playback, or to sync with digital video devices that rely on a master clock.

## Sound

If you are a devotee of Internet audio sites, especially those that feature "reviews" by amateurs, you've probably come across reviewers who swear they can, after a brief listen, discern what DAC chip was being employed in a digital device merely by its "sound." My response is: "Good for you!" I'll readily admit to not having that ability. When I review a digital product like the Brooklyn I listen principally to my own recordings and compare what I hear with what I heard during the recording sessions and subsequently on other playback devices. Using that yardstick the Brooklyn ranks with the best DACs I've used regardless of price or internal DAC technology. Try as I might I was unable to hear any sonic personality that varied from what was on the recording. Having said that, I could hear differences between MQA and non-MQA versions of the same recordings quite clearly once I learned what to listen for.

When used as a DAC/pre in my nearfield system the Mytek Brooklyn's sonic signature was quite similar to that of the Grace M-9xx DAC/pre, but with more gain (and a lower noise floor), due in part to the Brooklyn's balanced outputs. Both DACs did an excellent job of allowing me to listen deeply into complex mixes, but on MQA-encoded material the Mytek had an obvious sonic advantage.

Harmonically the Mytek Brooklyn is as neutral as it gets, so any warming or cooling of your system's overall harmonic character will have to come from some other component in the signal chain. Bass extension was such that if there was deep bass I could immediately tell. The amount of bass energy and treble extension I heard

## SPECS & PRICING

**Conversion:** Up to 384k/32-bit PCM, native DSD up to DSD256, and DXD
**MQA hi-res decoder:** Built-in, certified hardware MQA decoder
**Digital inputs:** USB2 Class2 (32-bit integer, OSX, Linux driverless, all formats), AES/EBU (PCM up to 192k, up to DSD64 DOP), 2 x SPDIF (PCM up to 192k, up to DSD64 DOP), TosLink/ADAT 2 x SPDIF (PCM up to 192k, up to DSD64 DOP), SDIF-3 DSD up to DSD256
**Clock:** "Mytek Femtoclock Generator" 0.82ps jitter
**Analog outputs:** RCA, balanced XLR, simultaneous, 50-ohm impedance
**Headphone outputs:** 500mA, 6W, dual headphone jacks
**Built-in attenuator:** Choice of 1dB-step analog attenuator, separate for main out and headphones, 1dB-step digital 32-bit attenuator, and purist relay bypass
**Built-in analog preamp:** Line level input or phono mm/mc input, relay controlled
**Audio interface function:** All digital inputs can be routed into computer via USB2
**Weight:** 4 lbs.
**Price:** $1995

**MYTEK DIGITAL**
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**ASSOCIATED EQUIPMENT**
**Source devices:** 2013 MacPro Desktop with a 3.7 GHz Quad-Core Intel Xeon E5 processor with 16GB of memory and OS 10.11.5, running iTunes 12.4 and Amarra Symphony 3.3, Pure Music 3.0.1, Audirvana+ 2.5, Roon 1.2, and Tidal 1.3
**Analog sources:** VPI TNT III w/Graham 1.1 tonearm, ClearAudio Victory II cart, VPI HW-19 with Souther SLA-3 'arm and Denon 103/van den Hul cartridge. Vendetta 2B and Rossi LIO phono preamps
**DACs**: PS Audio Direct Stream Jr. DAC, Cary Audio DMC-600SE Music Hub
**Amplifiers:** Pass Labs X150.3, April Music S-1 monoblocks, NuPrime ST-10
**Speakers:** Spatial M-3 Turbo SE with two JL Audio Fathom F-112 subwoofers. Audience 1+1, Role Audio Sampan FTL, Dali Opticon 1, ATC SCM-7 II, one Velodyne DD 10+ subwoofer
**Cables and accessories:** WireWorld Silver Starlight USB cable, WireWorld Eclipse 7 balanced interconnect, AudioQuest Carbon USB cable, J-Cat USB cable, AudioQuest Colorado single-ended RCA interconnect, Kimber KCAG single-ended and balanced interconnect, Audience Speaker AU24e speaker cables, PS Audio Quintet, Dectet, Octet, and Premier power conditioners

# Equipment Report Mytek Brooklyn MQA-Compatible DAC

during playback was primarily a function of the transducers I used, and not due to any audible sonic limitations imposed by the Brooklyn.

The Brooklyn's single-ended headphone outputs reminded me of those of the Grace M-9xx, but with greater ability to drive difficult 'phones, since I also had the option of using the Brooklyn's balanced output mode. With highly sensitive in-ears, such as the 117dB-sensitive Westone W-60s, I could hear a small amount of hiss but no hum. With standard-sensitivity headphones, such as the AudioQuest NightHawk, the Brooklyn's headphone amplifier was dead quiet. I also tried the NightHawk with a balanced Silver Dragon cable from Moon Audio. The balanced connection gave them a bit more dynamic verve and low-frequency extension. I also noticed an improvement with the balanced connection over single-ended with the MrSpeakers Ether C headphones. In balanced mode the Ether Cs had greater dynamic ease and punch. Using the toughest-to-drive headphones in my collection, the Beyerdynamic DT-990 600-ohm version with a single-ended termination, the Brooklyn never maxed out due to power limitations—19dB (–0 dB is max and –99 is the lowest level before mute) was the highest output level I used with any headphone, including the DT-990.

In order to see how well the Brooklyn's phonostage performed I pulled it out of my desktop system and installed it in my room-based setup. I set the analog input to mc phono, put the gain into bypass (full output), and connected it to my VPI HW-19 with a Souther linear-tracking 'arm and Denon 103/van den Hul moving-coil cartridge. This phono system had previously been attached to the $3875 Vinnie Rossi LIO, which I was using as a phonostage. As with the LIO I could adjust the gain levels of the Brooklyn via the volume control, but the Brooklyn also had the option of bypassing the volume control completely. When I compared the Brooklyn's analog volume control with bypass mode, bypass delivered a slightly more open top end and better-defined soundstage and imaging. I found the Brooklyn's phonostage to be as quiet as that of the LIO, and its overall performance was sonically comparable. The LIO had a slightly wider and deeper soundstage but the Brooklyn's focus was a bit more precise. I could listen to either for hours without any complaints.

## MQA

Shortly before I began to write this review Warner Music announced an agreement that made it possible for MQA to encode the entire WMG catalog. That is a lot of music. So far I've heard and done critical A/B listening on several systems with MQA-encoded music files from more than a dozen sources including Warner. In every case the MQA file has been sonically superior to the un-MQA'd comparison music file. I even had five of my own recordings, which were predominantly DSD tracks, encoded into MQA. Much to my surprise the MQA files sourced from my own DSD128 masters sounded superior to the originals! In what specific ways do they sound better? They were all spatially more accurate with more decipherable low-level information. On one of my recordings, which was recorded at 44.1/16 with a Marantz PMD-671 field recorder, and featured Chris Thile, Gabe Witcher, and Chris Eldridge playing outdoors, the low-level sounds far in the background were easier to decipher than on the original recording. The sounds from another workshop going on simultaneously over 150 feet way were also easier to hear on the MQA file than on the original.

Another of my field recordings featuring Bryan Sutton and Chris Eldridge playing vintage Martin dreadnaughts that was originally done at DSD128 also sounded better on the MQA-encoded file than on my master recording. Once more the difference was the decipherability of low-level information. It was simply easier to listen into the mix, plus everything within the mix had better delineated dimensional cues. Magic? Voodoo? Not really, if you understand the basics and weaknesses of digital recording.

The weak link of all analog-to-digital recorders (and digital-to-analog decoders) is their ability to handle extremely low-level signals. According to Robert Stuart, "MQA's target for temporal blurring is to do no more harm to sound than passing through a couple of meters of air—it seems trite, but it is actually a profound concept. Simultaneously, but separately, MQA uses advanced sampling and playback methods that particularly stabilize low-level signals and the recording 'noise-floor.' This uses advanced insights from sampling theory and neuroscience." MQA removes the distortions that were added during the recording process.

If you have a digital recording device that uses an analog-to-digital converter, try this test: Record something at maximum levels that peak just below 0dB, and then record the same track at the lowest settings possible. The lower-level recording will have far more additive distortion than the higher-level one. Even when a recording is done at correct volume levels the quiet passages and accompanying background noise will inevitably have higher levels of distortion than the loudest sections. This is not debatable—it's science. If you can reduce these low-level additive distortions the results will be a better-sounding recording. It is really that simple.

Anyone who doesn't understand how digital recording functions may have problems comprehending why MQA works, but even if you don't get the tech, if you critically listen you will hear the audible superiority of an MQA-encoded file when compared with the PCM or DSD original.

## Conclusion

As I learned from my mentor J. Gordon Holt, reviewers have a tendency when confronted by a new medium that reduces distortions to be over-enthusiastic in their praise. One of Gordon's regrets was that he wasn't more critical of the first CD player he heard, the Sony CDP-101. The Mytek Brooklyn and its MQA capabilities placed me in a similar situation. So far I've been unable to discern anything sonically negative while listening to MQA-encoded files through the Mytek Brooklyn. My natural tendency would be to write a spittle-flying gobsmacked rave, but that would be giving in to my baser instincts.

Even without MQA the Mytek Brooklyn offers exceptional value due to its versatility, flexibility, ergonomic elegance, and overall high level of sonic performance. Once you throw MQA into the equation, I have to say, "Game over" for any DAC or DAC manufacturer that can't keep up. tas

# Equipment Report

## Grace Design m9XX DAC

### Great Sound, Low Price

Steven Stone


**Grace Design may be a new** name for many audiophiles, but for recording engineers it has long been a well known and respected entity. Michael and Eben Grace have been manufacturing microphone preamplifiers since 1994. Their first model, the 801, began the pro-audio industry trend toward outboard, dedicated microphone preamps that could be used in place of a mixing board's built-in microphone preamplifiers. My own familiarity with Grace began in 1999, when J. Gordon Holt and I bought a Grace Lunatec two-channel portable microphone preamplifier. After one session, we took it to the Grace factory in Boulder, Colorado, where Michael Grace designed and installed an M/S microphone-matrix circuit and a "Macky Auditorium EQ" created for Macky, which was (and could still be if the University of Colorado comes up with $200,000) a pipe organ auditorium. Provisions in the hall designed for the organ pipes canceled some of the auditorium's lower-bass extension, so this equalization circuit was created to add a 3dB-per-octave bass boost starting around 40Hz to compensate for the hall's latticework proscenium. Subsequent versions of the Lunatec preamplifier included the option for M/S matrix based on the original circuit design Michael made for us.

Grace Design's first "consumer" or "end-user" product is a desktop DAC dubbed the m9XX. Why m9XX? Several reasons: First, all of Grace's previous pro DAC products have been m9 series beginning with the m901 and ending, so far, with the m920. The XX part is a tip of the hat to Massdrop, a site that specializes in "group buys." Currently Massdrop is the exclusive retail outlet for the m9XX. Massdrop works directly with manufacturers, commissioning special versions of existing or occasionally entirely new products. In the past, Massdrop has offered exclusive headphones from AKG, such as the K7XX. So that's where the XX moniker originates.

What is the m9XX? Basically it's a digital-to-analog converter with a variable line-level RCA output as well as two ¼" stereo headphone outputs. The m9XX has TosLink and USB 1.0 and 2.0 inputs (selectable via menu) in addition to two power modes, one via USB and another higher-current mode via a separate dedicated power connection. Although the m9XX has an MSRP of $799, Massdrop's "drop" price is $499. The good news for audiophiles on a budget is that the Grace m9XX has the potential to be a reference-level-sonic device at a near-entry-level price.

#### Technical Tour

The digital "heart" of the m9XX is an AKM 4490 chip, which features 256x oversampling, 32-bit processing, and the ability to decode everything from 44.1kHz to 384kHz as well as DSD64 and DSD128 via DoP (DSD over PCM). The DSD64 stream is packaged into a 176.4kHz PCM stream while the DSD128 is packed into a 352.8kHz PCM stream. Special bits are added to the DSD stream to indicate to the m9XX processor that

# Equipment Report Grace Design m9XX DAC

the data is DSD and not PCM. The AKM 4490 has provisions for four user-selectable anti-aliasing filters, including a traditional fast-roll-off linear-phase filter, a slow-roll-off linear-phase filter, a fast-roll-off minimum-phase filter, and a slow-roll-off minimum-phase filter.

Along with these four digital filters, the Grace m9XX has a defeatable cross-feed circuit for its headphone output. According to Grace Design, "The m9XX contains cross-feed circuitry which electronically simulates the signal cross-feed that occurs in a real acoustic space and helps the brain establish instrument locations across the entire soundstage. While it is difficult to perfectly model the very complex level, delay, and frequency response characteristics of the head, the cross-feed circuitry in the m9XX gives the brain some of the basic clues it needs to establish instrument locations."

The m9XX's USB input is handled by an eight-core XMOS processor, which operates in asynchronous mode. There is a TosLink input that can handle sources up to 96/24 from Blu-ray or DVD players. The XMOS processor is also responsible for receiving the TosLink data. This recovered clock from the TosLink stream is regenerated by an ultra-low-jitter (50ps) hybrid analog-digital PLL (phase locked loop) circuit. The corner frequency of the PLL is 1Hz, so there is over 90dB of jitter rejection at 1kHz.

Grace spent a lot of design time on its analog circuitry, and instead of a traditional voltage-feedback op-amp the m9XX employs a transimpedance or "current feedback" amplifier design. Transimpedance amplifiers have a nearly constant bandwidth over a wide gain range and are not prone to large-signal slew-rate limiting. The headphone amplifier in the m9XX is the THS6012, which has a slew rate of more than 900V/µS. The tradeoff of transimpedance designs is that they have higher measured total harmonic distortion (THD) than voltage feedback designs. But these harmonic distortion components are correlated with the signal and are much more euphonic than intermodulation distortion. Grace's designers believe that the sound quality advantages of a transimpedance design outweigh the measurement disadvantages.

The output impedance of the headphone outputs (there are two parallel outputs) is specified at only 0.08 ohms. According to Grace's published specifications, when driving 20-ohm headphones the m9XX has a damping factor of over 250. By comparison, a typical headphone amplifier with 10-ohm output impedance will have a damping factor of only 3.8. With 300-ohm headphones the m9XX's damping factor is over 3700. The THS6012 headphone amplifier used in the m9XX is a high-current device specified for driving 500mA of continuous current into a load. In high-power mode, the m9XX headphone amplifier can deliver 440mA peak into 20-ohm loads with both channels driven, which is a momentary power of 1800mW per channel.

The m9XX's volume control is a hybrid design with most of the volume control duties handled in the digital domain with 32-bit processing. The output amplifier is designed to operate in two gain modes: 0dB and +10dB, which are controlled automatically to create a 99dB volume range with 0.5dB steps. Thirty-two bit processing ensures that any artifacts of volume control operations are at -190dB down from full scale.

Unlike many USB DACs, which rely on a 5-volt USB source to supply power, the m9XX offers two different power options. You can either power the m9XX from your computer's USB to deliver a maximum of 0.5 amps, or you can use a second USB "power only" connection, which supports a maximum current of 1.5 amps. The m9XX automatically senses when the external 2A USB charger is connected to the high-power DC input. Once detected, the m9XX increases the DC power rails to +/-14.5V. This results in available continuous power for the headphones exceeding 1000mW per channel with both channels driven into 32-ohm headphones. One channel peak power into 20-ohm 'phones is more than 1600mW.

According to Grace Design, "noise from the computer USB port can cause jitter artifacts in the sensitive DAC circuits. To prevent this, the m9XX employs multi-tiered noise suppression. The first stage of noise suppression is provided by two high-quality USB cables, which are included with the m9XX. These high-speed cables feature RFI filters that are built-in, as well as extra-heavy 24AWG copper conductors for power and ground."

USB power is also filtered at the input connectors on the rear panel. Power is separated into five individual supplies: one for the XMOS processor, one for the DAC, and three for the analog circuits. The audio amplifier power-supply rails are produced with an ultra-low-noise push-pull converter that runs synchronous to the digital audio clocks. This high-efficiency, low-noise power-supply circuit was originally designed for use in Grace's Lunatec microphone preamplifiers, which have an EIN (equivalent input noise) of -130dB. This attention to noise suppression and isolation between digital and analog power yields a system with overall output noise of -109dBV A-weighted and-106dBV 22Hz–22kHz.

## Setup and Ergonomics

The m9XX looks like no other DAC. Its extruded sheet-aluminum chassis is only 4¼" by 1" by 5" and features a large rotary knob on top. The front panel includes two ¼" stereo headphone jacks and a seven-section LED readout. The back panel has one pair of RCA line-out jacks, a TosLink input, a 5.0V 2A micro-B USB input, and

### SPECS & PRICING

**THD+N:** 1kHz, 22Hz-22kHz BW, @1.0V out, no load <0.002%; @1.0V out, 32-ohm load <0.010%
**Frequency response:** 0.5Hz–45.9kHz (96kHz input)
**Dynamic range:** 112dB (20-22kHz)
**Output impedance:** 0.08 ohm (headphone) 47.5 ohms (line)
**Power consumption:** 8.0W (high-power mode); 2.5W (low-power mode)
**Dimensions:** 4" x 1.8" x 5.25"
**Price:** $799 ($499 street)

**GRACE DESIGN**
4689 Ute Highway
Longmont, CO 80503
(303) 823-8100
gracedesign.com

# Equipment Report Grace Design m9XX DAC

a USB 2.0 input. That's it. Because it has variable line-level outputs, the m9XX can serve as a DAC/preamplifier. The only drawback is that it only has one pair of outputs. If your system uses a subwoofer, you will need to connect it from either your amplifier's high-level outputs or use a line-level splitter to supply an additional feed for your sub. I employed the latter methodology with no perceivable sonic ill effects.

I used the m9XX in two configurations—as a digital source with its output set at unity gain routed into a preamplifier, and as a DAC/pre, where it was connected directly to a power amplifier and the volume was controlled by the m9XX. In both situations the Grace m9XX performed without any issues. The only problem I encountered was user-error: One time I managed to switch from USB to TosLink via the menu, and I had to call Grace to discover my mistake (Alex, the customer service person, found the problem quickly and didn't laugh at me).

Setting up the m9XX is simple, but because its display only supports two characters (due to its size restrictions), you will probably need to refer to Grace's comprehensive and well-written user's manual to determine what the display is trying to tell you. In USB 1 mode, the m9XX supports driverless operation on Mac OS and Windows at sample rates up to 96kHz. In Audio Class 2 mode, the m9XX supports driverless operation on Mac OS at sample rates up to 384kHz. On Windows, Audio Class 2 operation requires downloading and installing a free driver, available from Grace Design's website.

Once the m9XX was hooked up, it was time to go into the set-up menu. Your first option will be whether to employ the cross-feed circuit. "CF" means the cross-feed is off while "C.F." means the cross-feed is active. Next you can choose between the USB and TosLink inputs. "U" means USB while "To" means TosLink. Other set-up options include a dimmer control to lower the display brightness, a "power-up" option that lets you set the default volume level upon turn-on, the four digital filter options, and finally the USB mode. While it's a bit scary at first, the menu is easily learnable and once you get the hang of it, going into and out of the m9XX's set-up menu becomes quick and easy. And, yes, there's no remote since the m9XX was envisioned as a "within hand's reach" device.

Speaking of hands, the m9XX handles great "blind." By that I mean after a day or so, once you're through fiddling with the set-up menu, you can use the m9XX without ever having to look at it. The large top-mounted volume knob turns easily and the push-to-mute feature makes perfect sense. Another sensible feature is the way the two headphone outputs are slightly different—if you plug into the left one, the line-level output is unaffected, but if you plug into the right-hand one, the line-level output is muted.

## Sound

Over the years I've spent time with a number of Grace Design DACs and A/Ds. And while there isn't a pervasive "house sound" to Grace products, they do all share certain sonic attributes. The most important characteristic is a lack of listener fatigue during long sessions. I could listen to the m9XX for as many hours as I wanted (sometimes all day) and I never felt as if my ears needed a rest. But even with its easy-to-listen-to sound the m9XX was also as detailed and resolving as any DAC I've used. With my own recordings, which I know very well, the m9XX delivered all the low-level information and soundstaging cues that I'm accustomed to hearing. Part of the m9XX's sonic appeal stems from its lucid character. This makes it easy to listen deep into a mix without any strain; all the aural information is simply there, clearly and without any loss of low-level details.

The m9XX's harmonic balance is as neutral as I've heard from any DAC, which is surprising only if you also consider the m9XX's excellent low-bass extension. Usually when a DAC has this much low-bass and sub-bass information its overall balance seems to shift toward "the dark side," but the m9XX's harmonic balance still sounds extremely neutral. Perhaps some of this apparent harmonic neutrality stems from the m9XX's analog amplification section, which remains unfazed by dynamic peaks. This is a characteristic of Grace devices that J. Gordon Holt and I first discovered with our Lunatec microphone preamplifier. It was the first microphone preamplifier we had ever used whose sound did not change even when it was "hammered" by peak-level transients. I hear this same dynamically unflappable character with the m9XX.

Since one of the m9XX's primary functions is to serve as a headphone amplifier, I connected more than a dozen different earphones of various types to try to find any mismatches. Beginning with the most sensitive in-ears I have, the Westone ES5, I found the m9XX did have a slight amount of low-level hiss that was difficult to hear once music began playing. With the Westone ES5, my usual listening levels were near the lower end of the m9XX's output, between 20 and 30 (on a scale of 0 to 99). With Ultimate Ears' newest custom in-ear, the In-Ear Reference Monitors Remastered, there was no hiss and normal listening levels were between 30 and 40. Moving over to the other extreme, the m9XX had no problems driving my least efficient and most power-hungry cans, the Beyerdynamic DT-990 600-ohm version, to what I consider loud levels while still having some power to spare, at a usual setting somewhere between 70 and 80.

As I read through "headphone pairings" threads on headphone sites I'm often surprised by how two excellent products when connected together can be perceived as a major mismatch by listeners. This was certainly not the case with the Grace m9XX. Here's an example of the m9XX's wide-ranging compatibility: The AudioQuest NightHawk and Sennheiser HD 700 are two radically different-sounding headphones. The NightHawk has a dark character while the HD 700s are bright and vibrant, yet both sounded as neutral and uncolored as I've ever heard them sound through the m9XX. It's not as if the m9XX minimizes or reduces their intrinsic sonic personalities, yet the most sonically pernicious aspects of their innate characters were minimized. With the m9XX, the NightHawks weren't overly dark and the HD 700 wasn't peaky or lacking in dynamic control.

One of the headphone pairings that offered the most sonic value was when I connected the AKG K553 headphones to the m9XX. This relatively inexpensive over-ear closed design ($199 street) can sound somewhat matter-of-fact with many amplifiers, but with the m9XX they had

# Equipment Report Grace Design m9XX DAC

a dollop of extra dynamic verve and their bass extended lower than I'd heard before. Another headphone that proved to be a nicely balanced pairing with the m9XX was the Oppo PM-3 ($399 street). Once more, the m9XX brought out the PM-3's strengths, especially in soundstaging and image placement.

