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the absolute sound

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Buyer's Guide to Personal Audio, Analog, and Vinyl **2016**

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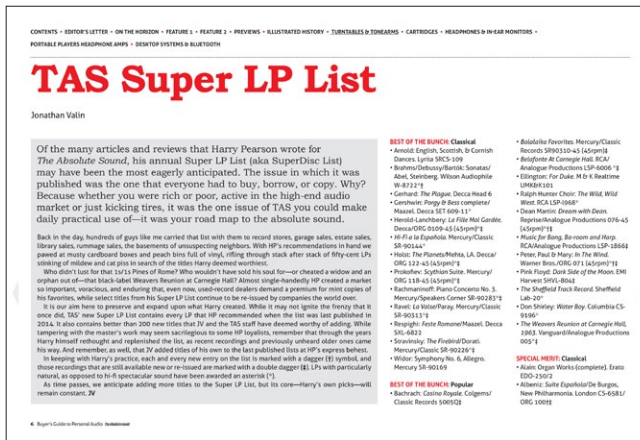
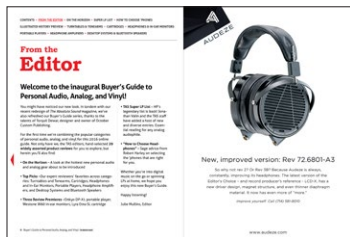
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HOW TO CHOOSE 'PHONES

Robert Harley shares his advice on how to choose just the right headphones in this excerpt from The Complete Guide to High-End Audio, Fifth Edition.

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the absolute sound®

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Buyer's Guide to Personal Audio, Analog, and Vinyl 2016



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From the Editor

Welcome to the inaugural Buyer's Guide to Personal Audio, Analog, and Vinyl!

In tandem with our recent redesign of *The Absolute Sound* magazine, we've also refreshed our Buyer's Guide series, thanks to the talents of Torquil Dewar, designer and owner of October Custom Publishing.

For the first time we're combining the popular categories of personal audio, analog, and vinyl. Not only have we, the TAS editors, hand-selected **29 product reviews**, but herein you'll also find:

- **On the Horizon** – The hottest new personal audio and analog gear about to be introduced
- **Top Picks** – Our expert reviewers' favorites across categories: Turntables and Tonearms, Cartridges, Headphones and In-Ear Monitors, Portable Players, Headphone Amplifiers, and Desktop Systems and Bluetooth Speakers
- **Four Review Premieres** – Onkyo DP-X1 portable player, Astell&Kern AKT8iE and Westone W60 in-ear monitors, Lyra Etna SL cartridge

- **TAS Super LP List** – HP's legendary list is back with updates from JV and the TAS staff! Essential reading for any analog audiophile.
- **"How to Choose Headphones"** – Sage advice from Robert Harley

Whether you're into digital music on the go or spinning LPs at home, we hope you enjoy this new Buyer's Guide.

Happy listening!

Julie Mullins, Editor

A
AUDEZE



New, improved version: Rev 72.6801-A3

So why not rev 2? Or Rev 3B? Because Audeze is always, constantly, improving its headphones. The latest version of the Editor's Choice – and record producer's reference – LCD-X, has a new driver design, magnet structure, and even thinner diaphragm material. It now has even more of "more."

Improve yourself. Call (714) 581-8010

On the Horizon

Hot New Products Coming Your Way

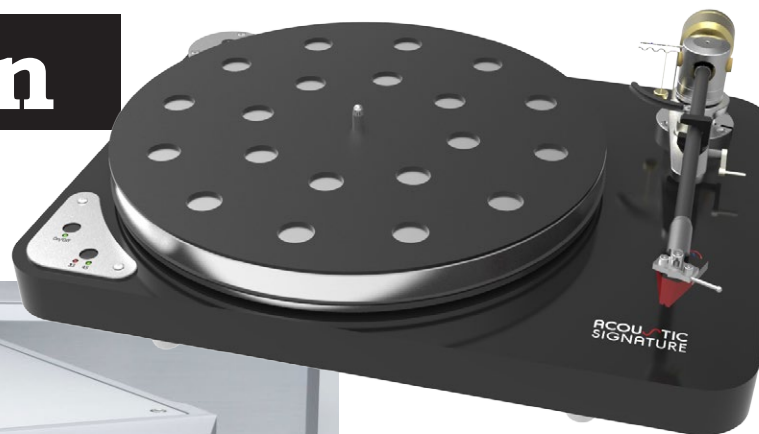
Neil Gader



Pass Labs Xs Phono

The Xs phono preamplifier is a dual-chassis, completely dual-mono phono, designed and built as a cost-no-object statement. Not because Pass Labs' engineers disdain affordability. Rather, because its engineers wanted to build the best-sounding phonostage they possibly could. Lead designer Wayne Colburn commented, "We tend to do well with products that we want for ourselves. Some of it is purely for us to have a reference." The Xs has three separate inputs (for those with more than one tonearm) with memory settings for each, improved shielding (for lower noise), and more accurate RIAA compensation. The use of custom-made capacitors and shock-mounted, gold-clad, custom ceramic circuit boards designed for RF applications all contribute to moving the Xs Phono up "into a different league—lower noise, better dynamics, all those things" says Colburn. "It's a synergy of all the parts."

Price: \$45,000. passlabs.com



Acoustic Signature Primus Turntable

The Primus represents Acoustic Signature's latest model. It is fully equipped with an Acoustic Signature TA-500 tonearm and mounted with an Acoustic Signature MM-1 cartridge. As is widely known, Acoustic Signature is a leading manufacturer of high-end turntables that have

been distributed worldwide since 1996. Offering turntables ranging in price from \$1995 up to more than \$100,000, all its products are engineered and produced at the Acoustic Signature factory in Germany. Acoustic Signature also offers a wide range of tonearms from entry-level to reference-quality performance. Known for excellent sound and remarkable build-quality, its Tidorfolon Bearing for example, comes with a ten-year warranty. Acoustic Signature employs more than twenty highly skilled workers including goldsmiths and watchmakers as well as engineers producing some of the finest turntables in the world.

Price: \$1995. acoustic-signature.com



Aurender Flow Portable DAC/Headphone Amp

Aurender, known for its award-winning music streamers/servers, also leads with its stylish Flow, a DAC/headphone amp that is robust enough to drive any headphone. Flow's 32-bit/384kHz, DSD64/128 DAC expertly renders the most robust of high-resolution audio content. In addition to its USB 3 and SPDIF optical inputs, there is also a 6.35 phi standard headphone jack. In keeping with its advanced capabilities, Flow's industrial design is equally noteworthy—the DAC and amp are housed in a sleek, gently curved, smooth aluminum case with an LCD multiple-status display, which is inside a velocity-sensitive volume control dial. Conveniently, Flow can store up to 1TB of music via its user-installable optional mSATA slot inside the unit. Thanks to this substantial storage, Flow can conceivably contain a user's entire music library, including both high-resolution and lower-resolution files. **Price:** \$1295. aurender.com

On the Horizon



AudioQuest Conductive LP Cleaner

Unlike other "anti-static" record brushes that are only semi-conductive and do little more than move debris from one point on an LP surface to another, AudioQuest's new Conductive LP Cleaner uses a simple but ingenious design to *truly* eliminate static, while removing even the finest particles of dust. By simply grasping the gold-plated portion of the brush's handle, the user creates a near-dead short circuit to neutralize the electric charge that often plagues vinyl playback. Further, with its tightly packed, ultra-fine carbon-fiber bristles—approximately 624,000 of them in total—AQ's Conductive LP Cleaner takes a no-nonsense, no-holds-barred approach to vinyl maintenance, aiming to be most effective record-cleaning brush on the market. Expected availability: Fall/Winter 2016.

Price: \$19.95. audioquest.com

By simply grasping the gold-plated portion of the brush's handle, the user creates a near-dead short circuit to neutralize the electric charge that often plagues vinyl playback.

Audeze LCD-X Headphones

Dynamic, nimble, neutral, and transparent, the LCD-X from Audeze is capable of revealing recordings in their entirety. It has become the ultimate tool for recording engineers, creators, and audiophiles alike for its clean, accurate sound. The sense of space is enormous, and the midrange and high-frequency detail permit the user to hear farther into the recording with more air and separation between performers. Its bass frequencies are legendary. The LCD-X is thoroughly engineered and meticulously handcrafted using the finest, most luxurious materials combined with cutting-edge, patented planar-magnetic technologies. It features diaphragms thinner than a human hair, unique proprietary Uniforce voice-coils, and advanced Fazor Elements for fast response times, dramatically reduced distortion, higher resolution, and improved imaging. The LCD-X is built by hand in Audeze's California factory.