As a DAC/preamplifier, especially for a nearfield desktop system, the m9XX performed beautifully once a solution was found for its paucity of outputs. I used a splitter to give me the two pair of RCA single-ended outputs I needed to connect both my subwoofer and power amplifier. Since it was a nearfield system, interconnects were only one meter long. I also tried driving two 25-foot runs and I heard no audible fidelity losses at the frequency extremes. If you need to drive an even longer run of cable you might want to check with Grace first. Of course you can always resort to "subwoofer plan B" and connect a second pair of speaker cables from the outputs of your power amplifier to your subwoofer's "high-level" or "speaker level" inputs. The disadvantage to this is that you need both the extra set of speaker cables *and* have to pass the subwoofer's signal through your power amplifier. Unfortunately this method allows the amp's colorations and noise to be added the original signal.

Sonically the Grace m9XX performed with flying colors when used as a DAC/pre. The well-controlled and extended bass that I heard through headphones was readily apparent when auditioned in a nearfield or room-based system. The m9XX's unfatiguing upper-frequency presentation made listening through my all-solid-state and Class D amplification system a very natural and relaxed affair. My only quibble is that if you have built a system that is already soft and forgiving the m9XX might be too much of a good thing. However, if you want a neutral, revealing, but still listenable DAC, the m9XX checks all the right boxes.

Does the Grace m9XX have any competition? Does Rihanna wear short skirts? However, nothing in its price range has the ergonomic elegance and simplicity of the m9XX. It reminds me of the Aurender Flow, but at half the size and price. If I could stretch my budget an extra $200, I'd still be tempted by the Audeze Deckard due to its analog input. But currently I'd say the Grace m9XX is a major contender for best-buy top honors at its price-point.

## Conclusion

Digital audio, especially with DACs, has its own particular version of Moore's law—every two years the price halves or the capabilities double. Two years ago you had to spend at least $1000 to get the sonic performance and features included in the $499 Grace m9XX. So, why not wait another two years and get m9XX's capabilities for $250? Because, silly rabbit, you'd be forced to spend two more years without experiencing the sonic and ergonomic elegance of the Grace m9XX.

The m9XX is U.S.-made and its build-quality is such that Grace Design offers a five-year warranty in an age when most manufacturers' guarantees for similar products are only good for a year at most.

Simply stated, the m9XX DAC/pre is something special—so special that it deserves to turn up on a lot of savvy audiophiles' desktops. tas

# Our Top Picks DACs and Disc Players


## AudioQuest DragonFly Black and Red

**$99/$199**

AudioQuest practically invented the low-cost, high-performance USB DAC in stick form with the original DragonFly. It was a massive success. But these two new models greatly improve on the sound of the original, and the $99 Black version comes at a lower price, to boot. The Black is smoother than the original, with more extended bass. Although both sound superb and are amazing values, the Red at $199 delivers striking sound quality, with exceptional transparency, resolution, timbral realism, and wide dynamics. Add AudioQuest's $49 JitterBug USB isolation device to either and take the performance up another notch. The Red with a JitterBug is good enough to use as a front end in a budget high-end home-based system. (270)


## Meridian Explorer² MQA DAC

**$299**

The Explorer² is the first DAC available to decode Master Quality Authenticated (MQA), a new digital format that delivers better-than-high-res sound quality in a file size that can be easily streamed. This small oval tube of a DAC is designed for personal listening, but with both line output and a headphone jack, can be used in a home system. The Explorer² has one mini-USB input at one end of the oval tube, and stereo 1/8" line-out and headphone-out jacks at the other end. The Explorer² is great way for you to experience MQA for yourself, in a desktop, portable, or even home system. It's a good-sounding DAC with conventional digital files, but spectacular when decoding MQA. It's not the ultimate realization of MQA, but it delivers the technology's musical essence at an eminently reasonable price. (263)

## Grace Design m9XX DAC

**$799 ($499 street)**

Grace Design may be a new name for many audiophiles but it has long been a well known and respected entity. The good news for audiophiles on a budget is that the Grace m9XX has the potential to be a reference-level-sonic device at a near-entry-level price. Basically the m9XX a digital-to-analog converter with a variable line-level RCA output as well as two 1/4" stereo headphone outputs. It has TosLink and USB 1.0 and 2.0 inputs (selectable via menu) in addition to two power modes, one via USB and another higher-current mode via a separate dedicated power connection. The digital "heart" of the m9XX is an AKM 4490 chip, which features 256x oversampling, 32-bit processing, and the ability to decode everything from 44.1kHz to 384kHz as well as DSD64 and DSD128 via DoP (DSD over PCM). Sonically the performed with flying colors when used as a DAC/pre. The well-controlled and extended bass that reviewer SS heard through his headphones was readily apparent when auditioned in a near-field or room-based system. The m9XX's unfatiguing upper-frequency presentation made listening through his all-solid-state and Class D amplification system a very natural and relaxed affair. If you want a neutral, revealing, but still listenable DAC, the m9XX checks all the right boxes. (273)

# Our Top Picks DACs and Disc Players

## Oppo Digital BDP-105D Multiformat Disc Player

**$1299**

For enthusiasts who like their audio how they like their pizza—with everything on it—the BDP-105D is quite the earful. It's a physical media lover's dream yet it also offers all the media player/renderer connectivity and Oppo's own media app control for the computer music aficionado, plus media support for Tidal and Netflix among others. Also unique to this Oppo model is an internal headphone amp to power a variety of cans (such as the maker's own planar-magnetic line). Driven by the ESS Sabre32 Reference DAC, sound quality was very good to excellent across all formats. Only SACD seemed to lack the micro-detailing, continuity, and immersiveness of the top-tier dedicated players. Cinemaphiles and multichannel mavens, take note: Blu-ray disc performance was stunning, and the Darbee Visual Presence video processing was an intriguing addition for optimizing picture quality. Well built and attractive, the BDP-105D is a true, one-box crossover solution for both physical and optical media—and for computer-audio fans. (270) *The BDP-105D has been superseded by the UDP-205 player. See p. 7 for details.*

## Schiit Audio Yggdrasil

**$2300**

Founded in 2010, this oddly named company has developed quite a reputation for creating great-sounding products at bargain-basement prices—though this DAC is an outlier, positioned price-wise far above Schiit's other offerings. Behind the brand lurks one of high-end audio's pioneering digital engineers: Mike Moffat (remember Theta Digital?). The Yggy proudly eschews DSD support and MQA decoding; its singular mission is to decode PCM (up to 384kHz) with the highest fidelity. The Yggy has a bold, assertive, vibrant, even vivid presentation. You'd never mistake it for a tube DAC. In some criteria—transient speed without etch, clarity of musical line, whole-body involvement—the Yggy is as good as digital gets. Reviewer RH found with the Yggy he felt a musical exhilaration that was experienced not as some intellectual abstraction, but at a more fundamentally visceral level. An out-of-this world bargain, says RH. (273)

# LOUDSPEAKERS

## Contents

*Click any product name to read that review*


RAGNAROK, $1699

YGGDRASIL, $2399


JOTUNHEIM, $399-499

## BACKWARDS.

Yes, our prices can seem like they're from way back in time. We never got with the program that says "charge what the market'll bear, and raise prices every revision." Heck, we've even *lowered* prices (while still keeping our manufacturing in the USA). But if that makes us backwards, then we really don't want to be any other way.

SCHIIT

WWW.SCHIIT.COM

FULLA 2, $99

# Equipment Report

## KEF Muo Wireless Desktop Loudspeaker System

### Honey, I Shrunk the Speaker

Julie Mullins

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

Achieving both great sound *and* portability is a tall order. Even in this crowded market segment, it's not easy to find that combination in a small, sleek, and smartly designed package. Producing big sound from a small speaker also presents big engineering challenges. Fortunately the UK-based loudspeaker manufacturer KEF has industrial designer Ross Lovegrove in its corner. Lovegrove, who designed the company's acclaimed Muon flagship floorstander, also conceived the Muo, which represents the opposite end of the speaker spectrum size-wise and price-wise. Yet the two have plenty in common: Many of the Muon's key design elements have been reproduced in the Muo, though obviously on a smaller scale. The Muo's smooth, modern exterior is made from the Muon's same acoustically inert, solid, brushed aluminum that minimizes resonances (though with the Muo you can feel some slight vibration in the lower octaves). The Muo has a substantial weight and feel; at just shy of two pounds, it's heavier than it looks. (A pair could almost double as hand weights for arm curls.) It's available in six striking matte color options: Light Silver, Neptune Blue, Sunset Orange, Storm Grey, Horizon Gold, and a limited-edition Brilliant Rose. The form factor is vaguely cylindrical, only with three sides and gently curved edges. A pair of soft, rubberized stoppers on the bottom prevents rolling when the speaker is in its horizontal position. It can also be positioned vertically on its side/end and, when paired with a second Muo, played in two-channel stereo mode. When both speakers

# Equipment Report KEF Muo Wireless Desktop Loudspeaker System

are positioned horizontally they're said to be in "party mode." More on this flexible usage later.

Yes, the tiny two-way Muo is elegant looking, cute even, but don't let its stylishness belie some serious proprietary technologies inside that have been "trickled down" from the Muon. (If you shine a light and look through the grille holes on the front panel you can actually see the drivers.) Let's start with the unique Uni-Q "point-source" driver array, a miniaturized version of the Muon's. There are two identical 50mm/2-inch full-range Uni-Q drivers, each with a decoupled central dome tweeter and midrange, in addition to one auxiliary long-throw radiator in between for better bass extension. When two drivers are placed closely together in a small enclosure, stereo imaging becomes difficult to extend beyond a limited sweet spot close to and directly in front of the speaker. High-frequency interference can distort and color the sound outside this area. In the Muo, only one Uni-Q driver handles the full frequency range, while the other driver plays only low and midrange frequencies. This configuration enables a "gentle" crossover for wider overlap and better sonic dispersion. Indeed, the Muo not only sounds like a larger speaker than it is, but its sound can fill a small-to-midsized room quite capably. In addition, either one (or a pair) is handy for desktop use, offers portability for travel, and paired most easily with my iPhone. (On practical note, I'd suggest that a slipcover case might be a worthy addition for a future model to help protect against marks and small surface scratches on the aluminum.) You can stream via Bluetooth 4.0 aptX from your computer or mobile device, or listen via an auxiliary input (DAC, NAS, etc.); plus there's a micro-USB input, which can be used for charging and firmware updates.

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

## Setup and Synchronization

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

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

To connect one speaker to your iPhone, turn the speaker on by pressing the center button for about three seconds, make sure your Bluetooth is on (under Settings native app), then select "KEF MUO" from "My Devices." You're all set. Connecting a pair of Muos in stereo mode (vertical position) requires another couple of button-presses (plus a little patience). First connect one—and *only* one—Muo to your phone via Bluetooth, then turn on the second Muo. On the first speaker, press and hold down both the main button and the smaller round one at the same time for two or three seconds. Repeat this on the second speaker (right channel). Sit tight while the Muos synchronize—about ten to thirty seconds or so, depending on the strength of the Bluetooth connection. You're ready for two-channel playback. You can also shift the speakers into horizontal position while they're playing, and they automatically reset from stereo to dual-mono or "party mode." Various combinations of two or three tones and a small ring of LED light (that switches colors) around the main button indicate changes in connection, disconnection, and power.

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

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

## Sonically Speaking

How does the Muo sound? What struck me most was how engaging the presentation was; I didn't expect the degree of detail, coherence, and immediacy. How they packed this remark-

### SPECS & PRICING

**Drivers:** 2 x 2" tweeter/midbass, 1 x bass radiator
**Inputs:** Bluetooth 4.0 aptX codec, 3.5mm aux
**Dimensions:** 8.3" x 3.1" x 2.3"
**Weight:** 1.8 lbs.
**Price:** $350 each
kefdirect.com

# Equipment Report KEF Muo Wireless Desktop Loudspeaker

ably clean- and clear-sounding configuration into this sleek, petite form is a wonder—and a testament to the Muo's clever design.

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

The Muo is light and quick in balance, which lends it a pleasing sense of effortlessness—an advantage of certain smaller speakers. But the Muos can also rock out, as I discovered on the White Stripes' heavy-duty, brash and bluesy "Ball and Biscuit," where the speakers flexed their muscles to reproduce Jack White's growling guitar licks admirably. I was told the Muo goal was to maintain cleaner sound over louder sound, even if that means sacrificing a little dynamic headroom or bottom-end. Obviously the Muos don't sound like floorstanders, but they sound larger than they are, and their ability to image in stereo is more than respectable, albeit miniaturized. Careful placement also helps.

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

## Conclusion

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

# Equipment Report

## Elac Debut F5

### The Main Event

Neil Gader


**One of the great stories in** the high end for 2015 is the resurgence of the venerable German loudspeaker company Elac, and its hiring of one the industry's top designer/engineers Andrew Jones. Jones, formerly of KEF and TAD, wasted no time getting to work, and within a few short months brought to market the Debut Series, an entry-level lineup of loudspeakers. Recently I wrote about the Elac Debut B5 (Short Take, Issue 259), a two-way compact with mighty intentions and an unpretentious $229-per-pair sticker. There, I heralded its class-shattering performance and sonics, and the stupendous value that the speaker represents. However, there's no harm in admitting that even a mighty-mite like the B5 may not meet *every* audiophile's expectations for dynamic output and bass extension, right? That's why I also called the B5 "the teaser"—a compact that even within its limits seemed to auger much more to come. Presenting, the "much-more-to-come" Elac Debut F5.

Before the cartwheels begin, a quick description. The F5 is a three-way floorstanding loudspeaker in a bass-reflex enclosure. It has the same basic DNA as its smaller sibling, the B5. The form factor is virtually the same: It looks like the B5 after a teenage growth spurt—a good two feet of cabinet, to be exact. The driver components are identical. The F5 uses the same cloth-dome tweeter, which thanks to the deep spheroid waveguide provides good off-axis dispersion that doesn't lock the listener within a narrow sweet spot or leave an adjacent listener out in the cold. Also carried over is the 5.25" woven-Aramid woofer with an oversized magnet and vented pole piece. But the quantity has grown from a single mid/bass driver to three woofers, or more accurately, a mid/bass and twin woofers.

Crossover points are specified at 100Hz for the mid driver, which in turn, hands off to the tweeter at 3kHz. Internally the upper third of the black brushed-vinyl cabinet is sectioned off to isolate the mid/bass and tweeter, and there are twin horizontal braces to further stiffen the cabinet and prevent unwanted resonances. The bass-reflex configuration uses a single port for the uppermost tweeter/midrange section while the bottom section of the cabinet has two ports.

In sonics, the pint-sized B5 would be a tough act to follow under most circumstances, but the F5 still manages to steal the show. It takes the strengths of the B5—a warm, relaxed, and responsive midrange, surprising bass extension and tunefulness, a lack of cabinet and port colorations, and a strong sense of musical truth, then significantly builds on them. In sonic criteria like tonality, micro- and macro-dynamics, and transient speed, the B5 and F5 have got the essentials down pat. As I listened to Ana Caram singing "Fly Me To The Moon," accompanying herself on a nylon-strung acoustic guitar, there were all the familiar cues—her gentle, airy vocals, the warm, subdued resonances of the guitar, and an expansive, immersive ambience that put me in mind of white sand beaches and soft tropical breezes. Turning to Christopher Cross' eponymous debut LP, I felt the Elac accurately captured the vocal balances of Christopher Cross' vocal and Michael McDonald's classic harmony. It caught the distinctive rhythmic "gallop" of the backing percussion section, while the rising string section arrangements were nearly as accurate to my ear on the B5/F5 as they were on my reference ATC—the passive version of the pro model, known for its tonal accuracy.

# Equipment Report Elac Debut F5

However, the main reason why many audiophiles (including myself) might opt for the F5 over the B5 is midrange and low-frequency dynamics. Take the Bach Cello Suite, for example. Correctly reproducing the initial transients off the bow and the thick, deep, trailing resonances of this instrument has foiled all levels of loudspeakers, but the F5 does a much more than credible job at capturing the full-throated voice of this instrument. And, as I listened to the Manhattan Jazz Quintet's version of "Autumn Leaves" it was as if someone had opened the dynamic floodgates. Compared with the B5, bass lines were reproduced with more accurate pitch and greater dynamic potency, while Lew Soloff's tricky-to-handle trumpet blasts had the speed and authority of a much bigger and sturdier old-pro speaker, costing many times the F5's price.

Although both models provide copious amounts of midbass energy, the biggest thing that distinguishes the F5 over the B5 is the sheer volume of air that the F5's additional woofers can move. For classical music listeners and "big music" peeps this has ramifications beyond mere bass extension and output—areas where the F5 already outpoints the B5. The F5 creates orchestral scale and scope that paints a much more convincing and deeply dimensional landscape of a large ensemble performing in a concert hall.

Vocalists of all stripes and genders shine on the F5 with performances that are fully fleshed out with chest-resonance weight and bloom. Take "Sabra Girl" by Nickel Creek—the Elac captures the delicacy of the arrangement with the acoustic flattop and mandolin sailing and swirling around Sara Watkins' vocal and harmonies. And then there's the issue of backbone. The F5 doesn't need a gut-check when called upon to play back the tortured, gritty, crunchy distortion of George and John's electric guitars as they pegged the meters during the "fast" version of "Revolution."

Let's get a couple nitpicks out of the way. Neither the B5 nor the F5 is a flawless loudspeaker—although it could be effectively argued that they're as faultless as a speaker is likely to get at these prices. Nonetheless, the tweeter remains a bit on the dry side, and the upper harmonic range could be more extended and open. Along those same lines, the F5 doesn't always disappear as a source and there are intimations of tweeter localization.

Also as good as its dynamic strengths were at medium-loud levels, when called upon to summon the reserves necessary to reproduce Stewart Copeland's kickdrum during the opening of "Murder by Numbers," the F5 grew a little shy and compressed. Imaging, though very good for this segment, did lack a bit of focus and specificity. For the most part the F5 enclosure does a stupendous job, and there is very little in the way of port noise or other effects; however, there's a small sense of the enclosure absorbing some of the output.

The Elac F5/B5 go beyond just being the rare, good speaker for the money. They're a veritable gift to budget-conscious audiophiles and the younger audience, particularly those looking for a cost-effective, room-filling alternative to headphones. And keep in mind that the Elac/Jones collaboration is just getting ramped up!

## SPECS & PRICING

**Debut F5**
**Speaker type:** Three-way, bass-reflex
**Drivers:** 1" cloth-dome with custom deep-spheroid waveguide, (3) 5.25" woven aramid-fiber cone with oversized magnet and vented pole piece
**Frequency response:** 42Hz–20kHz
**Nominal impedance:** 6 ohms
**Sensitivity:** 85dB at 2.83v/1m
**Dimensions:** 7.87" x 38" x 8.75"
**Weight:** 32.8 lbs.
**Price:** $559/pr.

**Debut B5**
**Speaker type:** Two-way, bass-reflex
**Drivers:** 1" cloth-dome tweeter with custom deep-spheroid waveguide, 5.25" woven aramid-fiber mid/bass cone with oversized magnet and vented pole piece
**Frequency response:** 46Hz–20kHz
**Nominal impedance:** 6 ohms
**Sensitivity:** 85dB
**Dimensions:** 7.87" x 12.75" x 8.75"
**Net weight:** 11.5 lbs.
**Price:** $229/pr.

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# Equipment Report Elac Debut F5

## Q&A with Andrew Jones, Chief Designer, Elac

**Were the F5 and B5 conceptualized simultaneously?**

All the speaker ranges were conceptualized simultaneously. This is necessary in order to plan what drivers are going to need designing and to make sure, therefore, that the drivers will work in as many systems as possible without needing changes. This helps guarantee the best possibility for the range to have a similar sound signature.

**In a newly proposed model line like Debut, do you decide and commit to the specs for the largest model first and scale the line down from there, or start with the smallest and scale up? Or, does it happen more organically than that?**

I always start with the smallest first, if only because they are the easiest! It gives me an initial confidence boost that hopefully is not dashed as I begin work on the bigger ones. It all starts with the driver development. That sets the capability of the sound of the systems. Having developed the drivers then I can begin the work of blending them together into a system. The trick is getting the big system to sound as near identical as possible to the small system, just with more "more" to it. I came up witha neat concept for the crossover in the F5 that helps tremendously in this goal.

**How much personal listening and voicing went into the Debut Series?**

I have often said that 80% of the design work is done before listening. This, of course, is because of years of experience in designing and listening, so that I know what to look for in the initial design goals. However, in some respects the final listening is the most difficult, as so many extra variables come into play. These include the room in which I am listening, the music and recording quality and provenance of it, the choice of equipment I choose to partner with the speakers, and of course deciding on what should be my target sound. It's surprising how long I debated, for example, over the tweeter level choice; 0.5dB variation mattered to me in the final voicing. So the listening can take quite some time, and is of course critical in the final process, but there is an awful lot of work that precedes it.

**Are two-ways more difficult to design and voice than three-ways?**

I see that my words of "the best two-way speaker is a three-way" are coming back to haunt me. My answer is yes, it is more difficult to design a two-way, especially a low-cost two-way. Blending becomes more difficult because the drivers have to work over a wider range and so are more internally compromised. At entry-level prices, I don't have access to parts and technologies that help so much to ameliorate this transition, so I have to spend a lot of time determining how to design the parts with minimum added cost to best achieve my goals.

**What is the most important area to get "right " in a budget loudspeaker?**

My colleague and product planner Chris would say "cost and timing!" My answer would be balance. Balance in performance across the range. Budget speakers have to appeal to a large audience. It's no good just getting the midrange "right" for vocals, for example. That will appeal to only a subset of listeners. At the same time, the loudspeaker must perform beyond expectation. At these price points, audiophiles are not necessarily purchasing for themselves, but are also recommending to others. I want those new listeners to be surprised when they listen.

**What particular failing spells certain death for a budget loudspeaker?**

I would say a hyped balance that is used to impress at the initial auditioning, especially in a situation where you can switch between different speakers. It might help in the initial sale, but once you listen at home you will quickly tire of the sound and then return the speaker to the store. That hurts long-term sales and profitability for both the store and the manufacturer, and ruins any reputation that the manufacturer is trying to build.

**You're celebrated for your coincident driver designs but they're more costly. Are there techniques you use to emulate that high level of performance in a budget product?**

Coincident drivers primarily help with driver integration and improved off-axis performance. One of the ways this happens is by the cone acting as a waveguide for the tweeter to control its directivity. In a non-coincident speaker this can be done by mounting the tweeter into its own waveguide. Doing so controls the directivity, improves its efficiency, and allows the tweeter to work lower in frequency with reduced distortion. tas

# Equipment Report

## KEF LS50

### Star Power

Neil Gader

**Some speakers sure know** how to make an entrance. They just have a presence when you first encounter them. I know that's how I felt when I crossed paths with the KEF LS50 a few months ago. At a glance, this two-way bass-reflex compact looks like little more than a stout box-speaker from an indeterminate era—as simple as it gets. But then you realize you can't take your eyes off it. Designed to celebrate KEF's 50th anniversary, it tips its hat to the BBC monitors of the 70s. But the LS50 is not an exercise in nostalgia. It bears zero resemblance inside or out to the birch-ply two-ways of that era—popularized by Spendor, Rogers, Harbeth, and, of course, KEF.

Beyond its modest silhouette, KEF has designed the LS50 with enough innovations to stuff a *piñata*. It's visually striking with its high-gloss finish and the KEF logo discreetly etched onto a corner of the top panel. The pink-gold (a nice 50th Anniversary touch) diaphragm of the Uni-Q driver is a pure KEF-designed coaxial unit and the star of its current generation of speakers. Bearing little relation to the deep-throated coaxials of yesteryear, KEF's latest-generation coincident was designed particularly for the LS50. It's positioned dead center in a radically curved one-piece front baffle—an incredibly dense, plastic compound which tapers to softly rounded edges.