Price: \$1699. audeze.com



AudioQuest NightOwl Carbon and NightHawk Carbon Headphones

A direct descendant of AudioQuest's award-winning NightHawk semi-open headphone, the closed-back NightOwl improves upon its predecessor's fit and finish, provides exceptional isolation from external sound, and includes a durable cable with mic and smartphone controls. Distinct from NightHawk, which features a semi-open design characterized by AQ's biomimetic sound-diffusing grille, NightOwl conceals a vent beneath the central circular portion of its earcups that runs along the perimeter of each dome and exits through a hidden airflow-resistive port, thereby creating an aperiodic damping system. Meanwhile, compared to the original NightHawk, NightHawk Carbon boasts several acoustic, ergonomic, and cosmetic refinements; it also adds a second pair of earpads, and includes NightOwl's more versatile cable, while retaining its predecessor's exceedingly low distortion, remarkable comfort, and non-fatiguing sound. Expected availability: Fall/Winter 2016.

Price: \$699 each. audioquest.com

On the Horizon



AudioQuest DragonFly Black & Red USB DAC/Headphone Amp/Preamp

Whereas the original DragonFly was designed specifically for use with computers, these latest models incorporate Microchip Technology's PIC32MX microprocessor—a low-noise, high-efficiency solution that enables compatibility with Android and Apple mobile devices. The new DragonFlies also use improved 32-bit ESS Sabre DAC chips—the 9010 in Black and the higher-performance 9016 in Red—both of which employ minimum-phase filtering for naturally detailed sound. Notably, DragonFly Red includes the latest ESS headphone amp and a bit-perfect digital volume control that resides on the 9016 DAC chip itself—a smart implementation that ensures maximum fidelity, dynamic contrast, and signal-to-noise ratio. Finally, the latest DragonFlies are software upgradeable through a complimentary Windows or OS X desktop application. While no upgrades have been announced yet, they are in the works.

Price: DragonFly Black, \$99; Red, \$199. audioquest.com

PSB M4U 4 In-Ear Monitor

The PSB M4U 4 is a unique, two-way hybrid design and the company's first in-ear monitor (IEM). It features a moving-coil dynamic low-frequency driver and a balanced-armature high-frequency driver controlled by a precision crossover network. Musical textures are finely wrought, bringing insight into the music while clearly delineating individual instruments and their distinct voices. The precision BA driver used in the M4U 4 is individually calibrated to meet the exacting response tolerances of this in-ear monitor. A wave-guide is used to link the sound tube of the BA driver to the woofer, creating time-aligned driver integration. A miniature PCB using surface-mount parts creates the electrical crossover network that divides the signal between drivers. The moving-coil dynamic woofer is tuned for accurate response with three separate chambers, creating an aperiodic loading that not only smoothens response but also suppresses resonances. The M4U 4 comes in either Black Diamond or Arctic White finish options.

Price: \$299. psbspeakers.com



Oppo Sonica DAC

Given that more and more music comes from digital sources, the DAC is one of the most important components in the playback chain. The new Oppo Sonica DAC improves upon the highly regarded audio performance of the Oppo HA-1 and BDP-95/105 players and presents an upgraded DAC chipset, the flagship ESS ES9038PRO SABRE DAC. The Sonica DAC combines the convenience of modern network streaming and the hi-fi sound quality of the traditional audiophile DAC. The Sonica app for iOS and Android allows you to conveniently stream music from your smartphone or tablet. The Sonica DAC supports high-resolution PCM and DSD audio via its USB, coaxial, and optical inputs. Additionally, Sonica DAC is a high-resolution audio player and can decode files directly from a connected USB drive, NAS drive, or network shares. Available in Fall 2016.

Price: \$799. oppodigital.com

The new Oppo Sonica DAC improves upon the highly regarded audio performance of the Oppo HA-1 and BDP-95/105 players and presents an upgraded DAC chipset, the flagship ESS ES9038PRO SABRE DAC.

On the Horizon



HiFiMan SuperMini Portable Player

Compact size, giant performance. HiFiMan has long been recognized as a leader in producing many of the best-sounding portable players on the market, and the company is credited with pioneering the hi-res portable player as far back as 2008. Its latest model is the SuperMini, a small, stylish, portable player for music lovers on the go. SuperMini combines light weight (2.4 oz) and compact size with remarkable performance. The player's robust output will drive all but the most power-hungry headphones, and despite its slim chassis, it features both normal and balanced outputs. And to make sure you can enjoy your tunes for a long time, SuperMini boasts an impressive 22-hour battery life. In addition to offering best-in-class sound quality, the HiFiMan SuperMini accepts a wide array of audio formats, is expandable, and easy to operate.

Price: \$399. hifiman.com

Bowers & Wilkins P5 Wireless Headphones

The P5 Wireless are B&W's first Bluetooth headphones, offering all the power, precision, and true hi-fi sound of the P5 Series 2 'phones (along with the same luxurious materials and solid build-quality) but with the added advantage of high-quality wireless streaming. P5 Wireless 'phones are capable of reproducing the best possible sound that your source device—whether it is a smartphone, tablet or computer—is able to deliver. P5 Wireless' rechargeable battery lasts 17 hours before a charge is required—and a supplied USB cable makes charging from a computer a breeze.

Price: \$399. bowers-wilkins.com



Moon by Simaudio Neo 230HAD and Neo 430HA Headphone Amps

Moon by Simaudio manufactures two award-winning headphone amps: the Neo 230HAD (\$1500) and Neo 430HA (\$3500, add \$800 for DAC). Both feature excellent linestage preamps, as well as DACs capable of DSD256 and PCM to 32-bit/384kHz. Producing 8 Wpc into 50 ohms, the 430HA is a reference-grade amp capable of effortlessly driving most any headphones with accuracy and transparency. With the optional DAC it can easily be the "heart and soul" of a high-performance audio system. Its little brother, the 230HAD will power most headphones (except those with very difficult loads) and is considered to be an ideal desktop solution for those on a budget, while the upper-tier 430HA can be classified as a no-holds-barred desktop solution. Both amps feature ultra-low output impedance at 1.25 ohms, and are handcrafted in Canada. (See p. 99 for Neo 230HAD review.)

Prices: \$1500 Neo 230HAD; \$3700 Neo 430HA. simaudio.com

TAS Super LP List

Jonathan Valin and *The Absolute Sound* Staff

Of the many articles and reviews that Harry Pearson wrote for *The Absolute Sound*, his annual Super LP List (aka SuperDisc List) may have been the most eagerly anticipated. The issue in which it was published was the one that everyone had to buy, borrow, or copy. Why? Because whether you were rich or poor, active in the high-end audio market or just kicking tires, it was the one issue of TAS you could make daily practical use of—it was your road map to the absolute sound.

Back in the day, hundreds of guys like me carried that list with them to record stores, garage sales, estate sales, library sales, rummage sales, the basements of unsuspecting neighbors. With HP's recommendations in hand we pawed at musty cardboard boxes and peach bins full of vinyl, rifling through stack after stack of fifty-cent LPs stinking of mildew and cat piss in search of the titles Harry deemed worthiest.

Who didn't lust for that 1s/1s Pines of Rome? Who wouldn't have sold his soul for—or cheated a widow and an orphan out of—that black-label Weavers Reunion at Carnegie Hall? Almost single-handedly HP created a market so important, voracious, and enduring that, even now, used-record dealers demand a premium for mint copies of his favorites, while select titles from his Super LP List continue to be re-issued by companies the world over.

It is our aim here to preserve and expand upon what Harry created. While it may not ignite the frenzy that it once did, TAS' new Super LP List contains every LP that HP recommended when the list was last published in 2014. It also contains better than 200 new titles that JV and the TAS staff have deemed worthy of adding. While tampering with the master's work may seem sacrilegious to some HP loyalists, remember that through the years Harry himself rethought and replenished the list, as recent recordings and previously unheard older ones came his way. And remember, as well, that JV added titles of his own to the last published lists at HP's express behest.

In keeping with Harry's practice, each and every new entry on the list is marked with a dagger (†) symbol, and those recordings that are still available new or re-issued are marked with a double dagger (‡). LPs with particularly natural, as opposed to hi-fi spectacular sound have been awarded an asterisk (*).

As time passes, we anticipate adding more titles to the Super LP List, but its core—Harry's own picks—will remain constant. **JV**

BEST OF THE BUNCH: Classical

- Arnold: English, Scottish, & Cornish Dances. Lyrita SRCS-109
- Brahms/Debussy/Bartók: Sonatas/Abel, Steinberg. Wilson Audiophile W-8722*†
- Gerhard: *The Plague*. Decca Head 6
- Gershwin: *Porgy & Bess* complete/Maazel. Decca SET 609-11*
- Herold-Lanchbery: *La Fille Mal Gardée*. Decca/ORG 0109-45 (45rpm)*‡
- Hi-Fi *a la Española*. Mercury/Classic SR-90144*
- Holst: *The Planets*/Mehta, LA. Decca/ORG 122-45 (45rpm)*‡
- Prokofiev: *Scythian Suite*. Mercury/ORG 118-45 (45rpm)*‡
- Rachmaninoff: Piano Concerto No. 3. Mercury/Speakers Corner SR-90283*‡
- Ravel: *La Valse*/Paray. Mercury/Classic SR-90313*‡
- Respighi: *Feste Romane*/Maazel. Decca SXL-6822
- Stravinsky: *The Firebird*/Dorati. Mercury/Classic SR-90226*‡
- Widor: Symphony No. 6, Allegro. Mercury SR-90169

BEST OF THE BUNCH: Popular

- Bachrach: *Casino Royale*. Colgems/Classic Records 5005Q‡

- *Balalaika Favorites*. Mercury/Classic Records SR90310-45 (45rpm)‡
- *Belafonte At Carnegie Hall*. RCA/Analogue Productions LSP-6006 *‡
- Ellington: *For Duke*. M & K Realtime UMK&K101
- Ralph Hunter Choir: *The Wild, Wild West*. RCA LSP-1968*
- Dean Martin: *Dream with Dean*. Reprise/Analogue Productions 076-45 (45rpm)*‡
- *Music for Bang, Ba-room and Harp*. RCA/Analogue Productions LSP-1866‡
- Peter, Paul & Mary: *In The Wind*. Warner Bros./ORG 071 (45rpm)*‡
- Pink Floyd: *Dark Side of the Moon*. EMI Harvest SHVL-804‡
- *The Sheffield Track Record*. Sheffield Lab-20*
- Don Shirley: *Water Boy*. Columbia CS-9196*
- *The Weavers Reunion at Carnegie Hall, 1963*. Vanguard/Analogue Productions 005*‡

SPECIAL MERIT: Classical

- Alain: Organ Works (complete). Erato EDO-250/2
- Albeniz: *Suite Española*/De Burgos, New Philharmonia. London CS-6581/ORG 100†‡

TAS Super LP List

- Anderson: *Music of Leroy Anderson (Vol. II)*. Mercury SR-90043
- Antill: *Corroboree*. (Australian) EMI OASD-7603
- Arnold: *Guitar Concerto/Bream*. RCA LSC-2487*
- Arnold: *Overtures*. Reference Recordings RR-48
- Arnold: *Peterloo Overture*: Symphony No. 5. EMI ASD-2878
- Babbitt: *All Set/Contemporary Chamber Ensemble*. Nonesuch 71303†
- Bach: *Six Solo Cello Suites/Starker*. Mercury/Speakers Corner SR-39016-3*††
- Bach: *The Keyboard Concertos/Gould*. Columbia/Speakers Corner 71449††
- Bach-Elgar: *Fantasia and Fugue in C Minor*. EMI ASD-2970
- Bach-Stokowski: *Symphonic Transcriptions*. Chandos ABRD-1055
- Balbastre: *Harpsichord Works*. Afka SK-298
- Barber/Menotti: *Violin Concertos/Ricci*, Pacific Symphony. Reference Recordings RR-45†
- Bartók: *Concerto For Orchestra/Reiner*. RCA/Analogue Productions LSC-1934*†
- Bartók: *Divertimento For String Orchestra/Barshai*. Decca 6026†
- Bartók: *Music for Strings, Percussion & Celesta*. RCA/Analogue Productions LSC-2374*†
- Bartók: *The Six String Quartets/*
- Juilliard Quartet. Columbia Masterworks D3S 717*†
- Bartók: *Sonata for 2 Pianos & Percussion/Solti*, Perahia. CBS Masterworks M 42625†
- Bax: *Symphony No. 6*. Musical Heritage Soc MHS 1198
- Beethoven: *Appassionata Sonata/Kamiya*. RCA/JVC RDC-4
- Beethoven: *Cellosonaten/Rostropovich*. Philips/Speakers Corner 2920††
- Beethoven: *Piano Concerto No. 4/Gould, Bernstein*. Columbia/Impex 6011††
- Beethoven. *Symphony No. 5/C. Kleiber*. Deutsche Grammophon DGR 31881††
- Beethoven: *Symphony No. 6/Walter*. Columbia/Analogue Productions AAPC 077†
- Beethoven: *Symphony No. 9/Solti*, Chicago. Decca GBB-121/2
- Beethoven: *Violin Sonatas Nos. 5 & 9/Oistrakh*. Philips/Speakers Corner 835259††
- Bennett: *5 Studies For Piano/Bennett*. Argo ZRG 704†
- Berg: *Lulu & Wozzeck Suites*. Mercury SR-90278
- Berio: *Cries of London/Swingle II*. Decca Head 15†
- Berlioz: *Requiem/Fremaux, et al*. EMI SLS-982
- Berlioz: *Symphonie Fantastique/Munch, BSO*. RCA/Classic LSC-1900*
- Birtwistle: *The Triumph of Time/*
- Boulez. Argo ZRG-790†
- Bizet: *Carmen Suite/Gibson*. RCA/Analogue Productions LSC-2449††
- Bliss: *Music for Strings*. Lyrita SRCS-33*
- Bloch: *Concerto Grosso No. 1*. Mercury SR-90223*
- Borodin: *Symphony No. 2/Ansermet*. London/Speakers Corner 6126†
- Brahms: *Alto Rhapsody/Walter*. Columbia MS-6488
- Brahms: *Piano Concerto No. 1/Curzon, Szell*. London/ORG 103 (45rpm)††
- Brahms: *Sextuor a Cordes No. 1, Op. 18/Les Musiciens*. Harmonia Mundi HM 1073†
- Brahms: *Sonata for Cello/Starker*. Mercury/Speakers Corner SR-90392*††
- Bredemeyer: *Schlagstück 5*. NOVA 8 85 186†
- Brian: *Symphony No. 9*. EMI ASD-3486
- Britten: *Four Sea Interludes*. EMI ASD-3154
- Britten: *Nocturnes*. London/ORG 152 (45rpm)††
- Britten: *The Prince of the Pagodas*. Decca Ace-of-Diamonds GOS-558-9
- Britten: *Sinfonietta*. Lyrita SRCS1111†
- Busoni: *Piano Concerto*. EMI ASD-2336/7
- Byrd: *Mass for Four Voice and Motets*. Harmonia Mundi HM 55212†
- Cage: *Third Construction*. New World/
- Classic NW-319*
- Chabrier: *España!/Argenta*. Decca/Speakers Corner SKL-2020*†
- Copland: *Appalachian Spring*. Can. Broadcast SM-5000
- Copland: *Rodeo*. Mercury SR-90172
- Crumb: *Makrokosmos I*. Nonesuch H-71293
- Crumb: *Music for a Summer Eve: Makrokosmos III*. Nonesuch H-71311
- Dahl: *Concerto a Tre/Tashi*. RCA ARL1-4328†
- Debussy: *Iberia*. Mercury SR-90010
- Debussy: *Iberia/Reiner, CSO*. RCA/Analogue Productions LSC-2222*†
- Debussy: *Images (for piano)/Michelangeli*. Deutsche Grammophon 250196†
- Debussy: *The Sea/Munch, BSO*. RCA/Analogue Productions LSC-2111*††
- Delius: *North Country Sketches/Groves*. EMI ASD-3139*
- Dorati: *Symphony*. Mercury SR-90248
- Duruflé: *Requiem*. Epic BC-1256
- Dutilleux: *Ainsi la nuit/Quartet Via Nova*. Erato STU 71546†
- Dutilleux: *Cello Concerto/Rostropovitch, Orchestre de Paris*. EMI ASD-3145†
- Dutilleux: *Figures de résonances (for two pianos)*. Erato STU 70810†
- Dvořák: *Cello Concerto/Starker*. Mercury/Speakers Corner SR-90303*†
- Dvořák: *Sextet in A major/Auryn Quartet, Altenburger, Demenga*.
- TACET L196*††
- Dvořák: *Symphony No. 8/Kertesz, LSO*. Decca/Speakers Corner SKL-6044*††
- Dvořák: *Symphony No. 8/Walter*. CBS/Sony 20 AC 1822
- Elgar: *Caratacus*. EMI SLS-998*
- Elgar: *Cello Concerto, Sea Pictures/Du Pre, Baker*. EMI Testament AEMI 655†
- Elgar: *Coronation Ode*. EMI ASD 3345
- Elgar: *Engima Variations/Mehta, LA*. London CS-6816
- Elgar: *The Kingdom*. EMI SAN 244-5
- Elgar: *Symphony No. 2*. EMI ASD-3266
- Faberman: *The All Star Percussion Ensemble*. Golden String/First Impression Music GS001††
- Fellegara: *Serenata/Hamburg Chamber Soloists*. Time S8006†
- Finzi: *Dies Natalis*. World Record Club SCM-50*
- Finzi: *Intimations of Immortality*. Lyrita SRCS-75
- Franck: *Pièce héroïque*. Mercury SR-90168
- Gerhard: *Astrological Series/London Sinfonietta*. Decca Head 11†
- Gerhard: *Symphony No. 4*. Argo ZRG-701
- Gershwin: *Collected Works*. Vox Box QSVBX-5132
- Gershwin: *Rhapsody in Blue/Wild, Fiedler*. RCA/Analogue Productions LSC-2367*†
- Gershwin: *Second Rhapsody For Orchestra With Piano/Tilson Thomas*.