According to the design team, the 5.25" magnesium-aluminum alloy midrange driver uses a mechanism to damp diaphragm resonances, so the usual peak in response common to metal cones is ameliorated. According to KEF, the now-familiar "tangerine" waveguide uses radial air channels to produce spherical waves up to the highest frequencies—and this allows a deeper "stiffened dome" diaphragm that raises the first resonance, culminating in response that extends beyond 40kHz. Collectively these technologies ensure wide and even dispersion without interference between drivers.

Despite the LS50's obvious physical differences from the Blade, these speakers have much in common. KEF has applied many of the same engineering principles for coincident-driver technology, internal damping, and innovative baffle design. The unique curvature and composition of the baffle is directly related to the Blade project and is designed to mitigate diffraction effects and spurious reflections—keys to good soundstaging and imaging. The

# Equipment Report KEF LS50

elliptical reflex port is offset in an upper corner of the rear panel. Its profile reduces high-level turbulence—sources of compression and distortion. The ribbing associated with the Z-Flex surround ensures that the surround does not cause any excessive discontinuity for sounds radiated from the high-frequency driver.

The enclosure, including baffle, is as non-resonant as I've experienced at this level. Cabinet construction is all MDF, but KEF analysis has optimized placement of the internal bracing. Add to that the constrained-layer damping placed between the internal bracing struts and the inner walls of the cabinet, and the term "acoustically dead" has rarely been more applicable.

When sizing up the potential of a coincident-driver eleven-inch cube like the LS50, one might assume that it would likely be a "voice" speaker—something more akin to a bridge monitor with distinct, perhaps even serious, wideband limitations. But this isn't the case. Even under levels of dynamic stress that would send a lot of other mini-monitors heading for the hills, the LS50's output is remarkably even. It hardly flinches, even when it's pushed hard. This is impressive, but high output alone is not much of a trick for small speakers nowadays. What is much rarer is high output with linearity and extension.

Sonically the LS50 doesn't suggest the lighter, faster, and edgier personality of the average compact with a five-incher for a driver. This is an essentially neutral monitor throughout the midrange. But there's also a prevailing sweetness, a harmonic saturation that lends it a dark, velvety overall character, and a bloom that is so pleasing that I began affectionately dubbing it the butterscotch sundae of small monitors.

When listening to a variety of symphonic music I noted image focus was excellent, as I'd expected from a coincident driver. But it's not hyper-focused. It provides a more spacious, open, and, in my view, authentic representation of an orchestra. Yes, the LS50 has quick transient reflexes, but that is not what grabbed my attention. Rather, it was its bloom and tonal weight. Heavens to Betsy, this little speaker has guts. As I listened to the Rutter Requiem [Reference Recordings], overflowing with the huge Turtle Creek Chorale and the massive voice of the pipe organ, the LS50 supplied a rich impression of large-speaker grandeur (although somewhat scaled back) as it energized the room with ambience and provided the illusion of the walls fading away as the musicians begin to materialize.

The mid- and upper-treble range is smooth; the sibilance region is controlled—crisp and clean, but with compliance. As I listened to the Bryn Terfel and Renée Fleming duet on "Not While I'm Around" from *Under the Stars* [Decca], I felt the physical presence of these superb singers, their voices seamlessly expressed. Their images were pitched slightly forward, but only enough to grab your attention and not enough to overwhelm or minimize the musical accompaniment. There is probably a hint of energy fall-off in the presence range, which, when combined with the heavier low end, adds a darker hue to vocals and ever so slightly rounds the edges from peakier recordings. As I listened to Leonard Cohen's "Darkness" from *Old Ideas* [Sony], I keyed on Cohen's voice, whose deep, tired, full-chested character seems dredged from the bottom of an old whisky barrel. Here it sounded even darker than usual, as if it had further sunk into his chest.

Ultimately, when pressed at higher volumes, the LS50 will give away some of the finer low-level details. I felt that during the Bach Toccata in C [RCA], Kissin's piano sounded slightly dampened during high-pursuit lines. As Kissin's left hand descended into the lower octaves there was a trace of soundboard plumminess that suggested the presence of a hard-working port. As with the Leonard Cohen example, the 12-string guitar that ushers in "All Things Must Pass" from *Concert for George* receded slightly in the mix, and during Jen Chapin's *ReVisions* [Chesky] baritone sax and acoustic bass shed some weight and developed a more strictly midband character.

The heretic in me should add that owing to the wide dynamic and spectral envelope of the LS50, it's a very satisfying companion when pressed into home-theater mode. I tend to break in speakers with all kinds of material, so if there's a Blu-ray movie I've been angling to watch, whatever speaker I happen to be running-in will be pressed into duty. In this case, the soundtrack to Wes Anderson's *Moonrise Kingdom*, which features Benjamin Britten pieces and Britten-inspired pieces from Alexander Desplat and Devo's Mark Mothersbaugh, and further contributions from Leonard Bernstein among others, proved to be a lush romantic workout for the KEFs, with terrific orchestral and percussive selections that exploited the speaker's dynamic range and vivid timbral colors. Not to mention excellent dialogue intelligibility, with no subwoofer or center channel required. Throw anything at it, the LS50 takes on all comers.

The LS50 is tuned for smaller rooms and is meant to take advantage of the room gain that can give midbass response a boost. However, there are always exceptions, and KEF provides elliptically sculpted foam plugs that are effective in reducing bass output a few decibels. These can be helpful in troublesome situations where the speaker setup is optimized for soundstage and imaging but where the room itself is over-boosting LF output, thickening the bass and thus masking details in key regions of the frequency spectrum.

The KEF LS50 is one of the most all-around-satisfying little speakers I've reviewed in some time. Construction and execution are exemplary. It delivers the kind of performance that deserves to be on a Wheaties box. And there's an incalculable coolness factor that makes it a breath of fresh air. The LS50 also answers the classic question, "Who says you can't teach an old box new tricks?" tas

## SPECS & PRICING

**Type:** Two-way bass-reflex mini-monitor
**Drivers:** Uni-Q array, 1" tweeter, 5.25" mid/bass
**Frequency response:** 79Hz–28kHz (47Hz-45kHz, -6dB)
**Nominal Impedance:** 8 ohms
**Sensitivity:** 85dB
**Dimensions:** 11.9" x 7.9" x 10.9"
**Weight:** 15.8 lbs.
**Price:** $1500

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# Equipment Report

## GoldenEar Triton Five

### Must-Audition

Jacob Heilbrunn

**In Greek mythology, the demigod** Triton is a creature of the depths who carries a trident. Half-man, half-fish, he resides in a golden palace at the bottom of the sea. But perhaps his most distinguishing characteristic is his ability to blow vigorously into a twisted conch shell to calm or rouse the waves.

So Triton is a fitting name for legendary manufacturer Sandy Gross' latest loudspeaker, the GoldenEar Triton Five. Much like the Greek god of yore, this GoldenEar speaker, roughly in the middle of the marque's lineup, has the ability to create upheaval or calm within the space of a few seconds. Connect speaker cables to it, hit play, and you have a rather formidable beast playing at musical levels far beyond its very modest (by high-end standards) price. Indeed, install it in a system like mine, where much of the equipment is considerably more costly, and it more than holds its own in both musicality and sheer output.

These speakers, in other words, can rock, which is what they did when I put the pedal to the metal with a rare first pressing (courtesy of a magnanimous friend) of Led Zeppelin II, an LP released by Atlantic in April 1969. "Whole Lotta Love" had a whole lotta impact through the Tritons, with drum whacks whizzing through the air, fronted by electric guitar solos and various sound effects. Is it beneficial for your ears to listen at such levels? Of course not. So I cooled it fairly soon. But still, even if such SPLs would give Gross himself heartburn, the inner audio devil in me couldn't resist seeing if the Triton Fives really have what it takes to peel out. They did, and do.

The Triton Five features an abundance of noteworthy drivers—one of the keys to its projection of a luscious and bountiful soundstage. For instance, its four side-mounted, sub-bass radiators are designed to deliver subwoofer bass without the need to employ an active sub, helping the Five to deliver a spacious sound—and setting it apart from most other speakers in the Triton line. They're also positioned close to the floor to maximize low-end impact. (More on the bass to come.) At the other end of the frequency spectrum, the Five's tweeter features what the company calls a High Velocity Ribbon Driver (akin to the Heil air-motion transformer), which is designed to pressurize the air rather than pushing it back and forth, thus providing superior impedance matching. The Triton's two 6" mid/bass drivers are also special—made from a formulated polypropylene cone material combined with a unique apical glue-bonding technique. Throw in nonparallel enclosure walls, a

# Equipment Report GoldenEar Triton Five

sleek front panel, and a decidedly elegant black finish (on the review pair submitted to me), and you have a winning loudspeaker.

Once again, I have to confess that, as was the case with some of the more economically priced equipment that's been in for review lately, I wasn't quite sure what to expect from these Triton Fives. The last time I listened extensively to a speaker in this price range was when I owned the Snell E/IV well over a decade ago. The Snells provided me with plenty of listening pleasure, and I recall them fondly to this day. But they had limitations that became more obvious as time went on. At the time, the Snells, a Conrad-Johnson preamplifier and amplifier, and a Linn turntable were at the extreme of what I could afford—and were what amounted to my audio gateway drug leading to the Magnepan 3.7 and then the 20.1 loudspeaker, Classé amplifiers, and so on. So listening to the Fives not only brought me full circle, but also provided a chance to see how much progress has been made in loudspeaker design in what amounts to an entry-level, full-range, high-end transducer.

What did I notice first? The Triton's coherence was obvious, and its treble capabilities and integration were striking. Every time I go to listen to a live orchestra I'm reminded of the degree to which audiophiles often seek out what they view as airy, extended top octaves, which is fine and dandy, but which can get confused with an artificially sparkly sound. That's not what the Five produces. If anything, the speaker's overall presentation landed somewhere on the darker side, particularly in the treble region. On a wonderful Carlos Kleiber live recording of the Vienna Philharmonic playing Strauss waltzes, for example, I was struck by the suppleness of the strings on "Accelerations." I was consistently impressed by the smoothness and silkiness of the Triton's tweeter; there was no etch, no glare, no trace of the digital nasties.

The soundstage was also surprisingly focused. On the Kleiber recording, bass drum whacks were clearly defined in the rear of the hall, with plenty of air surrounding flutes and the various other sections of the orchestra. Another example: The recent Anderson & Roe piano duo CD *The Art of Bach*, released by Steinway & Sons, features creative and innovative arrangements that delve into Bach's compositions in new ways. Once again, soundstaging and imaging were spot-on. The two pianos were precisely delineated, making it easy not only to follow where they were positioned relative to one another, but also to distinguish their intricate counterpoint.

The Triton Fives boast an excellent jump factor—they're quite fast. I've become increasingly aware that speed is crucial to dynamics. It isn't just the sheer wattage of an amplifier, but also the overall transient response of the entire system that can add to or detract from verisimilitude. For instance, I was somewhat taken aback by the sheer propulsive energy and thwack of the Fives on the CD *Count Basie Remembered* [Nagel Heyer Records] by The New York Allstars, which was recorded live in Hamburg before an enthusiastic audience. The ensemble certainly sounded all-star. On the cut "Swingin' the Blues," the band simply exploded out of these transducers. Joe Acione's drumming came through brilliantly as did a lusty trombone solo by Dan Barrett, both delivered through the Triton Fives with snap and precision.

What about the bass? It proved to be these Tritons' weakest point. I'm not saying the low end was anemic, just that it's not quite as good as the mids and highs, which are stellar. The Tritons go fairly deep but their bass response isn't—to borrow a marvelous term recently used by my TAS colleague Neil Gader in reviewing Kharma loudspeakers—saturnine. But this really shouldn't come as a surprise. Accurate, extrended bass costs the most money in any loudspeaker. And while the Tritons' mids were creamy and full, and its treble region extremely accurate—you could hear performers talking or singing with great clarity—the deep bass was just a little bit murky by comparison.

Still, when you contemplate everything that this loudspeaker does do well—gorgeously prismatic tonal color, dynamic alacrity, and a beautifully lissome treble—then it becomes hard to quibble about the Fives. Ultimately, among its other attributes, the Fives' ability to convey a direct emotional connection with the music is what makes it such an engaging product. On Christian McBride's album *Out Here*, the Tritons conveyed the soulfulness of the song "I Have Dreamed" in a simply mesmerizing way. The cymbal seemed to float into the ether, while the piano swells rolled on and on.

With its knack for playing a wide gamut of music convincingly, the Fives offer a tremendous amount of performance for the dough. After my foray into Led Zep territory, Sandy Gross was worried that I might prematurely terminate my listening sessions by destroying his speakers—or sink into pure headbanging. Not a chance. I enjoyed hour after hour of satisfying listening. I know that these speakers will appeal to a lot of audiophiles, but I can't help hoping that they will also entice anyone (like me all those years ago) who might be looking for a reasonably priced first speaker. In sum, Sandy Gross has hit another homerun. For anyone considering a loudspeaker under $10,000, the Triton Five isn't just an option. It's a must-audition. tas

## SPECS & PRICING

**Driver complement:** Two 6" high-definition cast-basket mid/bass drivers, four 8" planar sub-bass radiators; one HVFR (high-velocity folded ribbon) tweeter
**Frequency response:** 26Hz–35kHz
**Sensitivity:** 90dB
**Nominal impedance:** 8 ohms
**Dimensions:** 8 1/8" (rear) x 12 3/8" x 44 1/4"
**Weight:** 40 lbs.
**Price:** $1998/pr.

**GOLDENEAR TECHNOLOGY**
P.O. Box 141
Stevenson, MD 21153
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goldenear.com

**ASSOCIATED EQUIPMENT**
dCS Vivaldi CD/SACD playback system, Continuum Caliburn turntable with two Cobra tonearms, Lyra Atlas and Miyajima mono Zero cartridges, Ypsilon VPS-100 phonostage, PST-100 Mk 2 preamplifier, and SET 100 monoblock amplifiers, Transparent Opus and Nordost Odin cabling, and Stillpoints Ultra 5 isolation footers

# Equipment Report

## MartinLogan Motion 35XT

### Sweet and Lowdown

Neil Gader



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

The Motion 35XT is a two-way design in a bass-reflex enclosure with a rear-firing port. It's one of two stand-mount speaker options in ML's Motion Series, a "mix and match" collection that also includes three XT floorstanders, a pair of center channels, plus designer FX models, ultra-slim XL models, and even a sound bar, for goodness sake. The one common thread this broad lineup shares is ML's Folded Motion Tweeter—a fairly esoteric transducer in this modest price range but a not entirely surprising feature given that MartinLogan built its reputation on exotic electrostatic designs that harken back to the original full-range CLS from 1986. In many ways the Folded Motion driver is derivative of the classic Heil Air Motion Transformer wherein an ultra-low-mass diaphragm (4.5" x 2.75") is pleated, accordion-style, embossed with a conductor, and suspended in a magnetic field. The diaphragm squeezes the air along the pleats or "folds" and, voila, music. Its virtues are its extremely low mass, tiny excursions, and large radiating surface. MartinLogan has used this design on previous models, but this new generation boasts a 40% larger diaphragm area. The three XT models (35XT, 50XT, and 60XT) feature this new, larger-diaphragm tweeter; the other four Motion models use the standard Folded Motion driver.

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

The enclosure is a stout construction of ¾-inch MDF; its top panel is raked gently front-to-back presenting a non-parallel surface meant to reduce resonances and internal standing waves. The Motion 35XT is nicely detailed and richly finished in deep gloss—a clear step up from the typical bookshelf. Other features include ML's signature perforated steel grille, which attaches magnetically, and dual custom-angled, 5-way, tool-less binding posts for connection versatility.

The sonic character of the 35XT is first and foremost, refined. And like any contemporary small monitor worth its salt, the 35XT man-

# Equipment Report MartinLogan Motion 35XT

ages to vanish within the soundspace with ease. It has a smooth, neutral to neutral/light character not untypical of compacts that tout a single, smallish, mid/bass transducer and restricted internal volume. But it's not an edgy cold signature, which is often the case. There is a relaxed quality to the 35XT that takes a natural acoustic recording like Stravinsky's *Pulcinella* and delivers wind sections and upper strings with sweetness and openness. Transients, low-level resolution, and micro-dynamics are likewise also very good—I always listen for the soft tapping of the keys of the oboe midway through this ballet. The 35XT never missed a cue. The result of ML's efforts are treble octaves that possess an expansive yet precise sound that delivers images with air and substance—a realistic effect that isn't normally captured by a typical dome tweeter, but clearly is by MartinLogan's Folded Motion design. In many ways, solo images have some of the same freely suspended openness and sparkling character that I typically associate with Maggies and Quads, although on a more restricted basis with the 35XT. When I listened to Glinka's song *The Lark*, arranged for piano, the transmission of sound was almost frictionless, with free-flowing, fluttering keyboard trills and little to no smearing.

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

Imaging, on the other hand, was exceptional; the kaleidoscope of panned vocals and images zipping across the soundstage from Yes' "Owner of a Lonely Heart" and "It Can Happen" were startling in their movement and clarity. Soundstage dimensionality—at least laterally—was well resolved, but depth was a little lacking. The speaker has a tendency to emphasize and press forward a recording's backgrounds—for example, the backing singers, principally Michael McDonald harmonizing behind Steely Dan's Donald Fagen during "Hey Nineteen." Similarly the vast ambience and the depth of the soprano soloist within the Turtle Creek Chorale on the Rutter *Requiem* were not fully revealed; rather everything was pressed forward and flattened slightly.

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

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

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

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

## SPECS & PRICING

**Type:** Two-way, bass-reflex, hybrid ribbon/cone, stand-mount loudspeaker
**Frequency response:** 50Hz–25kHz +/-3dB
**Drivers:** Folded Motion XT Tweeter (4.5" x 2.75" diaphragm), 6" aluminum mid-bass
**Sensitivity:** 92dB @ 2.83 volts/meter
**Impedance:** 4 ohms
**Dimensions:** 13.5" x 7.6" x 11.8"
**Weight:** 18.5 lbs.
**Price:** $1299/pr.

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

# Equipment Report

## Audience ClairAudient 1+1 V2+

### A Class-Leading Compact

Robert Harley


**As enthusiastic as I've been** about Audience's tiny ClairAudient 1+1 V2+ speaker, I'm afraid that I've done the product a disservice. All my references to it have described it as a "desktop" speaker, and that's where it's been categorized in the Editors' Choice Awards and our annual Buyer's Guide. I think of the 1+1 V2+ that way because a pair of them is right in front of me every day, one on either side of my computer monitor. In fact, I spend more time listening to the 1+1 V2+ than I do to my main system (ah, the downside of being the editor).

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

The improvement to the revised speaker was immediately apparent as more weight and body in the mid and upper bass. On Brad Mehldau's piano on the superb *Blues and Ballads*, the new speaker had greater solidity to left-hand lines, and the piano lost its thin "tinkly" quality. The bass was fuller and richer, better conveying rhythmic drive. The improved bass performance created a more solid tonal foundation for the music. This impression was even more apparent when I got the 1+1 V2+ back to my desktop where the desk's surface helped reinforce the bottom end. The bass is full enough that I wouldn't consider adding a subwoofer.

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

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

Although the bass response is understandably

# Equipment Report Audience ClairAudient 1+1 V2+

## A Most Unusual Design

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

limited, the entire range from the lower mids through the uppermost treble was extremely clean, transparent, and pure. Vocals were particularly well served by the crossoverless design, seeming to hang in space with life and palpability. Many five-figure speakers aren't this transparent and immediate through the mids. Surprisingly for a one-way speaker, the top treble had plenty of energy and sparkle. Incidentally, I know someone who sold his Quad 57s and now listens to the 1+1 V2+ as his main speaker.

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

### SPECS & PRICING

**Impedance:** 8 ohms
**Sensitivity:** 84dB/1W
**Maximum RMS continuous output per pair:** 104dB
**Maximum RMS continuous power per speaker:** 45 watts
**Price:** $2345

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# Equipment Report

## JL Audio E-Sub e110 Subwoofer

### Old Dog, New Trick

Jonathan Valin

**It is no secret that I'm not** a fan of subwoofers. In my experience they take away more in transparency and coherence than they pay back in low-end extension and power-handling, especially when they are mated to bass-shy two-ways or any kind of planar, 'stat, ribbon, or quasi-ribbon. (Ironically, subwoofers work best—or at least better—with speakers that don't really need them, i.e., with dynamic speakers that already have good bass extension.) Thus, it may come as a surprise to learn that I really like JLAudio's e110 sub, even when it is paired with a two-way. It certainly came as a surprise to me.

The e110's price tag may also come as a surprise—$1500 in what JL calls its "black ash" finish, and $1700 in the gloss-black version sent to me. This isn't exactly cheap for a single ten-inch driver in a small (13.5" x 14.25" x 16.5"), hefty (53-pound), sturdy box, but it isn't Thor's Hammer or JL Audio Gotham (or even REL Series R) territory, either.

What you get for that grand-and-a-half is a highly engineered loudspeaker that incorporates many of the patented Finite Element Analysis-based technologies that JL Audio has been introducing since 1997—such as its Dynamic Motor Analysis program for computer-optimizing driver design, its Vented Reinforcement Collar driver-mount system, its Floating Cone Attachment method of driver construction, and its Engineered Lead-Wire System for internal wiring. You also get a built-in, proprietary Class D amplifier (powered by a proprietary switch-mode power supply) said to be capable of 1200W RMS; a genuine two-way (high-pass and low-pass), built-in, active crossover using a fourth-order (24dB/octave, 80dB/decade) Linkwitz-Riley filter, equipped with variable gain, variable crossover-frequency, and variable phase controls, as well as a polarity (absolute-phase) switch; a ten-inch JL Audio woofer with dual spiders and a linear motor system engineered to provide equal force over the driver's entire excursion range (with both positive and negative current flowing through the coils) at any applied power level up to the built-in amp's peak; and a sealed box whose entire front panel is actually the steel mounting flange of the E-Sub's driver assembly (the back plate of the driver is threaded and bolted to the thick rear wall of the enclosure). In sum, the e110 represents a lot of technology for the money.

# Equipment Report JL Audio e110 Subwoofer

As anyone who's fiddled with subs knows, set-up is at least half the battle when it comes to getting the most out of a subwoofed system, and I can honestly say that JL Audio (for whom subwoofers are a long-time labor of love) provides some of the sanest instructions and most useful tools for optimizing its subs I've seen—provided that you first acquire the right software. That software, which was sent to me separately by JL Audio (it doesn't come with the sub—and I think it should), is the Soundoctor Test CD V 2.6.1, available (for $18) on-line at http://www.soundoctor.com/testcd/index.htm.

Without this CD (or something similar) you will just be making educated guesses when it comes to certain key adjustments, which means, of course, that you will be haunted by second and third guesses since you'll never be quite sure whether your first guess was "right." With the Soundoctor CD (and the Radio Shack SPL meter for which it is optimized) you can dial certain parameters in with confidence, giving you a "textbook accurate" baseline, from which you can depart or to which you can return as you season the sound—and you will season the sound—by ear.

The first step in the set-up process is finding the spots where the subs are happiest in your listening room. What JL and Soundoctor suggest is to place one sub at your listening position, facing forward, then plug a CD player directly into the sub's RCA inputs (using the CD player's analog outputs), and play back Tracks 22, 23, and 24 of the Soundoctor CD, which contain music with very deep bass. As these tracks are playing, you crawl around the perimeter of your room listening for those areas where the bass sounds weak and thin or those where it sounds boomy and ill-defined (usually in the corners). According to JL, you should also find certain spots where the porridge is just right, and these are where the subs go.