TAS Super LP List

- CBS Masterworks IM39699†
- Gould: *Latin American Symphonette*. Vanguard/Analogue Productions SRV-275 SD
- Grainger: *Country Gardens*. Mercury SR-90219
- Grainger: *Lincolnshire Posy*. Mercury SR-90173
- Grieg: *Haugtussa and Poems by Wilhlem Krag/Andersen*, Bratlie. Simax PS 1011*†
- Grieg: *Peer Gynt/Fjeldstad*. Decca/Speakers Corner SXL-2012*
- Grieg: Piano Concerto/Lupu, Previn. London/ORG 162-45 (45rpm)*†
- Grieg: Piano Concerto/Rubinstein, Wallenstein. RCA LSC-2566
- Grieg: Violin and Piano Sonatas, Opp. 8, 13, 45/Tarak, Hancock. Bridge Records BDG 2003†
- Handel: *Water Musick/McGegan*. Harmonia Mundi France HMU 7010†
- Hanson: *The Composer & His Orchestra*. Mercury SR-90175*
- Hanson: Symphony No. 2. Mercury SR-90192
- Henze: *The Emperor's Nightingale!* London Sinfonietta. L'Oiseau-Lyre DSLO 4†
- Hindemith: *Mathis Der Maler!* Steinberg, BSO. Deutsche Grammophon 2530 246†
- Holst: *The Mystic Trumpeter!* Armstrong, Atherton, LSO. Lyrita SRCS 128*†
- Holst: *The Planets/Previn*, LSO. EMI/Hi-Q AHIR 003†
- Honneger: *Pacific 231*. EMI ASD-2989
- Howells: *Hymnus Paradisi*. EMI ASD-2600
- Janáček: Sinfonietta/Košler, Czech Phil. Denon/Nippon Columbia Co., Ltd. (Japan) OX-7110-ND†
- Janáček: Sinfonietta/Szell, Cleveland. Columbia Masterworks MS 6815†
- Kabalevsky: *The Comedians*. RCA/Analogue Productions LSC-2398*†
- Keats: String Quartet No. 2/Beaux-Arts Quartet. CRI 256†
- Khachaturian: *Gayaneh & Spartacus*. Decca/ORG 168-45 (45rpm)†
- Khachaturian: Symphony No. 2. London CS-6323
- Kodály: *Háry János Suite*. Mercury SR-90132*
- Leigh: Concertino/Harpsichord & Strings. Lyrita SRCS-126*
- Liszt: *Mephisto Waltz/Reiner*. RCA/Classic LSC-2341*
- Liszt: *Nojima Plays Liszt*. Reference Recordings RR-25†
- Lloyd: Symphony No. 5. Lyrita SRCS-124
- Lutoslawski: *Orchestral Works/Lutoslawski*, PRNSO. EMI Electrola 1C 165-03 231/36†
- Maconchy: Symphony Double String Orchestra. Lyrita SRCS-116
- Maderna: *Serenata No. 2*. Time S/8002†
- Mahler. *Das Lied von der Erde!* Bernstein, Fischer-Dieskau, King. London OS-26005†
- Mahler: Symphony No. 1/Slatkin. Telarc DG-10066
- Mahler: Symphony No. 3/Mehta. Decca/Analogue Productions AAPC 117†
- Mahler: Symphony No. 5/Barbirolli, Baker, New Philharmonia. EMI SLS 785†
- Martin: Concerto for Seven Winds and Orchestra/Ansermet. London CS-6241†
- Massenet: *Le Cid*. EMI/Klavier AKLALÉ 522†
- Mendelssohn: *A Midsummer Night's Dream*. EMI ASD-3377
- Messiaen: *La Trans de Notre Sgnr. Jesus Christ*. Decca Head 1 & 2
- Messiaen: *Turangalila* Symphony. EMI SLS-5117
- Meyer: Violinkonzert/Oistrakh, Suitner, Staatskapelle Berlin. NOVA 8 85 057†
- Moeran: Symphony. EMI ASD-2913
- Mozart: Concerto for Two Pianos (K. 365). Nonesuch H-71028
- Mozart. Piano Concerto No. 15 & Symphony No. 36 /Bernstein. Decca/Speakers Corner 332††
- Mozart: Piano Concertos Nos. 21 & 24/Istomin, Schwarz. Reference Recordings RM-2506 (45 rpm)††
- Mozart: Sinfonia Concertante/Oistrakh, Kondrashin. Decca/Speakers Corner 6088††
- Mozart: Symphonies Nos. 40 & 41/Guilini. Decca/Speakers Corner SXL-6225††
- Mussorgsky/Ravel: *Pictures/Reiner*, CSO. RCA/Analogue Productions LSC-2201†
- Offenbach: *Gaîté Parisienne/Fiedler*, BSO. RCA/Analogue Productions LSC-1817*†
- Orff: *Carmina Burana/Stokowski*, Houston. Capitol SPAR-8470*
- Partch: *The Delusion of the Fury*. Columbia M2-30576
- Penderecki: Sonata for Cello and Orchestra. Muza XW576 (mono)†
- Penderecki: String Trio/Janaki Trio. Yarlung 53964-376V*††
- Praetorius: Dances from *Terpsichore*. Archiv 198166
- Prokofiev: *Lt. Kije Suite/Reiner*, CSO. RCA/Analogue Productions LSC-2150*†
- Prokofiev: Piano Concerto No. 2/ Frager. RCA LSC-2465
- Prokofiev: Piano Concerto No. 3/ Janis. Mercury/Speakers Corner SR-90300†
- Prokofiev: *Romeo and Juliet/Maazel*. Decca SXL-6620-2
- Prokofiev: Symphony No. 6/Weller. Decca SXL-6777*
- Prokofiev: Violin Concerto No. 1/ Ricci, Ansermet. Decca/Eclipse ECS-746
- Prokofiev: Violin Concerto No. 2/ Heifetz. RCA/Analogue Productions LSC-2314†
- Prokofiev: Violin Sonata No. 1/ Salerno-Sonnenberg. MusicMasters MM-20022*†
- Rachmaninoff: *The Bells*. EMI ASD-3284
- Rachmaninoff: *Paganini Variations!* Rubinstein. RCA/Analogue Productions LSC-2430*†
- Rachmaninoff: Piano Concerto No. 1. RCA/Classic LSC-2541
- Rachmaninoff: *The Romantic Rachmaninoff*. Reader's Digest RDA-29
- Rachmaninoff: *Symphonic Dances*. Turnabout/Analogue Productions 34145-45 (45rpm)†
- Rachmaninoff: *Symphonic Dances!* Oue. Reference Recordings RM-1504††
- Rachmaninoff: Symphony No. 1. EMI ASD-3137
- Rachmaninoff: Symphony No. 2. EMI ASD-2889
- Rachmaninoff: Symphony No. 2/Slatkin, St. Louis. Reference Recordings RM-1002†
- Rachmaninoff: Symphony No. 3. British RCA LSB-4090
- Rachmaninoff-Respighi: *5 Études-tableaux*. EMI ASD-3013*
- Ravel: *Collected Works*. Vox Box QSVBX-5133
- Ravel: Concerto in G Major. Linn Recut 01
- Ravel: *Daphnis et Chloé/Ansermet*. Decca SXL-6204*
- Ravel: *Daphnis et Chloé/Munch*, BSO. Chesky RC-30
- Rawsthorne: Piano Concerto No. 1. Lyrita SRCS-101
- Respighi: *Ancient Dances and Aires*.

TAS Super LP List

- Mercury/Speakers Corner SR-90199*‡
- Respighi: *Brazilian Impressions*. Mercury/Speakers Corner SR-90153‡
- Respighi: *Pines of Rome*/Reiner. RCA/Analogue Productions LSC-2436*‡
- Reubke: *The 94th Psalm*. Orion ORS-78282
- Rimsky-Korsakov: *Scheherazade*. RCA/Classic/Analogue Productions LSC-2446*‡
- Rodrigo: *Concierto Andaluz*. Mercury SR-90488*
- Rodrigo: *Concierto Aranjuez*/Yepes, Argenta. London CS-6046*
- Rossini: *l'Italiana in Algeri*. Fone 016‡
- Rózsa: *Violin Concerto*/Heifetz. RCA/Analogue Productions LSC-2767*‡‡
- Saint-Saëns: *Carnival of the Animals*/Fremaux. EMI/Klavier 527*‡
- Saint-Saëns: *Piano Concerto No. 2*/Rubinstein. RCA LSC-2234*
- Saint-Saëns: *Symphony No. 3*/Dupre. Mercury SR-90012
- Saint-Saëns: *Symphony No. 3*/Fremaux. EMI TWO-404*
- Saint-Saëns: *Symphony No. 3*/Stern. Reference Recordings RM-1514 (45rpm)‡‡
- Schmitt: *Psalm 47*. EMI ASD-2892
- Schnittke: *Quasi una sonata*/Kremer, Gavrilov. EMI 065-03766‡
- Schoenberg: *Serenade, Op. 24*/Robert Craft. Columbia M2S 762*‡
- Schubert: *Death and the Maiden*/Juilliard. RCA LSC-2378*
- Schubert: *Winterreise*/Saeden.