To be honest, this "crawl-around" method is rather hit-and-miss. It also assumes that the subs will sound better somewhere along the perimeters of the room, which hasn't always been the case in my experience. Typically, I've found that for the transparency and coherence I prefer (as opposed to ultimate slam and extension) subs fare better close by the main speakers, immediately to the outside or the inside (or both, as explained in the sidebar) of the speakers' enclosure and roughly parallel to their drivers, although the subs' exact location vis-à-vis the mains and the sidewalls needs to be adjusted by ear.

Far more hit than miss are JL's suggestions for getting the subs and the mains in phase. A subwoofer's phase control is intended to adjust the "arrival time" of the sub's output so that its driver and the main speaker's woofer or mid/woofer or bass panel are pushing and pulling together throughout the frequency range covered by both units. The question is how can you tell when the drivers of both speakers are in maximum sync? With the appropriate tracks on the Soundoctor CD and the e110's continuously adjustable phase control, finding the answer to this often-perplexing question is a snap.

For the record, JL Audio recommends the same method that Robert Harley recommends in The Complete Guide to High-End Audio: Reversing polarity on the main speakers, playing a test tone at the crossover frequency (Tracks 2 through 17 on the Soundoctor CD give you one-minute test tones ranging from 20Hz to 120Hz at 5Hz and 10Hz intervals), and adjusting the continuously variable phase control for the least amount of bass. As Robert explains it: "The technique works because it's easier to hear the maximum null than it is to hear the maximum peak. When the phase control is set perfectly, the main speaker's woofers will move out when the subwoofer cone is moving in, cancelling each other. When the main speaker's correct polarity is restored, the main speakers and the subwoofer are maximally in-phase."

Similarly the sub's volume level can be optimally set by playing back Tracks 18 and 19 on the

## SPECS & PRICING

**Enclosure type:** Sealed
**Driver:** 10"
**Effective piston area:** 58.78 square inches
**Effective displacement:** 131 cubic inches
**Frequency response (anechoic):** 25–116Hz +/-1.5dB, -3dB at 23Hz, -10dB at 18Hz
**Amplifier power:** 1200 W RMS (short-term)
**Dimensions:** 13.5" x 14.24" x 16.51"
**Weight:** 52.7 lbs.
**Price:** $1500 in ash, $1700 in gloss

**JL AUDIO, INC.**
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**JV's Reference System**
**Loudspeakers:** Raidho D-5, Raidho D-1, Estelon X Diamond, MartinLogan CLX, Magnepan 1.7, Magnepan 3.7, Magnepan 20.7
**Linestage preamps:** Soulution 520, Constellation Virgo, Audio Research Reference 10, Siltech SAGA System C1, Zanden 3100
**Phonostage preamps:** Audio Research Corporation Reference Phono 10, Innovative Cohesion Engineering Raptor, Soulution 520, Zanden 120, Constellation Perseus
**Power amplifiers:** Soulution 501 and 701, Siltech SAGA System V1/P1, Audio Research Reference 250, Lamm ML2.2, Zanden 8120
**Analog source:** Walker Audio Proscenium Black Diamond Mk V record player, AMG Viella 12
**Phono cartridges:** Clearaudio Goldfinger Statement, Ortofon MC A90, Ortofon MC Anna
**Digital source:** Berkeley Alpha DAC 2
**Cable and interconnect:** Synergistic Research Galileo and Galileo LE, Crystal Cable Absolute Dream
**Power Cords:** Synergistic Research Galileo LE, Crystal Cable Absolute Dream
**Power Conditioner:** Synergistics Research Power Cell 10 SE Mk III, Synergistic Research Transporter Ultra SE, Technical Brain
**Accessories:** Synergistic ART system, Shakti Hallographs (6), A/V Room Services Metu panels and traps, ASC Tube Traps, Critical Mass MAXXUM equipment and amp stands, Symposium Isis and Ultra equipment platforms, Symposium Rollerblocks and Fat Padz, Walker Prologue Reference equipment and amp stands, Walker Valid Points and Resonance Control discs, Clearaudio Double Matrix SE record cleaner, HiFi-Tuning silver/gold fuses

# Equipment Report JL Audio e110 Subwoofer

Soundoctor CD. Track 18 contains "contoured" high-frequency noise (i.e., a test signal with no low-frequency information that has been contoured for the Radio Shack SPL meter). What you do is adjust the volume of your preamp so that your Radio Shack meter reads 85dB (slow, C-weighted) while Track 18 is playing. Track 19 contains "contoured" low-frequency noise (i.e., a test signal with only low-frequency information that has also been contoured for the Radio Shack SPL meter). Playing this track back, you adjust the level control on the e110 subwoofer so that your meter once again reads 85dB SPL (slow, C-weighted). In theory, your e110 subs are now matched in level with your main speakers.

Of course, this doesn't mean that your system will sound as coherent or as transparent as it does without subwoofers—or that the sub's level will not need further tweaking by ear. Getting a relatively seamless blend and tight, powerful, high-resolution, high-definition bass depends on several other equally important factors: the crossover frequency that you choose between subs and mains, the quality of the subwoofer itself (including its amp, controls, and crossover), and above all else your own listening preferences.

The question of crossover frequency is hotly debated. JL Audio recommends that crossover be set at 80Hz or higher, regardless of main speaker. And it is true that setting the sub at a higher crossover frequency can make for a more seamless sound. Alas, it can also make for a substantially different sound than what you're used to from your main speakers alone.

Let's face it: You've spent a lot of time and a lot of money on your loudspeakers. Presumably, you picked them from a myriad of others because you prefer the way they sound on the music you typically listen to. This doesn't mean, of course, that you think they are perfect. (Or why opt for subwoofers?) What it does mean, I think, is that their essential qualities satisfy you—that you are pleased with what we used to call, in The HP Era, their "character."

There is no surer-fire way of changing a loudspeaker's character than crossing it over to a powered subwoofer at too high a frequency. With first- or second-order crossovers the problem is generally that the subs continue to play (albeit at reduced levels) into the power range and the midrange, audibly masking the very qualities of timbre, resolution, speed, and dynamic nuance that led you to buy your main speakers in the first place. With steeper crossover slopes, such as the 24dB/octave


Linkwitz-Riley filters in the e110's crossover, this should be less of a problem. (The theoretical advantage of fourth-order Linkwitz-Riley filters is that because of their steep roll-off at the high and low cutoff frequencies their gain at crossover is closer to 0dB.) And yet...crossing the e110s over at 80Hz or higher isn't less of a problem. Here it's not so much that the sub is still playing beyond the crossover point, masking the main speaker's virtues; rather it's that the sub's own character (including the character of its amplifier and crossover) becomes more audible and predominant the higher up you cross it over, since the sub is literally playing more of the music.

Many people don't seem to be as sensitive to this "change of sonic character" as I am, and can live happily with the added bass-range power and extension (and concomitant added breadth and width of soundstage) at what they presumably consider a reasonable cost in tonality and transparency. Speaking for myself, I would far rather live without the deepest bass than audibly sacrifice the characteristic sound of my main speakers.

For me, then, the secret to subwoofer satisfaction is to find a way to cross the subs over that doesn't markedly change the character of the main speakers—or that changes it only in the sense of extending its virtues into the bottom octaves. With the e110s this means a lower crossover point (lower than 80Hz).

Although the speaker that I am using with the e110—Raidho's superb stand-mounted D-1 (review forthcoming, recommendation already the highest)—is a two-way, it has remarkably satisfying mid-to-upper bass. Flattish down to the 50Hz–55Hz range its ported 4.5" mid/bass driver (which uses a diamond diaphragm) manages to give the psychoacoustic impression of going lower than it does because of its naturally full and high-resolution reproduction of the power range, where first and second harmonics live (as do a whole lot of fundamentals).

Because the D-1 doesn't really cry out for a subwoofer and because I simply love the beautiful and lifelike way it sounds (which, reduced image size and dynamic power notwithstanding, comes very close to—and in certain respects exceeds—the sound of my reference Raidho C-4.1s), I picked it for this experiment, knowing full well that I would easily hear any changes in its character, and knowing, as well, that in the past I have not been able to mate super-high-resolution two-ways to subwoofers without substantial sonic penalties. And at a crossover point of 80Hz—with all other parameters (placement, phase, level) set to theoretical correctness (and then tweaked by ear to my own preference)—the changes in the Raidho's character were marked. Despite the much deeper, more generous bass, the D-1 simply no longer sounded like the speaker I'd fallen in love with.

However...moving the e110's crossover point down to 70Hz and subsequently to just below 60Hz, where the D-1 is still playing strongly, made for a blend that was so unexpectedly magical—and so much in character—that it was almost as if the D-1 had developed several more octaves of bass on its own.

At a crossover point of around 57–58Hz (this is an educated guess as the scale on the e110's crossover-frequency control, though graduated, isn't graduated finely enough to say for

# Equipment Report JL Audio e110 Subwoofer

sure), the bottom bass—and this little sub goes deep, down only 3dB at 23Hz—acquired the same tonal and dynamic character, the same dark, rich, lifelike timbre, sensational transient speed, and ultra-fine resolution of texture and articulation in the low bass that the D-1 has on its own in the mid-to-upper bass, power range, midrange, and treble. At the same time bottom-end pitch-definition, impact, and extension were dramatically improved.

It was as if (and I scarcely exaggerate) a blanket that had been thrown over the deepest bass octaves had suddenly been lifted, revealing an astonishing wealth of previously unheard information—and revealing it with a clarity and definition that I don't quite hear even with my reference Raidho C-4.1s (though, as you will see, there are other aspects of the bass that the C-4.1s are far better at reproducing).

I could give you musical example after example of the e110/D-1's virtues, but it is simpler to sum them up like this: In the bottom bass this combination reveals low-level details about pitch, timbre, intensity, and duration more clearly and more often than any loudspeaker I've heard, no matter how expensive or sophisticated. This is an ear- and mind-bogglingly high-resolution system. (It kind of makes me wonder what JL Audio's top-line sub—the $12k Gotham, with dual 13.5" woofs—is capable of, although, when it comes to matching the speed and resolution of a great two-way, there is something to be said for a "quick" ten-inch driver.)

While hearing a fresh bonanza of low-level information about an instrument and the way it is being played is enormously satisfying (and contributes greatly to the sense of being in the presence of that instrument), let me quickly point out that bass-range instruments in particular aren't just about texture and articulation. They are also about power and impact, and here the e110/D-1 combo is not the most revealing speaker system I've heard. To be fair, this isn't the e110's fault. A two-way—even a great one like the Raidho D-1—and a ten-inch sub simply can't move air in the bass and power range the way a big multiway can; nor can such a combo image with the more-lifelike size (particularly image height) of a big multiway.

There is this, as well. My decision to place the subs nearby the mains and to cross over at a lower-than-recommended frequency in order to more fully preserve the character of the D-1s comes with a slight additional price in imaging and power. With the reinforcement provided by a nearer-to-the-wall placement and a higher crossover point, the e110/D-1 seems to size bass instruments—indeed all instruments—more consistently from their top octaves to their bottom ones. With the closer-to-the-speaker positioning and lower crossover point, some instruments seem to shrink a bit in size as they descend in pitch, so that a four-string contrabass, for example, isn't as big and expansive sounding on its lowest notes (E1 and C1, 41Hz or circa 33Hz) as it is higher up in its frequency range.

This slight "funnel-like" effect in imaging is accompanied by a small loss of impact on big, powerful instruments and orchestral tuttis. I don't want to oversell this point. The e110/D-1 is plenty powerful, capable of genuine room-shaking temblors on really deep synth or bass drum, and punch-in-the-chest sock on toms or kickdrum. As two-way-based systems go, this one is a veritable dynamo. But...when it comes to pure wallop it ain't a Wilson XLF or a Magico Q7 or a Raidho D-5.

But then the Raidho D-1 and e110 subs don't cost what these giants cost, and don't take up the real estate that these giants do, and (if configured optimally—for which see the sidebar) don't give anything away in color, speed, definition, or resolution to the biggest of these Big Boys. For one-sixth (or less) of the system cost, you can live like a Robert Harley (or, yeah, like a Jonathan Valin)—with a loudspeaker that comes so close to the very best that you'll scarcely notice the difference. I scarcely do... and I do live like a Jonathan Valin.

The E-Sub e110 is a no-brainer highest recommendation if ever I heard one. And remember this is coming from someone who hates subwoofers (or used to). tas

## How Many Subs: One, Two, or...Four?

Unless you're restricted by budget or space, two woofers are the way to go. Though in the old days low bass was summed to mono on LPs, that isn't always the case with today's high-res sources (or with reissued stereo recordings from the so-called Golden Age). A single centrally located sub tends to "pull" bass-range instruments toward it, constricting soundstage breadth and changing the perceived location of instruments at the sides of the stage. For the widest and deepest soundfield and the most faithful-to-source imaging, two subs are definitely better than one.

However, there is a new wrinkle in low-bass management called "swarm" or "distributed bass" subwoofing. The logic behind the "swarm" is simple and elegant. With one or two subwoofers you are inevitably prisoner to the room-induced dips and peaks in response that (no matter how thoroughly you've "crawled around" the periphery of your listening space) accompany the locations you've finally settled on. But what if you were to add two or four more subwoofers (i.e., a swarm) to the original pair, asymmetrically positioning each sub throughout the room? Proponents of swarm subwoofing argue that the combined average of the different peaks and dips at the different locations of each sub will smooth out overall bass response. Voîlà: no giant mid-to-upper-bass humps, no need for digital signal correction.

Now I don't know whether this idea always works in practice as it should in theory, but I do know this: When I added a second pair of e110s to my setup (one on the outside of each D-1 and one on the inside at slightly different locations vis-à-vis the mains) I got even more fabulous sound. I'm not saying that you have to buy a second pair of e110s to get the exemplary sonics I talk about in this review. One pair will do quite nicely, thank you. But...if you want to carry this sub/satellite system even closer to the sound of those ultra-expensive Big Boys, a second pair of e110s will do the trick. JV

# Equipment Report

## Revel Concerta2 M16

### A Class-Leading Compact

Neil Gader

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

Visually the line has been refreshed and refined with smartly contoured enclosures, high-gloss finishes, and elegant design accents. There are no visible front baffle screws and hardware; the grilles are magnetically affixed. The flush-mounted drivers seamless fit into the front baffle. Similarly well finished is the spotless back panel that houses the rear port, along with a nicely inset board for the single-wire speaker terminals. Informed by Performa3 technology, upgrades and advances include the one-inch aluminum tweeter with an integral phase ring that is mated to a new, fourth-generation Acoustic Lens Waveguide. This apparently simple device optimizes the blend between the tweeter and woofers and improves off-axis performance over a wider listening area. The 6.5" mid/bass driver features an aluminum cone that minimizes distortion by improving rigidity without increasing mass. These improvements are designed to achieve the goal of ideal pistonic behavior across the frequency spectrum—the Holy Grail for cone transducers.

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

# Equipment Report Revel Concerta2 M16

in the M16's performance that helped express the tenderness and longing of Alison Krauss' "You're Just A Country Boy" within the intimacy of a live small-venue performance. Similarly, there was the distinctive metronomic strumming of a lone acoustic guitar during Rosanne Cash's "If I Was A Man" that (when the volume was dialed in just so) was eerily present in my listening room.

Revel doesn't design wallflowers that sonically shrink into the background, and the M16 followed suit with a certain forward swagger. Its midrange was tonally quite even but with an overlay of richness that was enhanced by the breadth of its nicely extended midbass, a difficult region for small monitors. Treble frequencies were also extended and detailed but did not possess quite the lightness, air, and bloom of the more sophisticated Performa3 tweeter. Still the M16's overall character came down on the warmer side of the tonal fence and steered clear of the lean, brittle signature of many small monitors.

Nor was this speaker a "special effects" product that tried to capture the ear with false tweeter detail or recessive midrange energy in an effort to enhance depth and dimensionality. I noted a minor boost in the sibilance range that added some juice to the lower treble harmonics of brass and wind instruments, but it was more a benign enhancement than an off-putting distraction. Transients were nicely portrayed—quick but not overly etched or prickly, and invariably coupled to the reality of a live performance.

The M16's low-frequency response floored me. It extended with confidence well into the midbass region of 50Hz or so. Allowing for room gain in my small listening space, there was easily perceivable output into the forty-cycle range. I could discern a little rise in the midbass region in my room setup that attached some big-speaker chestiness to baritone sax, acoustic bass, and male vocals but also shaded inner detail a smidge. However, the M16's pitch stability and dynamic energy provided a steady and heavy anchor to pop rhythm sections. These same attributes—which were plainly demonstrated during Fleetwood Mac's "Dreams" and "Gold Dust Woman"—will also appeal to rock music aficionados. Port noise, however, was very well controlled with virtually no overhang. And the cabinet imparted little in the way of colorations or the absorption of transient energy that can tend to slow or soften the snap of a performance.

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

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

However, there are distinctions. For example, during cellist Pieter Wispelwey's rendition of Bruch's *Kol Nidrei*, low-level edge detail softened slightly, with the proximity of instruments to one another less focused; in addition, the cello's attack off the bow lacked the last dollop of dynamic intensity. In sum, at two grand the Performa3 M106 does what it was meant to do, but at less than half the price the Concerta2 M16 can hold its head high in this more elite crowd.

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

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

A good part of this capability is owed to the speaker's excellent dispersion, à la the improved waveguide and Revel's general philosophy about optimizing in-room power response (a measurement that factors in both of off- and on -axis performance). In this aspect the M16 bears a striking resemblance to the Performa3. There's no beaminess. It's the antithesis of the authoritarian type of "sweet spot" that commands the listener to sit as still as a statue to glean the magic. And I didn't need to tilt, twist, or tweak them into hyper-specified positions. unlike most compacts. I just set them down and got out of the way.

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

## SPECS & PRICING

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

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# Equipment Report

## Micromega MySpeaker with MyAmp Inside

### MyLittle…MyEverything

Neil Gader


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

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

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

Today's wireless speakers are available in a wide array of configurations. For example, Dynaudio's Xeo series (see the Xeo 2 review in Issue 270) represents the fully wireless/actively powered school whereby only a pair of power

# Equipment Report Micromega MySpeaker with MyAmp

cords are required. On the other hand Audioengine's HD6 (Issue 262) installs most of the wireless connection electronics and amplification in one speaker that connects to the passive speaker with an umbilical cable. This latter approach, taken by Micromega with the MySpeaker, is less costly but has its own virtues including simplicity of set up. Another of these virtues is a rear-panel switch that allows you to choose left or right placement of the amplified speaker. This is a *huge* benefit during setup, making it easier to connect source components, or when there's only one awkwardly located AC outlet.

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


Convenience is a must with speakers of this segment, and the Micromega didn't disappoint. MySpeaker arrives packaged with a pre-stripped bare wire speaker umbilical to run between the multi-way terminals of the active and passive speakers. Once connected, double-check to make the sure the correct voltage (110V/220V) is selected. Then using the remote control, "pair" your phone or tablet via Bluetooth with MySpeaker. A blue LED flashes to indicate that MySpeaker is pairing with your device. Up to eight devices can be paired. Another nice feature: a rear-panel USB port for recharging handheld devices.

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

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

Bass response extended confidently into the fifty-cycle range with little apparent effort. As I listened to tracks from Ray Brown's *Soular Energy* and Jen Chapin's *ReVisions* I was able to follow acoustic bass lines with notable timbral accuracy, a tightly controlled attack, and a feeling of room-filling weight. Even big fanfare music like the National Symphonic Winds *Winds of War and Peace* didn't ruffle this game little speaker. Still, size matters. Although MySpeaker never shied away from higher sound-pressure levels, it ultimately revealed its econo-roots nature with a little bit of port overhang—a sensation of looseness and over-bloom in the midbass that could mask high-frequency detail. In most smaller settings however, MySpeaker could deliver more than enough low-end impact to satisfy all but the most sadistic head-bangers.

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

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

## SPECS & PRICING

**Type:** Two-way, powered compact, bass-reflex enclosure
**Drivers:** 1" tweeter, 5.25" driver
**Frequency response:** 50Hz–20kHz +/- 3dB
**Sensitivity (at 1W/1m):** 90dB
**Impedance:** 4 ohms
**Dimensions:** 12.4" x 7.5" x 12.5"
**Weight:** 25 lbs./pr.
**Power output:** 30Wpc into 8 ohms
**Price:** $999

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# Equipment Report

## Dynaudio Xeo 2 Wireless Loudspeaker

### To Wire or Not To Wire

Neil Gader


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

The $1500-per-pair Xeo 2 is a two-way, bass-reflex design. It stands a mere ten inches tall but exudes quality with flush-mounted drivers and clean design elements. It sports a 27mm soft dome tweeter and 14cm mid/bass driver that includes a rigid, one-piece, thermo-formed proprietary MSP (Magnesium Silicate Polymer) cone and an oversized 38mm pure aluminum voice coil. The crossover kicks in at 3.1kHz and employs a 24dB-per-octave slope. Dynaudio designs and makes it own drivers in-house in Denmark. In fact, Dynaudio is one of the world's largest manufacturers of high-quality drive units.

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

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

# Equipment Report Dynaudio Xeo 2 Wireless Loudspeaker

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

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

The sonic expectations for wireless speakers have risen considerably over the past few years. Latency issues, while still real, have been largely ameliorated. And it shows—the Xeo 2 performance was very stable with excellent throw distances and no signal drop-outs in my home, a personal first for a BT device. Part of this is due to Dynaudio's internal antenna. Dynaudio points out that many Bluetooth products include the antenna as an integrated part of the very small BT board. The Xeo 2 has the antenna integrated inside the Xeo 2 cabinet, but at a safe distance from the main electronics board and wiring.

Sonically, the Xeo 2 has a bold, confident voice that neither screams with treble lift nor shrinks into the background with midband suckouts. It's a midrange-centric sound that doesn't play favorites with male or female vocalists; it does justice to both, conveying intelligibility and a level of the tactile and physical underpinnings of the performance. There's a slight presence range dip but the impact on musicality was minor. It's a darker, warmer character overall, a more conservative balance, which is not necessarily a bad thing in a compact speaker. Small speakers often default towards rising top octaves that suggest detail of an order that never existed in the recording. On first listen this might get the speaker noticed but such hyper-detail and etching wear thin over the longer haul. Rather than drawing my attention to the tweeter, the Xeo 2 projected relatively smooth, coherent, energetic midrange dynamics, with a long-term listenability that prompted me to put iTunes on shuffle and let the music carry me away.

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

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

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

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

## SPECS & PRICING

**Type:** Active two-way, bass-reflex loudspeaker
**Driver complement:** 27mm tweeter, 14cm woofer
**Frequency response:** 40Hz–24kHz
**Weight:** 8.8 lbs.
**Dimensions:** 6.8" x 10" x 6"
**Price:** $1499 (white or black finish)

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# Equipment Report

## Elac Uni-Fi UB5

### Lightning Strikes Twice

Neil Gader


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

The UB5 is a stand-mounted compact with a bass-reflex design that uses a rear-firing dual-flared port. Just shy of thirteen inches tall, it's easily one of the smallest three-ways ever made and its compact size is almost entirely owed to the concentric driver's remarkable space-saving properties. Also known as a coincident (or archaically as a coaxial) driver, it's a sophisticated design that insets a one-inch soft-dome tweeter at the center of a four-inch aluminum midrange. Its crossover point is 2.7kHz. Also specially designed for the Uni-Fi line is the five-inch aluminum woofer. Apart from some minor trim changes, the UB5 is a near-spitting image of the B5 with some classy touches added, such as premium binding posts and the magnetically attached fabric grille. The result is a sturdy MDF-braced enclosure that adds a mere couple of inches in depth. Like the Debut line, it's nicely finished in black brushed vinyl.