- Proprius SWE-1982‡
- Schuman: *Violin Concerto*/Tilson-Thomas. Deutsche Grammophon 2530 103‡
- Seeger: *String Quartet 1931*/Amati Quartet. Columbia MS 6142*‡
- Shapey: *Variations*/Maximilien. CRI SD 496 *‡
- Shostakovich: *Cello Concerto No. 1*. EMI ASD-2924
- Shostakovich: *Piano Concerto No. 2*/Bernstein. Columbia/Impex LIMP6004*‡‡
- Shostakovich: *Preludes and Fugues*. Richter. Philips/Speakers Corner 835 204 AY‡‡
- Shostakovich: *Symphony No. 1*/Martinon. RCA/Classic LSC-2322
- Shostakovich: *Symphony No. 7*. EMI ASD-SLS-897
- Shostakovich: *Symphony No. 8*/Previn. EMI ASD-2917
- Shostakovich: *Symphony No. 13*. EMI/Alto ASD-3911*
- Sibelius: *En Saga*. EMI ASD-2486*
- Sibelius: *Four Legends*. EMI ASD-3092
- Sibelius: *Symphony No. 2*/Paray, Detroit. Mercury SR-90204*‡
- Sibelius: *Symphony No. 5*/Gibson. RCA/Analogue Productions LSC-2405‡
- Sibelius: *The Tempest*. EMI ASD-2961*
- Sibelius: *Violin Concerto*/Heifetz, Reiner. RCA/Analogue Productions LSC-2435‡
- Stockhausen: *Spiral/Wach/Japan*

- Pole*. EMI Electrola 1C 165-02 313/14‡
- J. Strauss: *Waltzes*/Reiner, CSO. RCA LSC-2500*
- R. Strauss: *Also Sprach Zarathustra*/Reiner. RCA/Analogue Productions LSC-1806*‡
- R. Strauss: *Don Quixote*/Kempe, Berlin. EMI Testament 326‡‡
- R. Strauss/Dvořák: *Romantic Music For Violin and Piano*/Steinhardt, Mayorga. Sheffield Lab 18*‡
- Stravinsky: *Ballets*/Ansermet. London CSA-2308
- Stravinsky: *Ebony Concerto*. Reference Recordings RR-55*
- Stravinsky: *Firebird Suite*/Stokowski, Berlin. Capitol SP-8407
- Stravinsky: *Petrouchka* (solo piano). Wilson W-8313*
- Stravinsky: *Petrouchka*/Ansermet. London CS-6009
- Stravinsky: *Pulcinella*/Marriner. Argo ZRG575‡
- Stravinsky: *The Rite of Spring*/Muti, Philadelphia. EMI ASD 3807/MoFi MFSL 1-519‡‡
- Stravinsky: *The Rite of Spring*/Solti, CSO. Decca SXL-6691‡
- Stravinsky: *The Rite of Spring* (solo piano)/Atamian. RCA ARC1-3636‡
- Sullivan-Mackerras: *Pineapple Poll*. EMI/Hi-Q 001‡
- Szymanowski: *Violin Concerto No. 2*/Szeryng. Philips 6500 421‡
- Takemitsu: *Garden Rain*/Elgar Howarth. Decca Head 14‡

- Tchaikovsky: *Manfred*/Previn. Alto/EMI ASD-3018*
- Tchaikovsky: *The Nutcracker*/Previn, LSO. EMI SLS-832
- Tchaikovsky/Nielsen: *Souvenir Parts I & II*. Trondheim Soloists. 2L*‡‡
- Thomson: *The Plow That Broke the Plains*. Analogue/Vanguard AP001
- Tippett: *Concerto For Orchestra*/Davis, LSO. Philips 412 378-1‡
- Toch: *Symphony No. 3*. Capitol SP-8364
- Vaughan Williams: *Choral Music*. EMI SLS-5082
- Vaughan Williams: *Job*. EMI ASD-2673
- Vaughan Williams: *The Nine Symphonies*. EMI SLS-822
- Vaughan Williams: *Sancta Civitas*. EMI ASD-2422
- Vaughan Williams: *Symphony No. 5, The Wasps Overture*/Previn. RCA SB-6856‡
- Villa-Lobos: *String Quartet No. 17*/Brazilian Quartet. Odyssey 32160175‡
- Vivaldi: *Lute Concertos & Trios*. Hungaroton SLPX-11978*
- Walton: *Cello Concerto*/Piatigorsky, Munch, BSO. RCA LSC-2109*‡
- Walton: *Crown Imperial*/Fennell, Eastman. Mercury SR-90197
- Walton: *Five Bagatelles*/Artzt. Meridian E77037*‡
- Webern: *Five Movements for String Quartet, Op. 5*/LaSalle. Muza XL/SXL 0282*‡

- Grace Williams: *Fantasy/Welsh Nursery Tunes*. EMI ASD-3006*
- Wiren: *Serenade for Strings* EMI ESD-7001

SPECIAL MERIT: Operas

- Berg: *Wozzeck*/Boulez, Paris National Opera. Columbia 32 21 0002‡
- Bizet: *Carmen*/Bernstein, et al. Deutsche Grammophon/Speakers Corner 2709 043‡
- Brecht/Weill: *Threepenny Opera*/New York Shakespeare Festival. Columbia 34326‡
- Britten: *Billy Budd*/Britten, Pears. London OSA-1390‡
- Britten: *Noye's Fludde*. Argo ZK-1
- Britten: *Peter Grimes*/Britten, Pears, ROHO. Decca SXL 2150-2‡
- *French & Italian Opera Arias*/Freni, Votto. EMI/Angel 34045‡
- Menotti: *Amahl & the Night Visitors*. RCA LSC-2762‡
- Mussorgsky: *Boris Godunov*/Ghiaurov, Karajan. Decca SET-514/7
- Puccini: *La Bohème*/Pavarotti, Freni, Karajan. Decca SET-565/6
- Puccini: *Tosca*/Price, Karajan. RCA LDS-7022
- Puccini: *Turandot*/Sutherland, Pavarotti, Mehta. Decca SET 561-3
- R. Strauss: *Elektra*/Nilsson, Solti. Decca/Speakers Corner 354/5*‡‡
- R. Strauss: *Salome*/Nilsson, Solti. Decca 228/9*‡
- Verdi: *Aida*/Tebaldi, Karajan. London OSA-1313

TAS Super LP List

- Verdi: *Macbeth*/Abbado, Verrett, Domingo. Deutsche Gramm 2709 062†
- Wagner: *Götterdämmerung*. London OSA-1604
- Wagner: *Parsifal*/Knappertsbusch. Philips/Speakers Corner 835 220/24 AY*††
- Wagner: *Das Rheingold*. London OSA-1309
- Weill: *Threepenny Opera Suite*/Chicago Pro Musica. Reference Recordings RR-29†

SPECIAL MERIT: Collections

- *Ballet for Band*. Mercury SR-90256
- *The Christmas Revels*/Langstaff. Revels Records RC 1078†
- *Concertos from Spain*/Alicia de Larrocha. London CS-6990†
- *Dances on Movable Ground*. Ciaramella Ensemble. Yarlung 09261819V†
- *Danses Anciennes de Hongrie*. Harmonia Mundi HM-1003
- *Delmoni Plays Bach, Ysaÿe, Kreisler*. Water Lily Acoustics WLA WS-07†
- *Evensong for Ash Wednesday*. Argo ZRG-5365
- *Exotic Dances from the Opera*/Oue. Reference Recordings RR-1505††
- *Festival*/Reiner, CSO. RCA/Classic/Analogue Productions LSC-2423*†
- *La Fête de l'Ane*. Harmonia Mundi HM-1036
- *Fiesta in Hi-Fi*/Hanson. Mercury/Speakers Corner SR-90134†

- *For My True Love*/Terri, Almeida. Capitol SP-8461
- *In Formation*/Kronos Quartet. Reference Recordings RR-9
- *Laudate II: Baroque Music from the Düben Collection*. Proprius PROP 7860†
- *Magnum Opus*. Wilson W-8111
- *The Moscow Sessions*. Sheffield TLP-1000
- *Musique de la Grèce Antique*. Harmonia Mundi HM-1015
- *New Music for Violin and Piano*. Zukofsky, Kalish. Mainstream MS/5016*†
- *Overtures Fantasies*. Mercury SR-90191
- *Percussion Music*. Nonesuch H-71291
- *The Power of the Orchestra*/RCO. RCA/Analogue Productions 2659-45 (45rpm)†
- *André Previn's Music Night*. EMI ASD-3131
- *The Reiner Sound*. RCA/Analogue Productions LSC-2183*††
- *Rhapsodies*/Stokowski. RCA/Analogue Productions LSC-2471*††
- *The Royal Ballet Gala Performances*/Ansermet. RCA/Analogue Productions LSC-6065*†
- *Sing We Noel: Christmas Music*. Nonesuch H-71354
- *La Spagna*. BIS 163/164/AudioNautes 1401†
- *Venice*/Solti, ROHO. RCA/Analogue Productions LSC-2313*††
- *Vienna: 1908-1914*. Mercury SR-90316

- *Wagner for Band*. Mercury/Speakers Corner SR-90276†
- *Witches' Brew*/Gibson, NSOL. RCA/Analogue Productions LSC-2225†

SPECIAL MERIT: Informal

- 10,000 Maniacs: *In My Tribe*. Elektra/Mobile Fidelity MOFI 1-013††
- Gene Ammons: *Boss Tenor*. Prestige/Analogue Productions 7180††
- Tori Amos: *Under the Pink*. Atlantic R1-82567†
- Areski Et Brigitte Fontaine: *Je Ne Connais Pas Cet Homme*. Saravah SH 10041†
- *Chet Atkins in Hollywood*. RCA/Classic Records LSP-1993Q†
- Chet Atkins: *Caribbean Guitar*. RCA LSP-2549
- *The Other Chet Atkins*. RCA LSP-2175
- Joan Baez: *Diamonds & Rust*. Mobile Fidelity MFSL 1-238†
- Joan Baez: *Farewell Angelina*. Vanguard VSD 79200
- Joan Baez: *In Concert*. Vanguard VSD 2122
- Count Basie: *88 Basie Street*. Pablo/Analogue Productions 2310-901 (45rpm)*††
- Count Basie: *Live at the Sands (Before Frank)*. Warner Bros./Mobile Fidelity MFSL 2-401††
- The Beach Boys: *Pet Sounds*. Analogue Productions 067 (mono)††
- The Beach Boys: *Surfer Girl*. Capitol ST 1981/Analogue Productions 060††

- The Beatles: *The Beatles in Mono*. Capitol Records LDB0914 (mono)††
- Beck: *Sea Change*. Geffen Records/Mobile Fidelity MFSL 2-308†
- Harry Belafonte: *Belafonte Sings the Blues*. RCA/Impex AIMX 6012-45 (45rpm)†
- Harry Belafonte: *The Many Moods of Belafonte*. RCA/Impex 6017-45 (45rpm)††
- *Ben and Sweets*/Webster, Edison. Columbia/ORG 117-45 (45rpm)††
- Tony Bennett: *I Left My Heart in San Francisco*. Columbia/Mobile Fidelity MFSL 1-358††
- *Blood, Sweat & Tears*. ORG 133 2 (45rpm)††
- *Bob and Ray Throw a Stereo Spectacular*. RCA LSP-1773 (Also Classic Records)
- David Bowie: *Earthling*. ISO/Columbia/Friday Music FRM-42627††
- David Bowie: *Let's Dance*. EMI America SO 517093††
- David Bowie: *Tonight*. EMI America SJ-17138††
- Dave Brubeck: *Time Out*. Columbia/Analogue Productions 8192-45 (45rpm)††
- Buena Vista Social Club: *Lost and Found*. World Circuit WC V090*††
- Kenny Burrell: *Midnight Blue*. Blue Note/Analogue Productions 84123††
- Peter Case: *Peter Case*. Geffen Records GHS 24105†
- Johnny Cash: *American Recordings I-VI*. American Recordings 81157††

- Tracy Chapman: *Tracy Chapman*. Elektra 960 774-1†
- *Ray Charles and Betty Carter*. ABC Paramount/Analogue Productions 385††
- *The Civil War (Vol. 1)*. Mercury LPSD-2-901 90173
- Leonard Cohen: *Live in London*. Sony/Music On Vinyl MOVLP1013†
- Leonard Cohen: *Popular Problems*. Columbia 50142††
- Leonard Cohen: *Songs from the Road*. Columbia 1121††
- Holly Cole: *Temptation*. Blue Note JP5003††
- Nat King Cole: *Love Is the Thing*. Capitol/Analogue Productions 824 (45rpm)††
- Nat King Cole: *The Nat King Cole Story*. Capitol/Analogue Productions 1613 (45rpm) ††
- Judy Collins: *Judith*. Elektra 6E-111
- John Coltrane: *Blue Train*. Blue Note/Analogue Productions 81577 (45rpm)††
- John Coltrane: *A Love Supreme*. Impulse/Analogue Productions AIPJ 77 (45rpm)††
- Ry Cooder: *Bop Till You Drop*. Warner BSK 3358†
- Sam Cooke: *Night Beat*. RCA/Analogue Productions LSP-2709 (45rpm)††
- Elvis Costello: *My Aim Is True*. Stiff Records SEEZ 3†
- David Crosby: *If I Could Only Remember My Name*. Atlantic 7203†

TAS Super LP List

- *Dafos*. Reference Recordings RR-12
- Miles Davis: *Kind of Blue*. Columbia/Mobile Fidelity MFSL-2-45011 (45rpm)*††
- Miles Davis: *Miles in the Sky*. Columbia/Mobile Fidelity MFSL 2-437 (45rpm) ††
- Miles Davis-Evans: *Sketches of Spain*. Columbia/Mobile Fidelity 1375†
- Jim Dawson: *Songman*. Kama Sutra KSBS-2035
- Doris Day: *Hooray for Hollywood*. Columbia C2L 5†
- Dire Straits: *Brothers in Arms*. MSFL-441 (45rpm)††
- Dire Straits: *Love Over Gold*. Warner AWAR 47772††
- The Doors: *L.A. Woman*. Elektra/Analogue Productions 75011-45 (45rpm)††
- Eagles: *Desperado*. Elektra AELE 61664†
- *Electric Love*. Mercury Limelight LS-86072
- Duke Ellington: *Duke's Big 4*. Pablo/Analogue Productions 2310 703†
- Duke Ellington: *Masterpieces by Ellington*. Columbia/Analogue Productions 4418 (mono)*††
- Bill Evans/Jim Hall: *Undercurrent*. Capitol/Mobile Fidelity MOFI 1-031††
- Eileen Farrell: *Torch Songs*. Reference Recordings RR-34*††
- Ella Fitzgerald: *Clap Hands, Here Comes Charlie!* Verve/Analogue Productions 4052-45 (45rpm)*††
- Ella Fitzgerald: *Ella and Louis*. Verve/Analogue Productions 4003-45 (45rpm mono)*††
- Ella Fitzgerald: *Sings Songs from Let No Man Write My Epitaph*. Verve/Analogue Productions 4043-45 (45rpm)*††
- Ella Fitzgerald: *Take Love Easy*. Pablo 2310 702†
- El Vy: *Return to the Moon*. 4AD CAD 3530††
- Enya: *Enya*. Atlantic 81842-1
- Donald Fagen: *Sunken Condos*. Reprise 532287††
- Victor Feldman: *Secret of the Andes*. Nautilus NR50†
- Fleetwood Mac: *Rumours*. Warner/Analogue Productions 517787††
- Peter Gabriel: *So*. Geffen Records GHS 24088/Real World RWD 800014††
- Melody Gardot: *My One and Only Thrill*. Verve/ORG 161 (45rpm)*††
- Art Garfunkel: *Breakaway*. CBS/Sony 25AP 1373
- Saul Goodman: *Mallets, Melody & Mayhem*. Columbia CS-8333†
- Ed Graham: *Hot Stix*. M & K Realtime RT-106
- The Great Jazz Trio: *Direct From LA*. East Wind EW 10005†
- Jon Hendricks: *Fast Livin' Blues*. Columbia/ORG 121-45 (45rpm)††
- John Hiatt: *Bring the Family*. A&M Records 395 158-1/Music On Vinyl MOV 786††
- Earl "Fatha" Hines: *Fatha!* M & K Realtime RT-105
- Lightnin' Hopkins: *Going Away*. Bluesville/Analogue Productions 1073
- Janis Ian: *Breaking Silence*. Columbia/Analogue Productions 027††
- Ian and Sylvia: *Northern Journey*. Vanguard/Impex 79154††
- INXS: *Listen Like Thieves*. Mobile Fidelity MOFI 1-041††
- Chris Isaak: *Heart Shaped World*. Reprise 258371†
- Harry James: *The King James Version*. Sheffield Lab 3†
- Jean Michel Jarre: *Oxygène*. Polydor 2473-10
- *Jazz at the Pawnshop*. Proprius 7778††
- Norah Jones: *Come Away with Me*. Analogue Productions 042††
- Rickie Lee Jones: *It's Like This*. Analogue Productions AAP 51056††
- Rickie Lee Jones: *Rickie Lee Jones*. Mobile Fidelity MFSL 2-45010 (45rpm)††
- Jacintha: *Autumn Leaves*. Groove Note 1006-45 (45rpm)††
- Janis Joplin: *I Got Dem Ol' Kozmic Blues Again, Mama*. Columbia 78221††
- Sara K: *Water Falls*. Stockfisch SFR 8011††
- Bruce Katz: *Crescent Crawl*. AudioQuest AQ-1012*
- Ali Akbar Khan: *Indian Architecture*. Water Lily WLA-ES-20
- Ali Akbar Khan: *Music of India, Morning and Evening Ragas*. His Masters Voice ALPC2 (mono)†
- Carol Kidd: *Carol Kidd*. Aloï AKH003/Linn Records AKH 297†
- *Klaatu*. EMI EST-11542
- Kraftwerk: *Autobahn*. Parlophone/Astralwerks AASW 66014†
- Diana Krall: *All for You*. ORG 006-45 (45rpm)††
- Diana Krall: *From This Moment On*. Verve B0007323-01*†
- Alison Krauss+Union Station: *Live*. Rounder/Mobile Fidelity MFSL-3-281††
- The L.A. 4: *Pavane Pour Une Infante Défunte*. East Wind EW-10003†
- Gordon Lightfoot: *Summer Side of Life*. Reprise MS-2037
- Julie London: *Julie Is Her Name*. Liberty/Boxstar Records LRP3006†
- Shelby Lynne: *Just a Little Lovin'*. Lost Highway/Analogue Productions 041††
- Antonio Lysy: *Antonio Lysy at the Broad*. Yarlung 95968-517V††
- Dean Martin: *This Time I'm Swinging*. Capitol/Mobile Fidelity MFSL 1-410††
- Mannheim Steamroller: *Fresh Aire II*. American Gramophone 359
- Mannheim Steamroller: *Fresh Aire III*. American Gramophone 365
- Bob Marley & The Wailers: *Natty Dread*. Island AISL 60066†
- Hugh Masakela: *Hope*. Sheridan Square Records/Analogue Productions 82020 (45rpm)††
- Christian McBride & Inside Straight: *Kind of Brown*. Mack Avenue 1047LP††
- Amanda McBroom: *Growing Up in Hollywood Town*. Sheffield Lab-13
- Sarah McLachlan: *The Freedom Sessions*. Arista 18784-2†
- Sarah McLachlan: *Fumbling Towards Ecstasy*. Arista 18725-2†
- Metallica: *Metallica (Black Album)*. Warner 511831-1 (45rpm)†
- Charles Mingus: *Mingus Ah-Um*. Columbia/ORG 130 (45rpm)†
- Joni Mitchell: *Blue*. Reprise/Rhino 74842*†
- Joni Mitchell: *Court & Spark*. Asylum/Elektra 1001†
- Joni Mitchell: *Hejira*. Asylum/Elektra 1087††
- Joni Mitchell: *Wild Things Run Fast*. Geffen/ORG 056 (45rpm)†
- Lee Morgan: *The Sidewinder*. Blue Note/Analogue Productions 84157††
- Oliver Nelson: *The Blues and the Abstract Truth*. Impulse/Analogue Productions AIPJ 5 (45rpm)*††
- Ferit Odman: *Dameronia with Strings*. Equinox EMLP0002††
- The O-Zone Percussion Group: *The Percussion Record*. ClearAudio 83058††
- Van Dyke Parks: *Song Cycle*. Warner Bros. 1727
- Art Pepper: *Meets the Rhythm Section*. Contemporary/OJC 338††
- *Peter, Paul & Mary*. Warner Bros. 1449