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

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

Sonically, if you loved the B5—and any self-respecting audiophile should—you're gonna love the UB5 just a little more, and maybe a lot more. The UB5 is the B5 gone to finishing school. It boasts fewer box colorations and smoother,

# Equipment Report Elac Uni-Fi UB5

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

It was easy to appreciate how the UB5's dedicated woofer and concentric driver have been put to use. Two key issues stand out: The first was the point-source-like coherence that the coincident created. Because the coaxial arrangement creates a near-ideal time alignment, the experience is more akin to a single full-range driver with the benefit of the two transducers both operating within their specified frequency ranges; this can yield a significant improvement in output and dynamic payload, and with less distortion. Compared with the two-way B5, there's an added specificity, steadiness, and focus to images that are trademarks of the concentric driver. This tighter imaging allows vocalists an even more distinct stage presence that I find especially attractive. Add to that a sibilance range that was natural, sharp, and quick (as in life) but not overdone to the point of drawing attention—qualities I plainly noted during the title

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

Bass quality was the other most notable improvement—a development I expected in light of the addition of the dedicated woofer (its crossover point is 270Hz). There was rock-solid fifty-cycle midbass output similar to the B5 but qualitatively much more controlled, and perceptibly less reliant on the port. For a dance track such as Michael Jackson's "Billie Jean" there was a hip-gyrating amount of midbass slam and door-rattling pulse. Timbral definition in this range could become a bit woolly and indistinct at moments, but having that crucial low-end energy was a tradeoff that more than makes up for this minor issue. To be sure, actual bottom-octave bass (sub-40 cycles) was beyond the UB5, but by any standard this was one game little loudspeaker. Soundstaging was about average in width and depth; nonetheless, Rutter's *Requiem* "Lux Aeterna" still conveyed at least some sense of venue dimension and expanse, with discernible boundaries and depth. The height component could have been more convincing too.

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

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

## SPECS & PRICING

**Speaker type:** Three-way, bass-reflex
**Drivers:** 1" soft-dome tweeter, concentrically mounted; 4" aluminum-cone midrange; 5.25" aluminum-cone woofer
**Frequency response:** 46Hz to 25,000Hz
**Sensitivity:** 85dB
**Recommended amplifier power:** 40 to 140Wpc
**Nominal impedance:** 4 ohms; minimum 3.4 ohms
**Dimensions:** 7.87" x 12.75" x 10.75"
**Weight:** 16.5 lbs.
**Price:** $499

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# Our Top Picks Loudspeakers

## KEF Muo
**$299**

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

## Elac Uni-Fi UB5
**$499**

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

## Elac Debut F5
**$560**

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

## PSB X2T
**$1299**

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

# Our Top Picks Loudspeakers

## Magnepan .7
**$1395**

sized, 2-way, line-source floorstander uses all quasi-ribbon drivers (as opposed to the mix of quasi-ribbon and planar-magnetic in the MMG). The result is a superior blend between tweeter and mid/bass, with much better power-and-bass-range speed, low-level resolution, color, and extension. (Indeed, much better speed, low-level resolution, and color overall.) Though the .7 benefits on some (chiefly large-scale) music from the addition of a subwoofer, reviewer JM thought that, all by its lonesome, it was shockingly realistic on acoustic instruments (and equally swell on a good deal of rock), reproducing an ambient soundstage so markedly different than the sound of the room the speakers were auditioned in that it transported her. JV completely agreed. In his opinion (and that of Ms. Mullins), the new .7 is the best option in a reasonably priced high-end loudspeaker. Like all Maggies, the .7s do require some power to drive. (250)

## Dynaudio Xeo 2
**$1499**

The Xeo 2 is a wireless, internally bi-amplified/DSP speaker system in a svelte two-way cabinet. Less than a foot tall, it projects a bold, confident voice that neither screams with treble lift nor shrinks into the background with presence-range suckouts. It has a dark, warm musical character that makes for soothing long-term listening. Its midrange-forward sound does justice to both male and female vocalists, with high intelligibility and lifelike presence. Connectivity is as easy as pairing with your iPhone BT, and the speaker's room-adaptive EQ settings are also helpful. In sum, a combination of packaging, performance, and convenience that deserves a receptive audience. (270)

## JL Audio e110/e112 Subwoofer
**$1500/$1900**

Before he got the hefty little e110 with 10" driver (the e112 comes with a 12" woof), JV was anything but a fan of subwoofers, which always seemed to take more away in midrange transparency, tone color, and resolution than they paid back in bass-range extension, detail, and power. Crossed over at the right frequency—which is easy to do with the instructions that JL Audio provides and the unit's mainfold built-in controls—the e110 is the very first sub he's heard that doesn't screw up the sound of the main speaker. Rather it seemed to extend that sound into the bottom octaves, producing the highest low-level resolution of bass timbres and textures from any transducer of his experience. Paired with something like a Raidho D-1 stand-mount the e110 will give you everything (save for overall impact) that you pay the big, big money for in a massive multiway floorstander, and it will do so for a mere $1500. (244)

## GoldenEar Triton Five
**$1995**

Legendary speaker-manufacturer Sandy Gross's latest offering, the $999 GoldenEar Triton Five floorstander features noteworthy drivers—four side-mounted, sub-bass radiators designed to deliver subwoofer bass without the need to employ an active sub; Golden Ear's High Velocity Ribbon Driver; and two 6"mid/bass drivers made from a formulated polypropylene cone material, all housed in a beautifully finished enclosure with nonparallel walls. Reviewer Jacob Heilbrunn thought the Fives offered a tremendous amount of performance for the price, generating hour after hour of satisfying playback regardless of genre. Greatly appealing to many audiophiles on a budget, the Triton Fives will also entice anyone who might be looking for a reasonably priced first speaker. "In sum," JHb concluded, "The Triton Five isn't just an option. It's a must-audition." (255)

# Our Top Picks Loudspeakers

## Audience ClairAudient 1+1 V2+

**$2460**

Don't let the 1+1 V2+'s nearly identical appearance to the 1+1 ($1800) fool you; this newly upgraded version is a huge leap over its already superlative predecessor. The V2+ employs a significantly redesigned version of Audience's full-range driver, top-level Au24SX internal wiring, retuned passive radiators, and custom tellurium solderless binding posts. The result is far more resolution and detail (particularly in the treble), superior transparency, wider dynamic expression, and even greater midrange purity. The 1+1 V2+'s midrange clarity, just one of the virtues of a crossover-less single-driver speaker, is on par with that of many speakers costing twenty times the V2+'s price. The state of the art for desktop listening, and a terrific choice as a main speaker in smaller rooms. (273)

## MartinLogan Motion 60XT

**$2999**

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

# PERSONAL AUDIO & HEADPHONES

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# Equipment Report

## Onkyo DP-X1 Portable Music Player

### MQA Goes Portable

Steven Stone


**When I reviewed Astell&Kern's** first offering in early 2013, the AK100 ($699), the concept of a high-performance portable music player was new and the AK100 was unique. Flash forward three years—nowadays audiophiles have a plethora of options. Astell&Kern alone offers seven players, from the AK Jr ($499) to the AK380 ($3499). Other manufacturers including Sony, Questyle, Calyx, Colorfly, iBasso, and Fiio have all come out with high-resolution, high-performance players whose prices range from less than $300 to $1300. Obviously, the portable player market has "blown up" into a massive business driven by an increasingly mobile customer base. And the plethora of choices continues to grow.

One of the latest manufacturers to toss its portable player hat into the ring is Onkyo. Its DP-X1 ($799) offers a unique set of features and capabilities at a highly competitive price. The first headline on the DP-X1's web page leads with "Powerful, Portable, ~~Pricey~~." Onkyo's intent is clear: Release a high-value, high-performance portable player whose features and performance rival "premium-priced" competition. Given the highly competitive nature of this particular market, Onkyo needed something more than merely "we sound better" to elbow its way in. So, what has the Onkyo DP-X1 got that the others haven't got? MQA. The Onkyo DP-X1 is the only portable player so far, besides its "cousin" the Pioneer XDP-100R ($699), to offer MQA capabilities. But, wait, of course there's more. The DP-X1 also includes a true balanced headphone output (and dual DAC chips) with the capability to drive difficult headphones that usually require beefy external amps to sound their best. Add to all this the ability to access and play popular streaming sources, including Tidal, Spotify, and Pandora, and you have a player that does indeed challenge competitors with much higher pricetags. Will the Onkyo succeed in displacing other competitors on the pedestal of best-priced high-performance player? That is a distinct possibility.

#### Technical Tour

The DP-X1 uses two amplifiers and two digital-to-analog converters, so it can deliver a true balanced signal. This is the primary difference between the DP-X1 and the Pioneer XDP-100R, which has one DAC and one amp and only supports single-ended headphone connections. With double ESS Sabre ES9018K2M DACs and double ESS Sabre 9601K amps, a balanced output is available via the DP-X1's 2.5mm connection, which is located to the right of a standard 3.5mm single-ended stereo connection. In addition the DP-X1 also has two types of balanced drives, ACG and BT. ACG is short for Active Control Ground drive, which according to Onkyo can deliver "greater stability, increased S/N ratio, and greater spatial dimensionality," as well as "greater delineation for lower frequencies in hi-res audio, and overall robust and taut sound." Inside the owner's manual, Onkyo has a slightly more detailed explanation of AGC. "The basic operating method is the same as the balanced mode, but AGC uses technology to even more forcefully fix grounding standards...output volume is the same as the regular single-ended operation, however."

The DP-X1's storage capacity currently maxes out at 432GB. To achieve this amount of storage you will have to use two 200G micro-SDXC cards. Internal memory is limited to only 32GB, and some of that will be occupied by the OS and whatever apps you choose to add to the DP-X1.

The DP-X1 supports a multitude of audio formats including 11.2MHz DSD, 384kHz/24-bit

# Equipment Report Onkyo DP-X1 Portable Music Player

PCM, MP3, WAV, FLAC, ALAC, and AIFF, as well as MQA files. Basically if it's a music file, the DP-X1 will play it.

## Ergonomics

The DP-X1 uses an Android 5.1.1 platform for its OS, which allows it to have all the functionality of a smartphone minus the annoying phone call part. You can access the Internet, send and receive email, and even keep your address book on the DP-X1 if you wish. Internet Access via WiFi also lets you use Google's Play Store to add any apps you wish to the DP-X1. I added Tidal and Onkyo's own "Onkyo Music" store to my review sample. Downloading and installing was quick and easy. The quick part was due to my WiFi's 5.0GHz connection speed, which speed-tested on the DP-X1 at over 100MBps! That throughput rate rivals my hardwired Ethernet connection. How come so fast? A month after I moved into my new home in Denver, CenturyLink offered my neighborhood fiber-optic connections. Since every time it rained I lost my Internet due to the old copper cable's lack of water-tightness, after the tenth service call I jumped at the opportunity, not so much for the speed (which has been nice) but for the reliability. Now even if I lose power my Internet still works for as long as the high-speed fiber-optic modem's battery back-up lasts.

If you already use an Android phone the DP-X1's pages will be quite familiar to you. Unlike some players with their own customized Android-based interface that can limit functionality, the DP-X1 is open to whatever you want including third-party music players and apps. While I didn't try out other player apps since I found Onkyo's supplied one did everything I needed, if you have a player that you're used to, or prefer to use, you can easily add it to the DP-X1. But since the DP-X1 has Android openness, you might download an untested program that could in extreme cases "brick" (make non-functional) your DP-X1, so I would advise some restraint.

Within the DP-X1's settings you have many options for general operations. In the music settings you can choose which form of amplification you wish to use (ACG or BT) as well as eq. The DP-X1's eq functions include five presets as well as 16-band user-selectable ones. Adjusting the 16-band eq requires a steady finger (or stylus) since the delineations are rather close together. The Onkyo also has something called "featured eq" which includes 18 different settings developed for different pop musicians including Buckcherry, Scott Ian, Tim Lopez, Steven MacMorran, Midi Matilda, Leo Nonventelli, Strange Talk, Chris Traynor, and Jim Ward. You can modify any of these eq settings and store up to 1000 custom eq curves.

The DP-X1 has three gain levels. But the differences between level settings aren't so great that you can't use "low" with low-sensitivity headphones. I know this because for the first couple of days I used the default "medium" with a wide variety of headphones before I found the gain adjustments, which are buried among the Sound & Notification settings. Perhaps seasoned Android users will find these nested menus old hat, but for new Android users the Onkyo's menu system will require a learning curve. The onboard owner's manual app is essential reading if you hope to become deft at navigating through the DP-X1's many features. Some adjustments, such as upsampling, digital filter, and DSD upsampling-conversion options, are found within the Onkyo music player app via a drop-down menu. While its settings are not as convoluted as those of some players, the DP-X1's more arcane controls are not intuitive in function or location.

The DP-X1 supports Bluetooth headphones or other playback devices via aptX. Once paired you can send an audio stream to any compatible BT device.

Battery life is listed at 16 hours using 96/24 FLAC files and a single-ended headphone connection. With balanced headphones, battery life will be quite a bit shorter. Also, if you leave the DP-X1 hooked up to a balanced headphone in pause mode overnight, the battery will be exhausted by morning and need a full recharge, which takes somewhere around three hours.

Populating the DP-X1 with music was as simple as connecting it to my MacPro's USB 3.0 inputs. Onkyo has its own file-transfer app called X-DAP Link (PC and Mac), which you can download from its site, but I used another app called Android File Transfer to move files into the DP-X1. This little app popped up every time I connected the DP-X1 to my Mac via the supplied USB cable. One further advantage of this method was that instead of appearing on my desktop as an external drive, which is what occurs with many portable players, the DP-X1 is recognized by the app, but not as a drive so you don't have to wait for it to un-mount before disconnecting it.

The DP-X1 can also be used as a "source device" to connect to other USB DACs. You will

## SPECS & PRICING

**Operating system:** Android OS 5.1.1
**Total (current) maximum storage:** 432GB
**Internal storage/RAM:** 32GB including Android OS system area (RAM: 2 GB)
**Extended storage:** 400GB via two 200GB micro-SD card slots
**DAC and HP amplifier:** Two ESS SABRE DAC ES9018K2M and two headphone AMP SABRE 9601K
**Wi-Fi specification:** 802.11a/b/g/n or 802.11ac (Wi-Fi direct / WPS)
**Bluetooth support:** A2DP/ AVRCP/ HSP/ OPP/ HID/ PAN
**Codec:** SBC/aptX (Transmit only)
**Playable audio formats:** DSD/DSF/DSDIFF/FLAC/ALAC/WAV/AIFF/Ogg-Vorbis/MP3/AAC/MQA
**Sampling rates & bit rates:** 11.2MHz/5.6MHz/2.8MHz 1-bit, 44.1k/48k/88.2k/96k/176.4k/192k/352.8k/384k 16-bit/24-bit
(32-bit float/integer can be played down-converted to 24 bit)
**Supported video formats:** H.263/ H.264 AVC/H.265 HEVC/MPEG-4 SP/VP8/VP9
**Balanced output spec:** 150mW + 150mW
**THD:** Less than 0.006 %
**S/N Ratio:** 115dB
**Frequency response:** 20Hz–80kHz
**Dimensions:** 3" x 5" x 0.5"
**Weight:** 7.16 Ounces
**Price:** $799

# Equipment Report Onkyo DP-X1 Portable Music Player

need a special cable to accomplish this, but Cables to Go, among other sites, has what you need to make the connection. Once hooked up, you have a multitude of options to send files to an external DAC, including upsampling and different DoP (DSD over PCM) file protocols. And if your external DAC is MQA-compatible, the DP-X1 can even output MQA files to that device.

## Sound

I've reviewed a fair number of portable players during the past couple of years. With most of them the primary limiting factor in overall fidelity has not been the player itself, but its synergy with the headphones or transducers connected to it. I used a plethora of headphones with the DP-X1 from hyper-efficient in-ears like the Westone W60 to the most power-hungry full-sized cans, such as the Beyerdynamic DT-990 600-ohm version. Even in single-ended mode the DP-X1 had no trouble driving the DT-990s to satisfying levels, and with the efficient ones the low-gain modes delivered sound without hiss or hum.

I used the DP-X1 via its single-ended output for several weeks before I received a Silver Dragon adapter cable to go from the 2.5 TRRS connection to a standard 4-connector XLR from Moon Audio. With the adapter installed I tried all the headphones in my collection that use balanced connections. These included the HiFIMan HE560, Sennheiser HD 700, Grado RS-1, Audeze LCD-2.2, AudioQuest NightHawk, and MrSpeakers Ether and Ether C. I also tried both of the DP-X1's balanced modes, Bal and AGC. I found the Bal had a slightly higher output level. With several phones, including the MrSpeakers Ether C, I preferred Bal overall due to its superior dynamic contrast and bass extension.

Comparing two different portable players is not easy. Making sure levels are the same is the first problem; the second is that switching from one player to another takes more than a couple of seconds, making direct comparisons even more difficult. I set up a test to compare the Onkyo DP-X1 against the Astell&Kern AK240. After listening to several of my own recordings via both players I was forced to conclude that at least with the three earphones I used, the Ultimate Ears RR, Jerry Harvey Laylas, and Empire Ears Zeus, I could not identify any differences between the two players when they were both playing back my own DSD5.6 recordings.

I could spend multiple paragraphs detailing the hows and whys of MQA, but it will be far more efficient for you to look at the video links at theabsolutesound.com ("MQA Explained in Short Videos"). For more information read Robert Harley's technical article about MQA ("Beyond High Resolution"), also on theabsolutesound.com. Finally, if you like questions and answers take a look at this interview with Robert Stuart on the Computer Audiophile site. On the DP-X1 all my MQA files played without any issues. MQA-encoded files also loaded and played just as fast as regular non-MQA versions.

When I compared MQA conversions of my own recordings with the originals, on some headphones I could not discern any sonic differences, but on those headphones and in-ears that I currently use for reference, such as the Ultimate Ears RR and MrSpeakers Ether C, I could hear the improved resolution. For me the improvements manifested by the MQA-encoded files were in soundstage specificity, image placement, and low-level details. It was easier to listen into the mix, and to differentiate between sounds that were more homogenized on the non-MQA files. On my recording of Bryan Sutton and Chris Eldridge playing "Church Street Blues" at a workshop outdoors, Eldridge's voice was better isolated from his guitar (whose sound hole was less than eight inches below his mouth). Instead of blending into one sonic entity the guitar and voice were separate and easily differentiated in space. Also some of the subtle variations in Bryan Sutton's picking were easier to discern on the MQA-encoded file.

## Conclusion

Yes, there are plenty of options nowadays for anyone looking to acquire a high-resolution high-performance portable player. But if value-for-dollar and maximum flexibility and functionality are high on your list of must-haves, you can substantially narrow down the list.

Taking it further, if future-proofing is among your most-wanted attributes, I can think of only two players that qualify, and only one of those can provide a true balanced output—that's the Onkyo DP-X1.

While the DP-X1 may not be quite as disruptive a new technology as MQA, it does raise the question of why, except for aesthetics or ergonomics, anyone would choose another player if his budget maxed out at under $1000 (except perhaps for the Pioneer XDP-100R, if I were absolutely sure I would never, ever, need a balanced output). I predict that Onkyo will sell a lot of DP-X1 players because it is currently the best value out there in flexibility, functionality, and sound. Recommended? Is that even a question? Onkyo has hit a home run that deserves two trips around the bases. tas

# Equipment Report

## Astell&Kern AK70 Portable Music Player

### Balanced and Well-Connected

Steven Stone


**By now, unless you've been** spending your time in a cave with no Internet access, you've heard of Astell&Kern. Although the company did not invent the portable personal music player, Astell&Kern has been a leader in portable audio ever since it introduced its first product, the AK100. Since then the maker has released a series of portable players that range from the AK Jr ($499) to the AK380 ($3499). Astell&Kern's latest offering is the AK70 ($599), which is its least expensive player with balanced output connectivity. The AK70 also includes provisions for support (with a subscription) of Tidal, Groovers+, and MOOV streaming services, so you have your choice of either local (on the Micro SD card installed in the AK70) or, with Wi-Fi access, online music libraries.

#### Technical Details

The AK70 uses the same Cirrus Logic CS4398 DAC used in Astell&Kern's AK100II. It can play back almost any musical file format currently available including up to 5.6MHz DSD. It recognizes and supports 384/32 PCM, but these files are internally down-sampled to 192/24 PCM during playback. The AK70 can also transfer DSD in native format through DoP, or it can convert DSD into PCM for output to portable DACs that do not support DoP.

The AK70 has two headphone outputs, a single-ended 3.5mm stereo connection and a 2.5mm balanced jack. Both have a maximum output of 2.3VRMS. Other output options include line-level analog (a full-level analog output that bypasses the volume control) and USB (so you can use the AK70 with an outboard DAC) as well as network playback via Wi-Fi. You can also use the AK70 as a stand-alone DAC via its USB connection; the limitation is that used as a DAC the AK70 only supports up to 96kHz/24-bit playback. For additional flexibility A&K also allows 48kHz/24-bit streaming over aptX Bluetooth HD.

Another very useful feature is "AK Connect," which allows the AK70 to connect via a WiFi network to a network attached storage (NAS) drive. When you are at home you can play any and all music contained on your NAS drive, including 192/24 PCM and 5.6 DSD. (For the record, after selecting a DSD file I did experience an initial delay of about two seconds before it began playing.)

The AK70 has one micro-smart-card slot that can support up to a 256GB card. With an internal memory of 64GB, you can max out the AK70 with 320GB of music files (some space is reserved for OS files). While that is not sufficient to carry an entire mature music library, unless you are doing a 500-day around-the-world walk-a-thon the AK70 should provide enough storage space to handle your comings and goings. When you're at home, the amount of onboard storage becomes moot since you have access to your entire music library on your NAS via AK Connect. Although the AK70 uses an Android operating system it is not open to the point where you can add apps from the Play Store. Currently the U.S. version of the AK70 comes loaded with the aforementioned Tidal, Groovers+, and MOOV.

#### Ergonomics and Everyday Use

Since the development of its AK100, Astell&Kern has maintained certain signature physical design characteristics, such as a rotary, side-mounted volume knob, that have been included once again on the AK70. But unlike the AK100, where the volume knob stuck out, or the AK120 where a protective barrier beside the knob was used (similar to the kind seen on Panerai wristwatches), the AK70's volume knob is recessed into the body of the player. To avoid "squareness" the AK70 has a slightly curved section to the right of its TFT LCD touchpad display. The AK70's stock color is mist green, but since its original release A&K has also issued several special-edition black options in select markets. When compared to A&K's other offerings the AK70 could very well be the most "sensible" physical design and shape. Neither too tiny nor too husky, and shirt-pocket-able, the AK70 is small enough to take on any trip, but not so miniscule that it's easily lost.