TAS Super LP List

- Oscar Peterson: *We Get Requests*. Verve/Analogue Productions 8606 (45rpm)†‡
- Cyndee Peters: *Black Is the Color*. Opus 3 Records 77-06†
- Madeleine Peyroux: *Careless Love*. Rounder/MFSL 37043†‡
- *Pig's Eye Jazz (Vol. II)*. Insight Records Vol. 2
- Pink Floyd: *The Wall*. EMI-4814†‡
- Elvis Presley: *Elvis is Back!* RCA/Analogue Productions 2231 (45rpm)†‡
- *Professor Johnson's Astounding Sound Show*. Reference Recordings RR-7*
- Lou Reed: *Rock n Roll Animal*. RCA/Music On Vinyl 529†‡
- *Reflections*. Reference Recordings RR-18*
- Renaissance: *Novella Sire*. SA-2576
- Sonny Rollins: *Way Out West*. Fantasy/Analogue Productions 7530†
- Rough Trade: *Avoid Freud*. True North TN-43
- Rough Trade: *For Those Who Think Young*. True North TN-48
- Rough Trade: *Shaking the Foundations*. True North TN-50
- Salt City Six: *Dixieland*. Audiophile AP-80
- Cecile McLorin Salvant: *Woman Child*. Mack Avenue MAC 1072†‡
- Santana. Columbia/Mobile Fidelity MFSL 2-45012 (45rpm)†‡
- Seals & Crofts: *Greatest Hits*. Warner Bros. BS-2886

- *The Sheffield Drum Record*. Sheffield Lab-14*
- Paul Simon: *Graceland*. Sony Legacy 8869191472*†‡
- Frank Sinatra: *Only the Lonely*. Capitol/Mobile Fidelity MFSL 1-326 (mono)*†
- Frank Sinatra: *Sinatra at the Sands*. Reprise/Mobile Fidelity MFSL 2-332*†
- Jimmy Smith: *Midnight Special*. Blue Note/Analogue Productions 84078†‡
- *Sophisticated Lady Jazz Quartet!* Wicks, Boyle, et al. Yarlung YAR09272-004V1†‡
- Simon Spillett: *Square One*. Gearbox Records GB1512†
- Dusty Springfield: *Dusty in Memphis*. Atlantic/Analogue Productions 8214-45(45rpm)†‡
- *Star of Wonder*. Reference Recordings RR-21*†
- Cat Stevens: *Tea for the Tillerman*. A&M/Analogue Productions 9135 (45rpm)*†
- Cat Stevens: *Teaser and the Firecat*. Mobile Fidelity MFSL 1-244†‡
- *The Strayaway Child*. Song of the Wood 7811
- Talk Talk: *Spirit of Eden*. Parlophone PCSD 105, 74 6977 1†
- James Taylor: *Dad Loves His Work*. Columbia/Mobile Fidelity MFSL 1-356†‡
- Masahiko Togashi: *Rings*. East Wind EW-9001-2†
- Sarah Vaughan: *Gershwin Live!*

- Thomas, LA Phil. CBS 37277†
- Stevie Ray Vaughan: *Couldn't Stand the Weather*. Epic/Pure Pleasure Records 39304†‡
- Jennifer Warnes: *Famous Blue Raincoat*. Porch Light/Impex IMP6021†‡
- Jennifer Warnes: *The Hunter*. Private/Impex IMP6007 (45rpm)†‡
- Jennifer Warnes: *The Well*. Impex IMP6001-45 (45rpm)†‡
- Dionne Warwick: *Soulful*. Scepter SPS-573
- Muddy Waters: *Folk Singer*. Analogue Productions 1843-45 (45rpm)*†‡
- Roger Waters: *Amused to Death*. Columbia Legacy/Analogue Productions 468761†‡
- *The Wilson Band Recordings*. Wilson W-8823/24*

SPECIAL MERIT: Singles

- A-ha: *Take On Me*. British Warner Brothers W-9006
- Louis Armstrong: *St. James Infirmary*. Audio Fidelity (45rpm)†
- David Bowie: *Let's Dance*. EMI-America SQ-17093†
- China Crisis: *In a Catholic Style*. British Virgin VS-765112
- Frankie Goes to Hollywood: *Relax*. British Virgin/ZTT-1ZZTAS1
- Freeez: *I.O.U.* Streetwise SWRL-2210
- Bill Henderson: *Send in the Clowns*. Classic Records/Jazz Planet 0779-33/45C (45rpm)†
- Human League: *Don't You Want Me*.

- British Virgin 466-12B
- Greg Kihn Band: *Jeopardy*. Beserkley 0-67932
- Propaganda: *Machinery*. British Virgin/ZTT 12xZ TAS 12
- Lionel Richie: *All Night Long*. Motown 4514-MG
- Gerry Woo: *Help Yourself*. Polydor 887-529-1
- Yaz: *Don't Go*. Mute Yaz-001
- Yello: *Lost Again*. Elektra 966790
- Yello & Shirley Bassey: *The Rhythm Divine*. Mercury 888-746-1

SPECIAL MERIT: Film and Broadway Score

- Bernstein: *West Side Story*. Columbia/Analog Spark OS 2001/79301836801-8 2*†‡
- Bliss: *Things to Come*. EMI ASD-3416*
- *The Flight of the Condor*. BBC Records REB-440
- Herrmann: *Citizen Kane*. British RCA GL-43441
- Herrmann: *The Fantasy Film World*. Decca PFS-4309
- Herrmann: *The Ghost and Mrs. Muir*. Filmmusic Collection FMC-4*
- Herrmann: *The Three Worlds of Gulliver*. Decca PFS-4337
- Homrich/Gascoigne: *The Emerald Forest*. Varese Sarabande STV-81244
- Horner: *Glory*. Virgin 1-91329
- Jarre: *The Professionals*. Colgems COSO-5001
- Kern: *Show Boat*/McGlinn, Von Stade, Stratas. EMI†

- *Lost Highway*. Nothing/Interscope Records SVLP 0119†
- Mancini: *Hatari!* RCA/Analogue Productions LSP-2559†
- Mancini: *The Pink Panther*. RCA/Analogue Productions LSP-2795-45 (45rpm)†‡
- Moroder: *Cat People*. Backstreet BSR-6107
- Myrow/Seagrave: *Phantasm*. Varese VC-81105
- Nitzsche: *The Hot Spot*. Antilles/Analogue Productions 8755 (45rpm)†‡
- *O Brother, Where Art Thou?* Lost Highway 619101†‡
- Prokofiev: *Ivan the Terrible*. EMI SLS-5110
- Rózsa: *Ben Hur*. Decca PFS-4394
- Rózsa: *Quo Vadis*. Decca PFS-4430
- Sondheim: *Pacific Overtures*. RCA ARL-1-1367
- Sondheim: *Sweeney Todd*. RCA CBL2-3379
- Tiomkin: *Lost Horizons*. British RCA GL-43445
- Tiomkin: *The Thing*. British RCA RL-42005
- Vangelis: *Antarctica*. Japanese Polydor 2MM-0290 †‡

† New entries on list

‡ Still in print

* Exceptionally natural and musical sound

Book Excerpt

How to Choose Headphones

Excerpted and adapted from

The Complete Guide to High-End Audio (fifth edition)

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Robert Harley

Which are the best headphones? There's no single answer to this question, but as many right answers as there are listeners and specific applications. Choosing the right headphones for you begins with defining how you will use the headphones, what combinations of sound and comfort you most value, and your budget. Let's explore some of these criteria, keeping in mind that many of them overlap.