With its 2200mAh 3.7V lithium polymer battery the AK70's play time will vary—as it does

# Equipment Report Astell&Kern AK70 Portable Music Player

with all portable players—based on the amount of power drain, which depends on the bit rate of the files played through it. A&K does not provide a battery-life specification, but I never ran out of juice at home. Even on a recent trip the AK70 was still going strong when I reached my destination. Accessory battery power supplies have gotten so inexpensive and ubiquitous that anyone who frequently travels should have at least one in his kit, which makes portable player (or smartphone) battery life less critical. Recharge time was under three hours from completely exhausted to full battery level.

I used the AK70 with a wide variety of headphones. With extremely sensitive in-ears such as the Empire Ears Zeus there was no continuous background hiss or noise, but when I used AK Connect I did hear a bit of low-level random noise during the silence before a track began to play. Going to the other extreme, the AK70's single-ended output drove my pair of Beyerdynamic DT 990 600-ohm version to adequate volumes at an indicated level of 125 out of a maximum level of 150. Using a Silver Dragon adapter cable from Moon Audio, I could use the MrSpeakers Ether Flow headphones in balanced mode with an average volume setting of 110. With both of these less sensitive 'phones there was no noise in the silences before tracks began to play.

## Sound

I must stress that your choice of earphones will have a far greater effect on the overall sonic character of the AK70 than the AK70's intrinsic sound quality. Having said that, I did find the AK70 had a different sonic character than the Onkyo DP-X1. The Onkyo has a more relaxed presentation (with the same in-ears, of course) with slightly more depth, but less presence, as if you had moved back several rows at a live concert.

The two headphone pairings I returned to on a regular basis during the AK70 review period were the MrSpeakers Ether Flow 'phones and the Ultimate Ears UE 18+ Pro in-ear monitors. In both cases the AK70 was absolutely silent when it was supposed to be silent, yet had gain to spare with excellent bass extension when playing the most demanding sources. Another pairing that proved to be a particularly synergistic combination that I would recommend for an AK70 owner on an extreme budget was the KZ ZST in-ear. This $25 (available primarily from Chinese Internet vendors such as AliExpress) hybrid earphone (one balanced armature and one dynamic driver) required very little power, with normal listening settings around 75, and delivered a smooth, almost lush harmonic balance that lent itself well to brighter pop music mixes.

## Competition

There is certainly no shortage of competition in portable players priced around $500. Although Astell&Kern's AK Jr is still available, for the extra $100 the AK70 clearly delivers a better value. With the addition of balanced output capabilities, streaming, AK Connect, and USB DAC features the AK70 does more of the things that a portable DAC should do. I also prefer the AK70's physical size and shape.

Deciding between the AK70 and the Onkyo DP-X1, whose street price is currently running around $599, is a more difficult choice. The DP-X1 has more onboard storage thanks to its dual micro-SD slots, but does not have the ability to connect with a NAS unless you add an app such as Foobar2000 from the Google Play store. With its open Android system, the Onkyo has greater flexibility than the AK70, but that can lead to compatibility issues since some third-party apps introduce more problems than they solve. The DP-X1 also supports and decodes MQA files, which could be a major advantage now that Tidal has begun streaming MQA. Size-wise I prefer the AK70's smaller dimensions and lighter weight. In sonics, as I've mentioned, your preference will probably revolve around your choice in earphones. Both are excellent players and neither could by any stretch be considered a bad or wrong choice.

The Sony ZX100HN that's currently priced at $699 offers 70 hours of battery life playing MP3 files and uses a "closed" Android system like the AK70. It does not have a balanced headphone output and was not as good a match with difficult-to-drive headphones. But it does come bundled with a dedicated pair of noise-canceling earphones which work quite effectively, and it also has Sony's Sense-Me shuffle, which I found to be the best "random play" feature I've experienced.

## Summary

With its previous players Astell&Kern firmly established itself as a purveyor of the finest (and most expensive) portable players available, but the company was never in the running to offer the best value for the money at entry level. But with the AK70, A&K has a player that offers more usable features and flexibility at an affordable price than any of its previous offerings. With the ability to easily handle a wide range of earphones thanks to its balanced and single-ended connections, combined with features such as AK Connect, which allows you to play back anything on your home NAS through the AK70, this player delivers more value and bang-for-the-buck than most of the current crop of players priced between $500 and $700.

If I were in the market for a portable player priced under $600, as of right now the AK70—along with the Onkyo DP-X1—would be my first choice. tas

## SPECS & PRICING

**Type:** Portable player with network capabilities
**Display:** TFT LCD
**Supported formats:** PCM to 384/32, DSD 2.8 and 5.6
**Outputs:** Analog single-ended and balanced digital
**Battery life:** Not listed
**Memory capacity:** 256K
**Dimensions:** 2.37" x 3.81" x 0.51"
**Weight:** 4.6 oz.
**Price:** $599

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# Equipment Report

## HiFiMan HE400S Headphone

### Easy Listening

Julie Mullins

**If you're into planar-magnetic** headphones but thought power requirements and price limitations might put the damper on a purchase, think again. The smart hi-fi men at HiFiMan have figured out how to deliver the sonic benefits of planar technology—noteworthy reproduction of finer details and spaciousness, for instance—in a high-sensitivity (98dB), low-impedance (22 ohms) can that isn't power-hungry. In fact, the HE400S is so efficient it can be driven by your smartphone with no external amp required—a rarity among planar headphones..

These cans are also easy to use, and with non-fatiguing sound, easy to love (and at an entry-level price of $299, easy on the wallet, to boot). What's more, the HE400S is capable of revealing the magic in music in subtle, yet affecting ways. (Examples to come.)

As I moved well past the recommended break-in period (150 hours) and into critical evaluation, the HE400S became my go-to 'phones for both travel and everyday listening, whether it was LPs, digital tracks of variable quality/resolution via Tidal or off my iPhone 6, etc. In fact, I'm listening to them as I write this review (some mellow Brian Eno tracks streamed via Tidal).

HiFiMan is a relatively new company—founded by Dr. Fang Bian in New York in 2007 and headquartered in the port city of Tianjin, China—that specializes in personal audio players and headphones. Judging from its extensive product lineup from entry-level to reference, and its technological and design innovations, it's clear HiFiMan strives to continually develop new offerings for a competitive market—and nowadays headphones are among the hottest tickets around.

Let's begin with the basics: The HE400S is an open-back headphone with fairly large round ear pads—which not only fit comfortably but allow greater surface area for the planar membranes housed inside them. (I'll return to a brief description of planar technology and its benefits in a moment.) Weighing just 350 grams—slightly more than ¾ of a pound—they're much lighter than they may appear to be in the photograph. Aesthetically, they have a slightly clunky look, but their appearance grew on me over time—the way I appreciated the boxy old Volvo I used to drive's solidity by (and of) design. The "dual" all-black headband features an innovative suspension wherein a smooth, slightly padded, leather-look band rests on your head while a separate, slightly flexible metal band positioned above it provides the (gentle) necessary tension to position the cans. Adjustments are easy to make: Just slide the metal pieces that hold the soft band on either side up or down; small holes mark the options. Being a female with a smaller-to-average-sized noggin, I was pleased to discover that the 'phones fit me fine (set to about the snuggest fit possible). Soft, slightly plush black fabric covers the full-sized ear pads, which are removable. The light silvery, shiny chrome-look finish on the outer part of each can completes the picture. (I ended up with some scratches on the finish of the outer earpiece hinges.) I found the HE400S to be quite comfy, and their near-feather weight makes them ideal for long listening sessions or multi-hour flights.

Accessories are quite basic. There's a ¼" headphone adapter and a (removable) 1.5-meter cable for the cans with a 3.5mm plug. (You can swap out the cable if desired.) A thoughtfully written, full-color, bilingual owner's guide is included. A couple of minor quibbles: There's

# Equipment Report HiFiMan HE400S Headphone

no travel case, alas. Also, the included cable is covered in a soft, black, woven "fabric" that's fairly tangle-resistant but prone to slight strain and wear around the connection points to the cans.

Regarding HE400S' technical design, most TAS readers are familiar with planar-magnetics vis-à-vis dynamic drivers, but just in case, here's the deal: Planar technology involves a diaphragm of very low mass that has conductive layers distributed throughout its larger (relative to dynamic designs) surface. This allows the diaphragm to be driven by magnetic force more evenly, resulting in lower distortion. From a sonic standpoint, this can translate into enhanced reproduction of subtle musical details in addition to improved soundstaging.

I'll share some listening examples that describe how I experienced these characteristics and others. Note: Because I wanted to highlight the most approachable aspects of the HE400S, I've chosen to focus on the affordable analog and portable digital sources I tried—ones that seemed to suit these mid-fi 'phones—rather than get bogged down with expensive desktop amps. Across both digital and analog sources, in keeping with planar-magnetic sonics, a mid-range focus emerged. The HE400S' treble range is also quite respectable, as it benefits from the lighter mass of the planar diaphragm compared to dynamic drivers.

First: analog sources. With an entry-level focus in mind, I opted for the GEM Dandy Poly-Table (reviewed in Issue 260) with a Jelco tonearm and Shelter 201 moving-magnet cartridge. In my review of the petite but powerful PS Audio Sprout integrated (Issue 259), I described how the HE400S' performance was quite literally startling in its imaging and staging: As I was listening to "I Confess" on the Mobile Fidelity reissue of The English Beat's LP *Special Beat Service*, I actually jumped when I heard a layered-in backup vocal that sounded as if it were coming from behind me. How's that for soundstaging? The sonic presentation was tight as a drum and clean as you please, with piano and Dave Wakeling's vocals front and center.

On the classical front, Khachaturian's *Masquerade* Suite on Analogue Productions' superb RCA Living Stereo LP reissue boasted thrilling climaxes with powerful transient attacks on cymbals and other percussion, which the HE400S delivered with a remarkable sense of realism, and—based on my experience listening to this same LP on systems such as JV's—noteworthy transparency.

I compared a few tracks on this analog setup with those same tracks streamed via Tidal (16-bit/44.1kHz FLAC files). On Tori Amos' "Past the Mission" from her remastered *Under the Pink* LP, I picked up occasional subtle echoes of the recording venue behind her Bösendorfer piano, along with twangy guitar accent-riffs that previously hadn't been as audible. The sense of balance and acoustic space felt coherent, of a piece. The digital version of that same track streamed via Tidal revealed crisp details that seemed to appear from different places within the acoustic. In contrast to the presentation of dynamic 'phones, it felt as though each channel had many more spots of possible sonic origin—a planar design advantage. That repeated guitar twang seemed to have longer decay, but a touch more sweetness, and Tori's voice had slightly more delicacy and detail. I must say I preferred the vinyl version for its stronger energy and excitement, but then again I do adore analog.

Listening to tracks on my iPhone 6's native music app naturally wasn't quite the same-quality sonic experience, though it provided hours of pleasure that remained easy on the ears. I listened with the volume up louder than I ever have before with cans, but that's a factor of the power planars require. (Nonetheless, it's still pretty remarkable that a mobile phone can drive planar-magnetic headphones!) I went with guilty-pleasure upbeat pop and experimental stuff. Some standouts included Daft Punk's "Get Lucky"—funky good fun—and Brian Eno and David Byrne's *My Life in the Bush of Ghosts*—compelling in its endless layers of old-school sampling and mixing. The track "Mea Culpa" delivered an astonishing sense of *center* spatial placement with found-percussion-instrument taps. And on Dirty Projectors' "Stillness Is the Move" I heard bits of gentle tambourine shakes I'd never picked up on before, deep in the right channel. The sense of space and easy naturalness was a recurring theme.

Of course, there are some tradeoffs inherent to planar-magnetic cans, similar to those found in loudspeakers of that type, with bass being the primary sticking point. I decided to put the HE400S to the test on some tracks with deeper bass. Listening to "Slow" from Leonard Cohen's *Popular Problems* on LP revealed some softening in the lower octaves, but the emotional impact of his vocals and of the track in general wasn't lost. These $299 'phones might not be the last word in low-end slam and extension, but in many other ways they easily hold their own.

## Conclusion

Billed as one of the highest-efficiency planar 'phones on the market, the HE400S is a noteworthy bargain within its category. These lightweight, comfy cans are also realistically priced at $299—among the least expensive planar 'phones to be had. There was a kind of effortlessness to their playback, with a largely neutral presentation that was crisp, clean, and open. Quite often, their dimensionality even resembled loudspeaker-style soundstaging.

These phones would make a great choice either for hi-fi fans on a budget or for audiophiles who are simply after a basic, high-quality, lightweight headphone for go-to convenience or travel.

I enjoyed the overall sense of involvement and envelopment within the music, thanks to a striking degree of realism—noteworthy at this price. The HE400S seemed to have a natural way of elevating even (well recorded) lowest-common-denominator tracks (e.g., mp3s and Red Book) into something a bit finer. Great sounding, and a great value. QED. tas

## SPECS & PRICING

**Type:** Open-back headphones with planar-magnetic drivers
**Frequency response:** 20Hz–35KHz
**Sensitivity:** 98dB
**Impedance:** 22 ohms
**Weight:** 350 grams
**Price:** $299

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# Equipment Report

## Stax SR-L700 Headphone

### Uncolored Sound

Steven Stone

**It would not be a stretch to call Stax** "the first audiophile headphone." When almost all other full-sized headphones were using dynamic drivers, Stax had already established itself as preeminent by using planar-electrostatic technology. Stax's technological advantage continued until fairly recently, when the headphone and portable audio business "blew up" into the most vibrant sector of high-performance audio. Unlike in the past when Stax was the only electrostatic option, nowadays audiophiles have their choice of planar designs from many other manufacturers. Obviously Stax noticed the increased competition, and with its SR-009 ($4450) introduced a new electrode structure that refined its original 36-year-old design—and that once again put Stax ahead of its competition.

Unlike most earphones all Stax electrostatic earspeakers use special dedicated amplifiers to drive them. This increases the cost of a Stax system proportionately—with an SRM-007tII ($2150) tube driver unit, the cost of an SR-007 Mk2 system goes up to $4500, while the SR-009 increases to $6600. That puts them among the most expensive headphone systems currently available, and out of the reach of many audiophiles. Stax needed an earspeaker that used the new stator technology in a more affordable package, so it developed the SR-L700 ($1400). Combined with the SRM-007tII, an SR-L700 system runs $3650, and if you opt for a less expensive Stax driver unit, you could put together an SR-L700 system for as little as $2725 by using the SRM-006tS.

I've been listening through Stax earspeakers since I got a pair of original Lambda Pros with an SRM-1 driver unit in the early 80s. I currently use a pair of Lambda Pro Nova Signature earspeakers with an SRM-007t driver amp. I also have several pairs of older Stax models including the SR-5, SRX Mk3, and the portable SRS-001 system. In 2013, I reviewed the SRS-4170 system ($1775), which included the SR-407 earspeakers and SRM-006tS amplifier. I found the SRS-4170 system more similar to than different from my older Stax system. Does the new SR-L700 up the ante sonically? Let's find out.

#### Tech Tour

The SR-L700 utilizes the same "sound element" developed originally for the flagship SR-009. Stax calls this new ultra-thin polymer material "super engineering plastics." The new Stax transducer also uses a special electrode scheme, which Stax named MLER (multilayer electrodes). Stax's explanation on its website for this new technology loses something in the translation from whatever original language it was written in: "While infinite thinness and flatness are required for the fixed electrodes, they simultaneously need to have other characteristics such as low resonance, high

# Equipment Report Stax SR-L700 Headphone

transmissivity of sound wave, and so on. The entirely new electrodes have been completed through the unification of metal plates processed with ultra-precision photograph etching using the high technology of heat diffusion combination on the atomic level." Obviously a dimension can't be "infinite," but Stax's intention was to create a thinner, lighter, stronger diaphragm material coupled with a thinner, lighter, and more powerful electrode array, and it has succeeded on both counts.

Where the SR-L700 differs from the SR-009 and SR-007 is that instead of the new round enclosure featured on those two models, the SR-L700 uses the traditionally shaped Stax Lambda Pro rectangular enclosure, headband, yoke, and earpads. But the SR-L700 enclosure is not the same dimension as previous Lambda models—it's thicker. The added thickness was necessary to encompass the new electrostatic design.

Stax added several other design changes for the SR-L700, including adopting the click-stop adjustments for the leather headband, making a more robust (but still plastic) yoke, and using new cushion material in the earpads. The permanently attached cable features 6N high-purity annealed-copper wire for core wires, and six silver-plated annealed-copper perimeter wires arranged in a wide parallel structure to lower the overall capacitance.

## Setup and Ergonomics

I used the Stax SR-L700 earspeakers with several Stax driver amplifiers including a current-production solid-state Stax SRM-727II and tube SRM-007tII, as well as my own, older units, the SRM-007t and SRM-1 Mk II. Most of my listening was done with these driver amplifiers connected to the Grace m9xx DAC/Pre via a 1/2-meter length of Kimber KCAG.

A manufacturer could assemble the finest-sounding personal transducer ever made and if it doesn't fit well, it's sure to be a failure. The Stax Lambda Series has long been considered among the most comfortable headphone designs ever devised, and the SR-L700 continues this tradition. I found the SR-L700 fit me slightly better than my Stax Lambda Pro Nova earspeakers because the SR-L700's click-stop adjustments (instead of the older friction-fit) insured that the headband's length didn't change after every use. I also liked the SR-L700 earpads better—they were slightly thicker and softer. The SR-L700's clamping force was slightly greater than on the Lambda Pro Novas, but still had less pressure than the majority of headphones. On a scale of 1 to 10, if 1 was no pressure and 10 was getting your ears boxed by a big strong guy, the SR-L700s clock in at a 2.5. You can (and I did) wear them for hours on end with no discomfort.

The SR-L700, like almost all Stax earspeakers, is an open-case design. That means it does nothing to attenuate outside noise from reaching your ears—or from your music reaching the ears of those nearby. For all practical purposes, the SR-L700 is for listening at home in a quiet, private environment. If you need isolation and portability the SR-L700 is not your best option.

The SR-L700's cable is permanently attached. If you need a longer cable you can purchase extension cables from Stax. I have a Stax 25-foot cable that I've owned for more than 20 years, which I occasionally use if I want to pace while listening. It's still as good today as when I acquired it. I know cable-rolling fans (those audiophiles who like to try third-party cables with their earphones) will be disappointed that they can't use alternatives to Stax's stock cable. But the stock cable is so remarkably rugged that even a cable-roller should be content. I have been unable to nick, crimp, twist, or irrevocably bend the cable on my Lambda Pro Nova ear speakers, even after many years of use.

The only aspect of the SR-L700's physical design that makes me nervous is the plastic yoke that holds the Lambda enclosure in place. It is pretty much the same yoke that Stax has been using for its Lambda Series for the last 36 years. And even on the thinner original Lambda enclosure, the yoke was flimsy and barely adequate. Over the years I have purchased several replacement yokes for my Lambda Pro Nova headphones because they cracked and broke. I suspect that using this same yoke material and design on the SR-L700's will have similar results. I recommend handling the SR-L700 with extreme care to avoid broken yokes.

## Sound

The first time that you hear a pair of Stax electrostatic headphones, regardless of model or manufacturing date, the primary impression they make, if distilled down to a single word, is speed. The transient response of a Stax electrostatic design, when compared to a more conventional dynamic driver design, seems "faster," with less additive distortion stemming from the mechanical action of the driver itself. With its lower mass, an electrostatic diaphragm moves with less physical impedance and once in motion can stop with less electronic damping needed because it has lower mass than a comparable dynamic driver.

After listeners have spent some head-time with a pair of older Stax Lambda headphones, the second thing that many will notice is the

### SPECS & PRICING

**Type:** Push-pull, open-back, oval electrostatic headphone
**Frequency response:** 7Hz–41kHz
**Electrostatic capacitance:** 110pF (including cable)
**Impedance:** 145k ohms (including cable, at 10kHz)
**Sound pressure sensitivity:** 101dB/100V RMS, 1kHz
**Maximum sound pressure:** 118dB/400Hz
**Ear pads:** Genuine lamb leather (direct skin contact), high-quality synthetic leather (surrounding portion)
**Cable:** Silver-coated 6N (99.9999%) OFC parallel 6-strand, low-capacity special wide cable, 2.5m full length
**Weight:** 0.8 lbs. without cable (1.1 lbs. with cable)
**Price:** $1400

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# Equipment Report Stax SR-L700 Headphone

'phones' unique bass character. The Stax low-frequency presentation has always been airier and faster than other headphone technologies, but many of the earlier Lambda models lacked impact in what I refer to as "the meat and potatoes" upper bass and lower midrange region. The only older Stax model that had enough midbass weight for my tastes was the SR-X Mk 3. The SR-L700 is the first Lambda model that delivers satisfying weight and impact in the lower midrange and upper bass. While it still may not deliver enough low-end impact for serious "bass-head" EDM fans, the SR-L700 definitely offers enough bass to keep anyone who prefers a balanced harmonic presentation happy.

The size and image specificity of the Stax SR-L700 soundstage is dependent on the driver unit that is attached to it. The tube-based SRM-007tII produced the largest and most precisely imaged soundstage, followed closely by the older SRM-007t, which is also tube-based. The smallest and most congested soundstage resulted from the oldest solid-state driver amp, the SRM-1 Mk II. The current-production solid-state SRM-727II's soundstage and harmonic characteristics were definitely superior to the SRM-1 Mk II's, but not quite as precise or expansive as the two tube-based driver amps.

Using different driver amplifiers with the SR-L700, I quickly discovered that these earspeakers do "scale up" nicely. By this I mean that when you tether them to a better-performing drive unit the SR-L700's overall fidelity improves noticeably. As a result, audiophiles who can't afford the SRM-007tII amplifier will not be hearing the SR-L700's full sonic capabilities. However, unless you do direct A/B comparisons between amplifiers as I did, I doubt you will find the SR-L700's sound to be sub-par with any amplifier, including the "lowly" SRM-1 Mk II (which you can find used for around $300). The primary sonic issues with the SRM-1 Mk II are that it had a darker tonal balance and smaller soundstage than other drivers I used with the SR-L700s.

The SR-L700's new stator design is more efficient than that of the older Lambda design, and at any volume setting the SR-L700s will play louder than the original Lambdas. This increased efficiency came in quite handy with some of my own live concert recordings, which were recorded at lower levels than commercial releases to allow for their wide dynamic range. With the Lambda Pro Novas I had just enough volume using the SRM-007tII turned up all the way, but the SR-L700's additional sensitivity let me ease up some on the volume knob setting.

During the time I was listening to the Stax SR-L700 I had the new Audience 1+1 V2 speakers installed in my desktop system. Comparing these two seemingly very different transducers, speakers-to-headphones, was enlightening. Both are crossoverless designs that have a more cohesive and well-integrated midrange presentation than a transducer that needs a crossover in its upper midrange (which is where most two-way loudspeakers have their crossovers). But even when used nearfield, my room added some additional midrange energy to the original signal coming from the 1+1 V2 that was absent from the Stax SR-L700's feed. This illuminated one fundamental truth: If you want to hear how a recording sounds without any room colorations, use headphones. Any loudspeaker, even in a nearfield setup, will interact with the room in ways that will have an audible effect on the overall perceived harmonic balance and presentation. If you need to hear how a recording sounds without room colorations, a pair of SR-L700s is a great way to go.

## Competition

Unlike days of yore, Stax currently has plenty of competition in the headphone sector. I've seen rave reviews of the Abyss electrostatic, and I've auditioned them at several audio shows. The Abyss 'phones sounded superb every time I've heard them, but they were among the least comfortable premium headphones I've used. If you lean forward more than a bit they will come tumbling off your head. For me they were a giant ergonomic fail.

I have not spent much time with the latest flagship models from Audeze (the LCD-4) or HiFiMan (the HE1000). Both are planar designs that don't require a dedicated driver amp, making them more portable and flexible than the SR-L700. Both are also more robustly made and should stand up to more abuse successfully than the SR-L700.

Another competitor is the new Sennheiser HD 800S. I own a pair of Sennheiser HD 700 headphones, which are a similar design. The Stax SR-L700s were slightly more comfortable than the HD 700s. The SR-L700s were also sonically less spectacular and less harmonically colored.

If you require a full-sized headphone that delivers a high degree of isolation, none of the Stax open-enclosure designs are going to work for you. But currently none of the other models I've mentioned that are in contention for "best" headphone are closed-enclosure designs. As of right now, if isolation is your top priority, you may either have to opt for a custom in-ear monitor or compromise with a headphone that's not quite as spatially open, harmonically uncolored, or detailed as the Stax SR-L700.

## Conclusion

Mike Longworth, who was Martin Guitar's longtime historian and A&R head, wrote, "The main competition of a new Martin guitar is an old Martin guitar." The same can be said about Stax earspeakers. When you manufacture products that remain largely unchanged for more than 30 years, that happens. The Stax SR-L700 ranks as the third-best earspeaker in the brand's line-up. It is also the least expensive earspeaker that uses Stax's latest stator technology. As such, it is the first new design from Stax that could, due to its combination of lower price and higher performance, lure many longtime Stax owners, such as myself, to replace their older Stax models.

Whether the new SR-L700 will attract first-time Stax buyers is yet to be seen. I suspect that most beginning Stax purchases will be one of the more entry-level packages, such as the very fine SRS-2170 system ($790). But for those audiophiles who want to experience the company's latest technology, the new SR-L700 is simply the most cost-effective way to arrive at a new level of uncolored Stax sound. tas

# Equipment Report

## MrSpeakers Ether C Headphone

### Closed Encounter

Steven Stone

**If you look at the "flagship" full-sized headphones** currently on the market, you'll notice they all share one particular trait: Whether they're planars, dynamics, or hybrids, whether they cost $400 or $4000, they're all open-backed designs. As long as you're listening in a quiet environment and have no problem with other people hearing what you're listening to, open-backed designs are superior. But what if you're in a noisy spot or someplace where your music might distract others? In such situations an open-backed design may not be a practical option. Unless you can switch to in-ear monitors or have a pair of closed-enclosure headphones readily available, you may find your only civil choice is silence.

So far, the goal of creating a closed-back, full-sized headphone that doesn't have serious sonic drawbacks compared to a similar open-backed version has eluded most headphone designers. Some attempts, such as the Audeze EL-8C, have come very close to the sound of open-backed designs (in Audeze's case, the EL-8), but have not quite equaled them. Enter the MrSpeakers Ether C ($1499–$1549, depending on cable length) headphones. Their sole reason for existence is to duplicate as closely as possible the sound of MrSpeakers' open-enclosure Ether ($1499–$1549) so that end-users can listen to music in places where the open-backed design would be inappropriate. The big questions are: 1) how close does the Ether C's sound come to that of the Ether, and 2) how close does the Ether C's sound come to that of the best flagship open-enclosure headphones? I'll attempt to answer both questions in this review.

#### Technical Description

The Ether headphone series is MrSpeakers' first design not based on a modified Fostex driver. Instead, the Ether headphones use a proprietary 69mm by 44mm V-Planar driver, which has a pleated surface that Dan Clark, MrSpeakers' chief engineer, claims "can reduce distortion, improve transient response, and extend frequency range." Bruce Thigpen originally developed this pleated driver for his Eminent Technology planar loudspeakers, and he is listed as the co-inventor on MrSpeakers' pending patents. According to MrSpeakers, "V-Planar

# Equipment Report MrSpeakers Ether C Headphone

technology addresses nonlinear driver motion by more deeply creasing the diaphragm to increase compliance. Much as pleats allow an accordion to expand and contract without stretching the fabric, the creases in the driver 'open' slightly during larger excursions...the resultant peaks and troughs are deep enough to maintain more of their physical structure even after the driver has been tensioned." Increasing a planar driver's compliance also improves its ability to accelerate rapidly in a linear fashion.

The Ether C is slightly less sensitive than the open-backed Ether at 92dB instead of 96dB. But because of its low impedance of only 23 ohms, even lower-output portable players such as the Astell&Kern AK Jr or the Sony NW-ZX100 should be able to drive the Ether C easily. The Ether C (394 grams/13.9 oz.) also weighs slightly more than the Ether (375 grams/13.3 oz.). The Ether C's enclosure is similar in size and composition to the Ether, but instead of an open-back earpiece protected by a honeycomb lattice, the Ether C's enclosure has a carbon-fiber cap that is very well damped against sympathetic resonances. The Ether C comes standard with MrSpeakers' DUM (distinctly un-magical) interchangeable cable, which can be ordered with either a single-ended ¼" stereo or balanced XLR connection.

The Ether C is fairly lightweight due in large part to its headband design, which uses a Nitinol "memory metal" frame combined with an adjustable leather band. The adjustable leather band has two set-screws (one for each side). Once you find the ideal position you can lock the band in place, so the next time you put on the Ether Cs they will fit perfectly. The side-pressure exerted by the metal headband frame is firm yet not uncomfortable, making for a good seal with enough isolation to prevent anyone nearby from hearing anything, as long as he is more than a foot away from you and you're not playing at deafening levels. The Ether C's earpads are made of well-damped "lamb leather," and are designed to completely encapsulate your ears to form a tight seal. Unlike some earphones, such as the Audeze LCD-2, which require trial and error to get right, the Ether C fit perfectly from the onset without fiddling.

## Ergonomics

The Ether C is among the most comfortable headphones I've used. The fit was firm, and no amount of movement could unseat the earphones once they were properly positioned. Figuring out which side is left and which is right is easy thanks to the embossed L and R on the leather headband. The DUM cable also has a small circle of red plastic shrink-wrap on its barrel to delineate the right channel. The cable attachment itself is well designed with a spring-loaded outer collar that must be pulled back to release the cable. My only issue with this scheme is that it creates a stiff 1½" long connection from each earcup that can catch on something and, if enough force is applied, possibly snap off. (The HiFiMan HE560 has a similar attachment issue.)

The Ether C's two-point, gimbaled, earpiece-attachment scheme allows more than enough range of motion for the headphones to fit quite well but does not permit them to fold flat, which would require less storage space. The early-production Ether headphones do fold flat, but the design was changed because the Ether's gimbal screws could scratch the headphone cup enclosure. Since it's more likely that you will want to travel with the Ether C headphones, this change may not be for the better. The Ether C comes in a supplied hard-shell case that is rather large (about the size of a Nerf football) but does a good job of protecting the 'phones from damage during travel.

Because the Ether C's cable is interchangeable I was able to use MrSpeakers DUM cables with both single-ended and balanced connections, as well as Moon Audio's Silver Dragon cable with both terminations. The DUM cable was more flexible and less microphonic than the Moon Audio cable, but the Moon Audio cable was lighter weight and slightly more revealing sonically.

As noted, I found the Ether C was an easy headphone to drive, even with less beefy portable players. The Astell&Kern AK Jr had no problems pushing it to satisfying levels at around 45 on the AK's 0–75 volume scale. The Sony NW-ZX100HN needed a setting of only 16 on its 0–30 scale to play loudly. Unlike some earphones, such as the Sennheiser HD 700, which benefit from using a balanced connection, I found the Ether C did not improve sonically when I used the balanced headphone connection on the Mytek Brooklyn or the Auralic Gemini 2000.

## Sound

The first difference I usually notice when I go from an open-headphone design to a closed one is that the size of the stage shrinks and recedes to the point where there is no sound extending beyond the confines of my cranium. In this regard, I noticed very little difference between the Ether C and the open-backed Ether. Both headphones displayed excellent image specificity and both created a large three-dimensional soundstage that seemed to extend outside the physical limits of the headphones (and my head). While the Stax SR-L700 coupled to the Stax tube-based SRM-007tII created an even larger soundstage than the Ether C connected to the Mytek Brooklyn, the Ethers were just as three-dimensional and placed instruments just as precisely in space as the SR-L700.

Another area where closed-enclosure headphones usually suffer in comparison to open

## SPECS & PRICING

**Type:** Closed-back planar-magnetic
**Sensitivity:** 92dB/mW
**Impedance:** 23 ohms
**Driver:** 2.75" x 1.75" MrSpeakers-designed single-ended planar-magnetic (with V-Planar surface processing); matched +/-1.5dB between 30Hz and 5kHz

**Weight:** 390g (13.8oz)
**Price:** $1499–$1699, depending on cable choice

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# Equipment Report MrSpeakers Ether C Headphone

ones is in their sense of "openness" and air. Again I found the two Ethers virtually identical in these regards. On an MQA-encoded recording of Beethoven's "Emperor" piano concerto, both headphones had the same amount of air and spaciousness and both allowed me to hear the sound bloom from the piano's location in the middle of the stage to the outer edges of the proscenium. On my own recording of Chris Thile practicing Bach, the Ether C had the same amount of space and ambient detail as the Ether.

Bass extension from the Ether C was also very similar to the open-enclosure Ether. Neither headphone is as "bass-centric" as some 'phones, such as the AudioQuest NightHawk. The Sennheiser HD 700 has a bigger, more pronounced midbass, but it doesn't have as much control or definition as the Ether C. On some pop recordings I did wish for a bit more low-bass slam, but given a choice between the Ether C's tight definition and a bigger, sloppier, bada-boom low end, I prefer the Ether C.

The midrange is, as we all know, where most of the music resides. And the midrange is where the Ether C excels. Vocals, whether male or female, were rendered with spot-on harmonic balance. Unlike some headphones, such as the Sennheiser HD 700, which give female vocalists a bit too much treble emphasis, the Ether C lets mezzo-sopranos stay mezzo, not elevating their timbre to coloratura. On the other end of the spectrum, male vocalists didn't have any additional chestiness added to their tone. The Ether C's midrange tonal accuracy is so good that I would have no hesitations using them as on-location recording monitors.

As I've gotten older my sensitivity in the upper treble has become limited to 14kHz. So commenting on treble extension is something I realize needs a qualifier. But one test I've found very useful when testing a headphone's upper-frequency response is a sinewave sweep in mono from 15kHz to 500Hz via the Audiotest app on my Mac. This test reveals several things. First, if there's any imbalance between the right and left channel at high frequencies the signal will move off the central position it should occupy towards the side with higher output. Some headphones, especially less expensive models with less stringent driver matching, can exhibit multiple pulls from one side to the other as frequencies change. This test also lets you know if the frequency response has any noticeable bumps or dips in level at certain points. Much as I enjoy my pair of Sennheiser HD 700 headphones, they exhibit several very noticeable peaks in their upper midrange and lower treble that diverge from flat when I run this test. Also my particular pair of HD 700s pulls to the left between 11kHz and 7kHz. Conversely, the Ether C had no pulling from side to side or obvious peaks as the sinewave worked down from 15kHz to 500Hz.

As I discovered when I reviewed the AudioQuest NightHawk headphones, many headphones add some amount of additional upper-midrange energy to increase perceived detail. While certainly brighter than the NightHawks, the Ether C occupied a well-considered middle ground between top-end darkness and excessive detail. During the review period I did a lot of A/B listening tests between MQA and non-MQA files. Through the Ether I could easily hear how the MQA version of the sample file of Keith Jarrett's *Köln Concert* had less intermodulation distortion on the leading edges of piano transients than the 96/24 version. I could also hear further into the background in the MQA version. These differences are rather subtle, but the Ether C made them relatively easy to hear.

## Competition

Because of their price, the Ether C has a lot of competition, but most models are open, rather than closed, enclosure designs. The Audeze LCD-2 Bamboo ($995 street), which I've used as a reference for a while, has a slightly smoother upper midrange and equally precise imaging characteristics. The LCD-2 also produces a slightly larger soundstage and more low bass. But when it comes to comfort the Ether C easily bests the LCD-2 due to its lighter weight and lower side-pressure.

Although discontinued several years ago, the AudioTechnica ATH W-3000ANV ($1299) has been my go-to closed headphone due to its comfort, high level of isolation, and overall fidelity. Compared to the Ether C, the AudioTechnica ATH W-3000ANV has a noticeably warmer midbass and more piquant upper midrange. The AudioTechnica ATH W-3000ANV also has a smaller soundstage, but equally precise imaging capabilities. Comfort-wise I'd give the Ether Cs the edge, but not by much.

## Conclusion

When I travel I need three pairs of earphones—one in-ear monitor for on the airplane, one open enclosure for the waiting area (so I don't miss out when they change gates on me), and one closed-enclosure headphone because sometimes you need more isolation than an open pair but not the 30dB isolation of in-ears. And while I have multiple options for reference-level in-ears and open-enclosure full-sized headphones for travel, when it comes to closed-enclosure, full-sized, over-ear headphones that are reference-level the options have been more limited. The MrSpeakers Ether C fills that last category nicely. It combines great sound, exceptional comfort, wide-ranging portable-player compatibility, and good isolation with A+ build-quality and an elegant physical design. What's not to like? tas

# Our Top Picks Personal Audio and Headphones

## Astell&Kern AK Jr Portable Player
**$299**

Unlike many portable players that include a balanced headphone output and claim to be able to drive every transducer that anyone has ever placed on his head, the Astell&Kern AK Jr is designed to power reasonably efficient headphones. Couple it with one of the many headphone options available in the $300 to $500 range, and for under $1000 you too can have a wonderful portable rig that delivers superb fidelity and simply slides in your pocket without any unsightly bulges. Indeed, the only things that are really junior about the AK Jr are is its size and its price. (review forthcoming)

## HiFiMan HE400S Headphones
**$299**

The smart hi-fi men at HiFiMan of Hong Kong have figured out how to deliver the sonic benefits of planar-magnetic headphone technology for under $400. The HE400s delivered detail and spaciousness that blew reviewer Julie Mullins away. Plus, the HE400S are so high in sensitivity they can be driven by your smartphone—no outboard amp required. Great sounding, and a great value, too. (261)

## Onkyo DP-X1 MQA Portable Player
**$799**

Onkyo's DP-X1 offers a unique set of features and capabilities at a highly competitive price. It uses two amplifiers and two digital/analog converters to deliver a true balanced signal. While the DP-X1 may not be quite as disruptive a new technology as MQA, it does call into question why, except for aesthetics or ergonomics, anyone would choose another player if his budget maxed out at under $1000. Reviewer Steven Stone predicts that Onkyo will sell a lot of DP-X1 players because it is currently the best value out there in flexibility, functionality, and sound. (266)


## Berning microZOTL2.0 Headphone Amp
**$1100**

Reissued under license by Urban HiFi, the new microZOTL2.0 maintains the internal circuitry of the original, which was discontinued in 2007, but offers an external power supply and improved functionality and parts-quality. Sonically, the new and improved microZOTL2.0 surpasses the original. Although it can be configured as a line preamp or used as a personal amp, it shines as a headphone amplifier, delivering an emotionally charged listening experience by using a 6SN7 triode as a power tube. An outstanding bargain, in DO's opinion it represents the pinnacle of desirability in headphone amplifiers. (260)

# CABLES & POWER PRODUCTS

## Contents

Click any product name to read that review

# Equipment Report

## Shunyata Venom PS8 Power Distributor, Venom Defender, and Venom HC Power Cord

### How Dedicated Are You?

Neil Gader


**Shunyata must've seen me coming**. It has designed a system that takes the existing AC power entering a listening room to the next step without engaging the services of an electrical contractor. There are three basic components to its entry-level Venom Series of power products, starting with a Venom PS8 power strip. Nicely constructed of heavy, brushed steel, the PS8 is 20-amp rated to cover even the most demanding high-current components, provides eight Hubbell outlets that are cryogenically treated using Shunyata's Alpha process, and a tough Carling Hydraulic Electromagnetic breaker. It sits on thick rubber feet, but steel spiked-footers with floor protectors are also offered as a $195 option.

The second component is the Venom Defender—a tidy little plug-and-play power conditioner. Chassis-free, it's a plug-in module that incorporates the MPDA (multi-phase-differential-array), thirty-element parallel filters found in Shunyata's flagship Hydra models. Ruggedly built, Defender is equipped with 20,000 amps of surge protection and its own LED fault-detector. It can be plugged directly into the PS8 or, ideally, into the same wall outlet.

The final link in Shunyata's power chain are the Venom HC power cords. Big brothers to the original Venom cords (still a steal), they use heavier 10-gauge conductors, and employ hand-soldered contacts that are crimped to improve the metal-to-metal contact integrity.

All Shunyata components are cryogenically treated. Each can be purchased individually, but these three have been designed and priced to perform in trio. With three Venom HC cords, the complete Venom system Shunyata set me up with retails for under $1800.

Shunyata's Grant Samuelson filled me in on Venom system particulars. He reiterated that "all home electronics are extremely peak-current-sensitive. Their power supplies draw current dynamically off the peak and trough of the sinewave. Any break or open contact in the electrical chain represents a loss that can affect

# Equipment Report

## Shunyata Venom PS8, Defender, and HC power cord

system performance."

Shunyata, he says, "views current delivery as a high-frequency event, not a low-frequency event because systems draw current at a high-frequency and they output high-frequency noise. It all starts and ends with junction integrity, material quality, material manipulation—all aimed to lower the insertion-loss of the device. The overriding design goal of this system is to minimize peak-current loss at every junction.

"The Defender builds upon the foundation the PS8 establishes. Its filters are computer-modeled to capture and filter the high-frequency noise that exists on any line and prevent it from re-circulating within the system. All of this is accomplished without any added connections and with no loss of peak current integrity—which is our baseline for performance."

### All Amped Up

My approach to evaluating power strips, power cords, and line conditioners pretty much comes down to the same tried-and-true methodology. After concluding a period of extended listening with the current reference system, I unplug the entire rig, substitute the electricals under evaluation, and let 'er rip. Electronics in this instance were the Parasound JC 3 phonostage, the mbl Corona C11 preamp, and the mbl C21 stereo amplifier in rotation with the Aragon 8008 amp (review to come)—a system requiring three power cords. A Meridian Director USB DAC decoded computer-sourced files.

My first impression of the Venom system flat-out caught me off-guard, largely because my expectations were built on previous encounters with power distribution products, some good, some not so good. I began by cueing up The Wasps Overture [RCA] followed by the third and fourth movements of the Beethoven Ninth Symphony [Decca]. In each instance I heard the same thing, which arrived in the form of newly discovered orchestral weight and a more rigidly grounded soundstage. The system revealed a density change in the way I perceived ambient information. At first I thought I was hearing a tonal shift downward, as if a darker palette of colors were being applied to the performance. But in truth this was more about system or line noise being reduced to the extent that significantly more ambient information and harmonic minutiae from venue and orchestra were freely emerging.

Celli and bass viols exhibited more pitch precision and less bloat. The individual voices of a chorus were unwavering in space and could be more easily pinpointed, almost visualized. String section layering was better defined in depth. The Venom system was not just quieting the system down; it was also allowing resolution within those silences of the acoustic/reverberant life that exists between notes or during musical pauses, but which is so often obscured. It was like the air was fueled with a different mixture of energy and harmonics. I listened closely to Copland's Fanfare For The Common Man and its near overpowering dynamic swings. Thankfully, what I didn't hear was a softening or smoothing over of transient detail and contrasts. The textures of music, from the reedy and bristly to the buttery, were fully represented. Compression of dynamics—the bane of many conditioning products–was non-existent on either the micro or macro scale.

Weirder still was that when I took out the Venom system the individual artists of St Martin's in the Fields, performing excerpts from Stravinsky's Pulcinella, seemed somewhat abandoned, as if they were separated by acoustic dead zones rather than joined as a contiguous ensemble. With the PS8 out of the system, the air and dimensionslity, the swirl of ambient activity became spotty. The impression of a single soundspace unbroken from one end of the proscenium to the other, upstage and down, sounded more thread-bare, like an unframed musical canvas. Reinserting the Shunyata into the system, the fully framed picture rematerialized.

When I turned to pop vocals like Shelby Lynne's "Just A Little Lovin'," I encountered the same enriched ambient quality that I had with symphonic recordings. In this instance it was the distinctive, heavily damped, reverb-washed character of the recording studio. Imaging on this disc was truly stunning. Drums, bass, acoustic guitar cues were so clean, quick, and stable that it was as if someone had applied a squeegee to a grimy window. Even the title track's metronomic hi-hat had more drive and a thicker, less tinny quality. The Shunyata found more sustain in the instrument, while the slight smearing that collected in the wake of certain of its transients all but vanished. Bass response was further defined in character and timbre. For example, the bass vamp that kicks off the intro to Holly Cole's "I Can See Clearly" didn't come off as more deeply extended per se but as considerably tightened up, with more rhythmic bounce and melodic character.

In as little time as it takes to plug in a couple


power cords, I've gone from skeptic to believer. The Shunyata Venom system refined the voicing of my system to an extent I never would have predicted at the outset. And I never felt the music was being compromised. To be clear, Shunyata doesn't promise a seismic shift in system performance, but a subtle clarification of previously hidden musicality. Don't look at me to pull the plug anytime soon. For the dedicated among us (without a dedicated line) the Venom system represents a cost-effective, plug-and-play, real-world solution to power issues. Another way of saying that I guess I better tell my electrical contractor not to wait up for my call. tas

### SPECS & PRICING

**Venom PS8**
Number of outlets: 8
Price: $695
**Defender**
Price: $195
**Venom HC Power Cord**
Price: $295/1.75m

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# Equipment Report

## Morrow Audio SP7 Grand Reference Speaker Cable and MA4 Reference and MA7 Grand Reference Interconnects

### Up-and-Comer

Neil Gader


**Morrow Audio is a relative** newcomer to the high-end cable segment. Founded in 2006 and based in Independence, Kentucky, the company currently manufactures both a pro line as well as a comprehensive consumer line that includes power cords and an expanding assortment of headphone cables. Morrow's interconnects and speaker cables are divided into seven levels not including the Elite Grand Reference Series, which, as the name implies is in a class of its own. Common to all Morrow cabling is a three-pronged design philosophy that it describes as SSI Technology—an acronym for solid-core, small-gauge, individually insulated. Key to Morrow's SSI configuration is the excellent RFI- and noise-rejection characteristics that its technologies are said to bring to the table.

My review samples included two levels of interconnects, the MA4, the MA7, and the marque's penultimate speaker cable, the SP7. The MA4 consists of 24 runs of insulated silver/copper conductors and is thin, very lightweight, and manageable. The MA7 ups the ante with 72 runs with its stiffness increasing only slightly. The SP7 speaker wire consists of a whopping 120 runs. For insulation Morrow uses PVDF, a plastic material of the fluoropolymer family. The wires are finished with nylon jacketing and silver-soldered to a choice of terminations. The cables have an attractive, nondescript appearance and are refreshingly light and pliable. Whereas some cables approach the rigidity of conduit pipes, Morrow makes it a breeze to angle its offerings around equipment or furnishings.

Morrow Audio might be the new kid on the block, but its wire performed like an old pro. The entry-level MA4 was nicely weighted with a firmly centered midrange sweetspot that focused images with clarity and conviction. In all-out extension, MA4 is a hint subtractive in that it couldn't fully capture the air and ease of the fancier MA7 interconnects. For example, when it was tasked with reproducing the complexities of orchestra and chorus during Beethoven's *Ninth* [Chicago, Solti, Decca], the imaging of each section grew a little less distinct, the dimensional outlines of the hall a bit imprecise. The sound also wasn't quite as dynamically charged, exhibiting hints of compression on the gut-churning opening kickdrum of The Police's "Murder By Numbers."

However, the MA4 is particularly well suited to the entry-level world in that it possesses a darker, more forgiving character that soothes and slightly softens treble anomalies rather than resolving every last harmonic detail. This makes it an ideal palliative for systems that already have some attenuation in the lower frequencies and might also have a bit of a treble kick that tends to bleach orchestral string and brass harmonics. At this juncture, I always return to the all-important issues of perspective and system-matching. As well positioned as the MA4 is in its entry- to mid-level niche, it would be overmatched in the company of ultra-high-performance electronics driving resolution monsters like the Vandersteen Treo CT (review forthcoming) or the Wilson Audio Sabrina (Issue 256). Naturally that's why Morrow Audio offers Level 7.

If the MA4 proved to be a great warm-up act, the combination of MA7/SP7 was a very satis-

# Equipment Report

## Morrow Audio SP7, MA4, and MA7 Cables

fying main event. Compared with the MA4, the darker overall character was lifted. And while the MA4 was midrange centered, the pricier MA7 spiced up harmonics and offered more than a bit juicier textures. It fully restored the delicacy and dynamic throw-down of pianist Ivo Pogorelich's performance during the Mozart Piano Sonata in A Major [DG]. Though a little cooler overall than its budget sibling, the MA7/SP7 wire was by no means bright or edgy. The sibilance range was nicely controlled and conveyed naturally occurring energy rather than a hard sizzle. Also on hand were very good low-level resolving power and solid bass responsiveness. During Nickel Creek's "Sabra Girl," I admired how the MA7/SP7 captured the delicate, acrobatic character and transient speed of Chris Thile's mandolin, and the ripe resonance of the acoustic flat-top accompaniment, and fiddle player Sara Watkins' touching vocal on *This Side* [Sugar Hill]. In soundstage and dimensionality, the Level 7 combination came up a little short of reference level in conveying the vast spread and dimensional depth that top-tier cables such as the much more expensive Kimber Select KS and Synergistic Atmosphere offer. During Norah Jones' "The Nearness of You," her piano didn't fully inhabit the soundspace and decay into the resonant hall. And micro-dynamic differences were not as distinguishable. In comparison, my reference wire placed Pieter Wispelwey's cello precisely within a pocket of the orchestra, while the Morrow was a little more tentative in committing to this unambiguous, locked-down position [Bruch, Channel Classics]. However, in terms of the absolute sound—acoustic music recorded live in a hall—on balance, the Morrow wire bore most of the hallmarks of the very best cables, particularly in the areas of dynamics, tonality, resolving power, and harmonic nuance. It possessed a general ease and lack of artifice when reproducing complex groupings of musicians on the symphonic stage.

Setting performance aside for a moment, Morrow Audio is also making an aggressive play on the marketing side of the equation. For example, all Morrow Audio wire comes with a lifetime guarantee. Morrow also offers bundle packages, an "easy pay program" option, a break-in service option, and a 60-day return. That's what I call *confidence.* Morrow is even shaking things up in the more freewheeling headphone market with innovative ideas such as color selections for some headphone cable models.

By any standard, Morrow Audio is an up-and-comer. Its products may not be head-turners to look at, but in the high end performance is where the rubber meets the road, and perform Morrow's cables do. Going forward I expect its offerings will challenge many of the more highly regarded notables. An impressive debut. tas

### SPECS & PRICING

Price: Interconnects, MA4 $329, 1m/pr.; MA7, $1399/1m pr.
Speaker cable: SP7 level, $1499/2m pr.

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# Equipment Report

## Shunyata Research Venom Interconnects and Speaker Cables

### No Snake Oil

Julie Mullins

**Whether it's cries of "snake oil" or** balking at prices, of all the components in an audiophile's system none seems to raise more hackles than cables. But like it or not, cables can—and do—make a difference. Naturally, quality of materials and construction are the entry-level essentials for achieving desirable sonic results.

Shunyata Research is not your typical cable manufacturer. Though the company invests most of its budget in top-tier parts and materials, its main focus is keeping prices as low as possible for the end user. In keeping with this philosophy, the Venom Series is Shunyata's most affordable line yet to meet high-performance standards, and under review here are the Venom speaker cable and interconnects. The "Research" part of the Shunyata name isn't just a catch-phrase; it's a nod to the on-going R&D and real-world science the manufacturer brings to the table, from the eight patents held and the other nine pending, to white papers on its measurements and problem-solving prowess.

Since it began sixteen years ago, the Poulsbo, Washington, company has quietly (or perhaps not so quietly) specialized in the design and construction of cables, interconnects, power conditioners, and other accessories. Shunyata Research is led by founder and CEO Caelin Gabriel—an audiophile who has a military background working for top-secret, NSA-type projects. It also happens that Gabriel is an expert low-level-signal scientist specializing in distortion reduction. So it follows that in addition to some pro-audio market interests—legendary record producer Rick Rubin is reportedly a fan—Shunyata also now leverages its signal-distortion-reduction technologies for applications in the medical field—electrophysiology imaging used in cardiology clinics and for heart surgery. Every product Shunyata makes is geared towards maintaining signal integrity, be it for audio or cardio, and eliminating distortion or keeping it from getting in the way.

Designed to punch well above their price points, the Venom cables and interconnects use a proprietary hollow-core conductor that Shunyata calls VTX. According to Shunyata, VTX is a type of wire geometry that approximates a virtual tube, containing small, microfine wires that form a hollow core wherein the signal travels over the wires' surfaces in a more linear path to eliminate skin effects and random eddy currents. This hollow-core VTX design is fabricated from highest-purity copper and, according to Shunyata, only two factories in the world (both in Japan) are licensed to make that conductor's OCC copper. Rather than relying on off-the-shelf connectors, Shunyata also has them custom-made.

As for external characteristics, the Venom cables are highly flexible and pliable (I could wrap them around my slim wrists)—not only in their length but also in their termination options, thanks to Shunyata's STIS (Speaker Terminal Interconnect System), which allows you to swap out termination types simply by unscrewing the one on the cable and screwing on a different one. Their form factor is on the slim side, but it makes the wires that much easier to connect in the tighter quarters of certain power components.

How do the Venoms sound? After living with these speaker cables and interconnects in my reference system most of the time for several months, I found both to be very natural, open, and dimensional. In other words, in much the same way that Shunyata's designs strive to keep distortion out of the signal path, its cables get out of the way of the music. The Venom speaker cables and interconnects offer a reasonably

# Equipment Report

## Venom Interconnects and Speaker Cables

neutral palette with pleasing delicacy of detail and rich, warm harmonics. To borrow a favorite expression from JV, they are quite *gemütlich* and sweet, without glare or etching. Some might find them a touch polite dynamically (I don't), but that's a matter of personal taste.

On some harder-hitting indie rock tracks such as the title cut from El Vy's *Return to the Moon* LP, at times I longed for just a little more transient impact, which occasionally prompted me to turn up the volume a bit (not a bad thing with El Vy), and the midbass was nice and full though not the very last word in definition. Backgrounds were quiet, however, and I never noticed any upper-midrange glare. A listen to the Mobile Fidelity LP reissue of *Special Beat Service* from The English Beat played back as pacey as you please, with crisp, clean-sounding percussion, full of the lively snap and energy that define ska. Palpable images of sax, trumpet, and vocals emerged sounding very natural and wonderful.

On a different note, a listen to Khachaturian's *Masquerade* Suite (RCA Living Stereo LP reissue from Analogue Productions) revealed the majestic sweep, scale, and dynamics of the full orchestra, from forte to pianissimo and beyond. Strings sounded gorgeous, particularly in the second movement, conveyed with a silky smoothness, a sense of ease, and a natural sweetness. Woodwinds, especially oboe, were also quite realistic. Sure, I have heard harder-hitting transient response from snare and cymbals, but the presentation was far better than respectable—especially given these friendly price-points. I was pleased.

Perhaps what's struck me as most noteworthy is that when compared to several *far* more expensive cables I've had in my system the sonic differences didn't prove to be nearly as stark or glaring as I would have expected. Naturally, most of you won't be pitting cables in this low-to-mid three-figure price category against those retailing for well over five figures, but my point is that, even if you do make this comparison, Venom's cost-to-performance ratio is remarkable, as is the line's lifetime warranty.

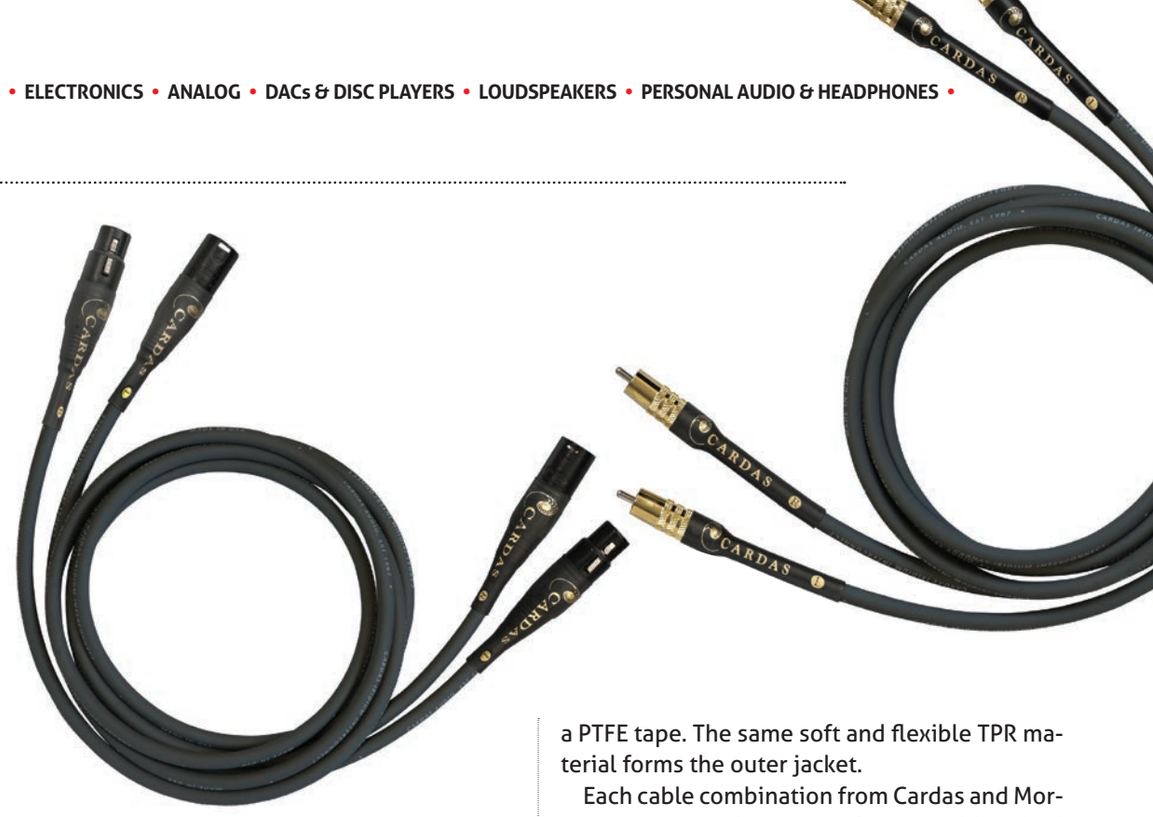
Based on my experience with the Venom cables and interconnects, the line exemplifies the company's primary focus on developing products with an eye to maximizing quality while striving to get to the lowest possible retail prices. It's unusual for a cable in this price range to contain Ohno cast copper (OFE 101 certified), for instance, but the high-grade materials and build-quality seem to have paid off handsomely. These lovely-looking and -sounding cables are easy to handle, easy on the eyes, and, most importantly, easy on the ears. As such, the Venom wires would be welcome additions to any system, whether for the hi-fi newbie or any audiophile on a budget. These offer hard-to-beat value—no snake oil here! tas

### SPECS & PRICING

**Price:** Interconnect, $295 1m/pr.; speaker cable, $595 (custom lengths also available)

**SHUNYATA RESEARCH**
26273 Twelve Trees Lane
Poulsbo, WA 98370
(360) 598-9935
shunyata.com

# Equipment Report




## Morrow Audio 5 Series & Cardas Audio Iridium Interconnects and Speaker Cables

### No Snake Oil

Julie Mullins

**The old Chinese philosophy** of yin and yang may not apply completely to this pairing of Cardas Audio Iridium and Morrow Audio 5 series of interconnects and speaker cables, but there are some correlations. I'm sure many TAS readers think that cables can't really affect sound if they are made correctly. On the surface this may seem a reasonable assumption, but in listening tests there can be noticeable differences, some of which I'll discuss shortly.

Morrow Audio supplied two pairs of 2-meter MA5 interconnects ($758/pair) with standard RCA connectors and a 3-meter set of SP5 speaker cables in a bi-wire configuration ($858) with spade terminals on both ends.

The MA5 interconnects are handcrafted with 36 runs of Morrow SSI wire. SSI is a solid-core, small-gauge, individually insulated, silver-coated copper wire. The wire is silver soldered to the termination (interconnect or speaker cable) of choice. The user options for the interconnect include a choice of standard RCA, Eichmann KLE Copper Harmony RCA, Eichmann KLE Silver Pure Harmony RCA, or Neutrik silver-coated XLR connectors. The SP5 speaker cables contain 72 runs of the same Morrow SSI wire. The cable options include a standard run with a single termination at both ends, a bi-wire run with a pair of terminations at the speaker end, or a bi-amp run with dual terminations at both ends. The length of the termination wires at both ends can be the standard 6", 12", or 18". SP5 termination choices include standard spade, small spade (for screw terminals), banana, and bare wire. The final choice for MA5 and SP5 is break-in service—up to two days of break-in is free (5 or 10 day service is available at an additional cost).

Cardas Audio supplied two pairs of 2-meter Iridium interconnects ($320/pair) with Cardas GRMO RCA connectors and a 3-meter set of Iridium speaker cables ($500) with Cardas CGMS spade terminations. The speakers used for the listening sessions require bi-wiring or bi-wire jumpers. Using an additional set of Iridium speaker cables to bi-wire would have doubled the cost of the speaker cable as this model doesn't allow for a bi-wiring configuration. For this report Cardas supplied a 6" set of its 11.5AWG bi-wire jumpers ($150).

The Iridium interconnects are Grade 1 OFHC 99.9999% copper Litz wire with a cross-field geometry in an insulated FEP jacket. The geometry of the wiring is said to be a shielded star-quad 4 arrangement in golden ratio proportions bound together by PTFE tape while the hybrid shield is spiraled tin-plated copper surrounded by carbon-impregnated PTFE tape. The outer jacket is made from a soft and flexible TRP material. The speaker cables are made from the same Grade 1 OFHC 99.9999% copper Litz wire with a cross-field geometry in golden ratio proportions in an insulated FEP jacket. The geometry of the speaker cable is a twisted pair using natural cotton filler wrapped together with a PTFE tape. The same soft and flexible TPR material forms the outer jacket.

Each cable combination from Cardas and Morrow was run in the system for several hundred hours with incremental listening along the way. The general subjective character of the cables didn't change significantly, though the cables did tend to shake off a bit of edge that overlaid the music at the start. The sound character mentioned below was identifiable on every genre of music played during this evaluation. The listening was done with three different sources (digital CD/SACD, vinyl, and ¼" two-track reel-to-reel) through the available preamps and amplifiers into the Vandersteen Model 3a Signature speakers.

The Morrow Audio MA5 interconnects and SP5 speaker cables were consistent across all sources and equipment combinations. The pair tended to display an abundance of energy and detail from the upper midrange through the lower treble. This extra information was not hard-edged or rough. On the contrary, it resulted in a pleas-

# Equipment Report Morrow Audio 5 Series & Cardas Audio Iridium

antly highlighted presentation. For instance, on "If It's Magic" from *Soulcall* [Concord] Nnenna Freelon's voice sounded more intimate with an accent on the sweet smoothness of her singing. The addition of highlights on the backing guitar was an added bonus that seemed to spotlight both the fingering of the strings as well as the upper harmonics of the notes. This effect turned the performance into one that was a bit lighter and airier sounding than usual. I observed a similar airiness and lightening of sound character on Nnenna's rendition of "Straighten Up and Fly Right" with Take 6's *a cappella* backup. Nnenna's voice (along with the male vocals of Take 6) tended to lose some gusto in favor of a more floating and less weighty character. The effect was also noticeable in the speed and openness of percussion instruments. The Chesky label's album titled *The Coryells* displayed this same upper-midrange enhancement on the allegro of "Sentenza Del Cuore" by bringing the percussion playing of Alphonse Mouzon forward, roughly on the same plane as the guitars of the three Coryells (Larry, Julian, and Murali), while bassist Brian Torff moved a bit further back than normal. The reflections of the percussion in St. Peter's Episcopal Church were enhanced and easily heard.

Despite the upside of music played back with the MA5/SP5 combo, there was a reduction in amplitude and dynamic intensity in the bass, which affected the underpinning in the power region and bottom octaves. On *The Coryells*, "Goodbye Porkpie Hat" gave up a bit of authority and tended to favor the strings over the instrument's body. While the sound wasn't aggressive, it did skirt the edge of this listener's limit without going over it.

The Iridium interconnect/speaker combination showed similarly consistent performance across all sources and equipment combinations. The Iridium leaned toward being a bit more even in sonic distribution with a slightly warmer-than-neutral presentation. Music playback was better proportioned with no enhancements and a slight reduction in low-level resolution and bass dynamics (more bass than the MA5/SP5 but still slightly less than desired). As a result, "If It's Magic" sounded full though not as detailed, with a natural flow to the sound that was inviting. "Straighten Up and Fly Right" had a bit more gusto and foundational underpinning, adding to the realism of the male backup vocals. The allegro of "Sentenza Del Cuore" had less of an enhanced percussive effect, which deepened the soundstage of St. Peter's Episcopal Church where this disc was recorded. The balance was closer to what I am used to hearing, but with slightly less instrumental decay and greater warmth.


Though I enjoyed the Iridium's evenness, there was an ever-so-slight lessening of low bass and a bit less detail and transparency than I'm used to. For instance, on "Better Than Anything" there was a reduction in the decay on Nnenna's voice and in the resolution of the fingering of the bass during the introduction.

Neither the Cardas Iridium nor the Morrow MA5/SP5 cables were harsh, aggressive, soft, woolly, or edgy—and yet they did have some contrasting sonic properties. A user's preference for either of them will come down to system performance and sonic priorities. In a system that could use a bit more emphasis on the upper midrange and lower treble along with a lowering of bass energy, without any overt losses of tone and speed, the Morrow Audio MA5/SP5 might fit the bill. If the system could use a bit fuller sound with additional bass authority in the power region and some reduction of upper midrange and lower treble energy, the Cardas Audio Iridium might be right. Despite some skeptics believing cables shouldn't (or don't) matter, these two good performing—but very different—cable pairings could convince some that that skepticism is a bit misguided. In any event, both cable are worth an audition for those looking in this price range. tas

## SPECS & PRICING

**Morrow Audio Series 5**
**Price:** MA5 interconnect, 1m pair, $499 (RCA termination); MA5 interconnect, 2m pair, $758; SP5 speaker cables, 2m pair, $549 (standard), $609 (bi-wired); SP5 speaker cable pair, 3m, $858 (bi-wired)

**MORROW AUDIO**
6608 Dixie Highway
Florence, KY 41042
(859) 356-6994
morrowaudio.com

**Cardas Audio Iridium**
**Price:** 2m Iridium interconnects, $320; 3m Iridium speaker cables, $500; 6" 11.5AWG bi-wire jumpers, $150

**CARDAS AUDIO, LTD.**
480 11th St SE
Bandon, OR 97411
(541) 347-2484
cardas@cardas.com
cardas.com

# Our Top Picks Cables

## Shunyata Research Venom Interconnects and Speaker Cables

**Interconnect: $295 1m/pr.; Speaker: $595**

Shunyata Research is not your typical cables manufacturer. Its philosophy focuses on investing most of the budget in top-tier parts and materials, with an eye to keeping prices as low as possible. In keeping with this ethos, the Venom series marks the company's first foray into more affordable cables that meet high performance standards. Indeed, thus far in her listening, JM finds the sound to be very natural, open, and dimensional—in other words, they get out of the way of the music and the rest of the system to reveal a window right into the presence of recordings. The Venom speaker cables and interconnects offer good neutrality with pleasing delicacy and sense of harmonics. To borrow a favorite expression from JV, they are quite gemütlich and sweet, without glare or etching. It's rare for a cable in this price range to contain Ohno cast copper, but the high-grade materials and build-quality seem to have paid off—handsomely. (266)

## Cardas Audio Iridium

**2m Iridium interconnects, $320; 3m Iridium speaker cables, $500; 6" bi-wire jumpers, $150**

The Iridium interconnects are Grade 1 OFHC 99.9999% copper Litz wire with a cross-field geometry in an insulated FEP jacket. The speaker cables are made from the same copper Litz wire with a cross-field geometry in golden ratio proportions in an insulated FEP jacket. Reviewer AJ found that this Iridium interconnect/speaker combination leaned toward being a bit more even in sonic distribution with a slightly warmer-than-neutral presentation. Music playback was well proportioned with no enhancements and a slight reduction in low-level resolution and bass dynamics. Though he enjoyed the Iridium's evenness, there was an ever-so-slight lessening of low bass and a bit less detail and transparency than he's used to. If your system could use a bit fuller sound with additional bass authority in the power region and some reduction of upper midrange and lower treble energy, the Iridium might fit the bill. (274)

## Morrow Audio 5 Series MA5, SP5

**MA5 interconnect, 1m pair, $499 (RCA termination); MA5 interconnect, 2m pair, $758; SP5 speaker cables, 2m pair, $549 (standard); other options available**

The MA5 interconnects are handcrafted with 36 runs of Morrow SSI wire. SSI is a solid-core, small-gauge, individually insulated, silver-coated copper wire. The wire is silver soldered to the termination (interconnect or speaker cable) of choice. The SP5 speaker cables contain 72 runs of the same Morrow SSI wire. Options for terminations both wires are plentiful. According to review AJ, the pair tended to display an abundance of energy and detail from the upper midrange through the lower treble. This extra information was not hard-edged or rough. On the contrary, it resulted in a pleasantly highlighted presentation that was often a bit lighter and airier sounding than usual. In a system that could use a bit more emphasis on the upper midrange and lower treble along with a lowering of bass energy, without any overt losses of tone and speed, the Morrow Audio MA5/SP5 could be your ticket. (274)

## AudioQuest Wind

**$1995 1m/pr. (RCA or XLR)**

Although not entry-level priced, AudioQuest's Wind interconnect nonetheless represents a terrific value. This interconnect features all of AudioQuest's top technologies, and competes with top-tier models at a less-than-stratospheric price. Wind has very little sonic effect on the signals passing through it, and consequently, preserves the music's dynamic verve, spatial dimensionality, and timbral purity. It's detailed and vivid, but not in an analytical way. If you want a cable that softens transients and removes a bit of excessive zip from your system, this isn't it. Dynamics are sensational, in part because of the extremely quiet background. With a quick and taut rendering, the bass is also exceptional. (254)