Location and Intended Use: Where will you use the headphones? If you plan to listen in public places such as airplanes, trains, or subways, you'll want the headphones to provide isolation from outside noise as well as prevent those nearby from hearing your music.

Earphones and in-ear monitors are ideal for this, both for their portability and their noise-isolation qualities. Earphones that provide a good fit—and *all* custom in-ear monitors—provide excellent isolation from noise. But remember that keeping outside noise from

intruding on your listening experience can also prevent you from hearing sounds that warn of danger.

Conversely, if you're buying headphones because your home system is headphone-based rather than loudspeaker-based, or to enjoy music late at night without disturbing neighbors or family members, noise isolation and portability won't be as important. For home listening, your top priorities should be sound quality and comfort.

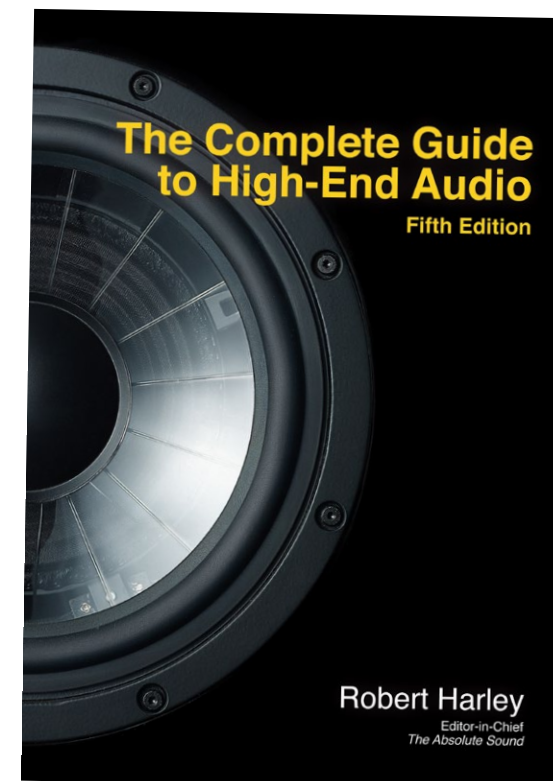
Supra-aural and Circumaural: Headphones are classified by how they fit on your head: supra-aural and circumaural. *Supra-aural* (literally, "over the ear") headphones have pads that rest on the ears (Fig.1), which is why they're also called "on-ear" headphones. By contrast, a *circumaural* (literally, "around the ear") headphone completely covers and encloses the entire ear (Fig.2). Supra-aural headphones are generally lighter, smaller, and more easily fit in a travel bag. The disadvantage is that they allow



Fig.1 Supra-aural headphones rest on your ears, and are also called "on-ear" headphones. (Courtesy Bowers & Wilkins)

in outside sounds, which can be distracting. And it works in the other direction: Supra-aural headphones leak sound from the headphones to the outside world, potentially disturbing those nearby. Supra-aural headphones are thus not a good choice for subway commuters or airline passengers. By completely enclosing the ear, circumaural headphones provide greater isolation from outside sounds, and those nearby won't hear your music. If you plan to listen in the presence of people who may be bothered by your music, choose circumaural over supra-aural headphones.

Open-Back vs. Closed-Back: A second major division in headphone design is open-back and closed-back headphones. In open-back 'phones (Fig.3), the side of the diaphragm facing away from the ear is open to the outside



world. Conversely, a closed-back design (Fig.4) completely seals the driver in an enclosure. Open-back headphones provide less isolation from outside noise, and allow others nearby to hear your music.

Generally speaking, open-back headphones have a more spacious soundstage and better imaging, and closed-back headphones have deeper, more powerful bass. Completely enclosing the driver, however, causes the sound radiated from the back of the diaphragm to be reflected from the enclosure back to the diaphragm, introducing unwanted diaphragm motions that are heard as colorations and

Book Excerpt *The Complete Guide to High-End Audio* (fifth edition)

smearing. Generally, open-back 'phones offer better sound quality than closed-back designs. Closed-back 'phones can also make your ears feel hotter with extended use; open-back 'phones "breathe."

Portability: The ultimate in portability is provided by earphones and in-ear monitors, which are often supplied with a small travel case that easily fits inside a briefcase, backpack, or purse. Some listeners object to inserting objects in their ears, and will opt for headphones even for traveling. If portability is important, look for headphones that fold up for storage in a travel case.

Comfort: The best-sounding headphones in the world won't be much good if they're uncomfortable to wear. Headphones vary immensely in how they feel on the head and against or around the ears, and any discomfort will only grow the longer you wear them.

There's some agreement about which model headphones are generally comfortable and which aren't, but everyone's head is different. You should wear the headphones under consideration for an extended period, if possible, before committing to a purchase.

Generally, lighter headphones are more comfortable than heavier models. Supra-aural headphones that rest against the ear usually weigh less than circumaural 'phones that enclose the ear, but the pressure applied to your ears by supra-aural headphones can become uncomfortable. Also consider the headband padding, which ranges

from a vinyl cover over bare metal to a deep cushion. Because every listener's head has a different shape and size, some brands or models of headphones will naturally fit you better than others.

Ruggedness: If your headphones will never leave your listening room, rugged build quality won't be an important consideration. For those who carry their 'phones everywhere they go, choosing headphones designed to withstand the rigors of daily travel is essential to realizing a long service life. Headphones designed for professional use are usually more durable.

Sound Quality: The criteria for judging the sound quality of headphones and loudspeakers are the same: You want a smooth tonal balance with no colorations, particularly through the midrange. The bass should be extended and full, but not bloated and thick. Headphones vary considerably in their treble extension and sense of openness, and a model without good treble extension will sound closed-in. Transparency, resolution, and dynamic range are all important factors in how much musical satisfaction the headphones will deliver in the long term. Listen to familiar music through the headphones you're considering, preferably for an extended audition.



Fig.2 Circumaural headphones surround the entire ear. (Courtesy Beyerdynamic)

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Noise Canceling: Active noise canceling is a technology that suppresses steady-state background noise, such as that generated by airplanes, cars, and trains. A microphone picks up ambient sound, amplifies the sound, inverts its polarity, and drives the headphones with the inverted signal. This inverted signal cancels, to some degree, the ambient sound leaking into your ears through the headphones. Noise-canceling headphones greatly reduce fatigue on long flights. By lowering the level of background noise, this technology can also make the music more intelligible and offer greater resolution.

Noise-canceling headphones require a power source: either an integral rechargeable battery pack, or two or more AA or AAA replaceable batteries. They're a little larger and more expensive than conventional headphones, but if you travel frequently, they can go a long way toward making travel less unpleasant. There's no reason why noise-canceling headphones need to compromise fidelity; I own a pair of terrific-sounding headphones that happen to have noise-canceling technology. They greatly reduce the constant roar inside an airplane cabin; I wear them even when I'm not listening to music.

Amplifier Matching: As explained in technical detail later in this chapter, headphones perform best when their electrical characteristics match those of the amplifier driving them. The primary specification to look at is the headphones'



Fig.3 Open-back headphones often sound better than the closed-back variety, but offer less isolation from outside sounds. (Courtesy Grado Labs)

impedance. Briefly, inexpensive portable audio devices tend to work best when driving headphones of high impedance (i.e., higher than about 100 ohms). Low-impedance headphones perform better when driven by a more robust amplifier, such as those found in portable DACs and dedicated headphone amplifiers.

See "Headphone Specifications," later in this chapter, for more detail on this subject.

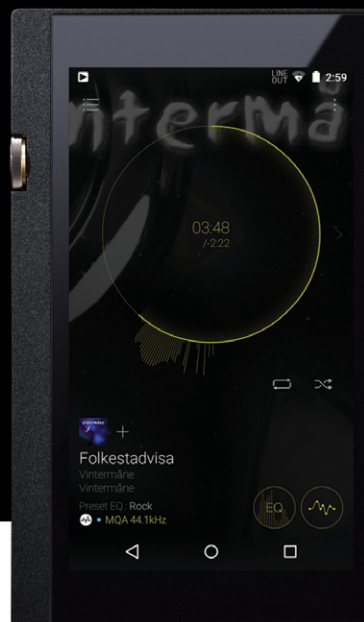
Balanced and Unbalanced Drive:

Some headphones offer the option of balanced connection between the amplifier and headphones.

Balanced connection, described in detail in Chapter 10 ("Cables and Interconnects"), carries the audio signal on three conductors rather than two. Balanced connection requires headphones that are wired with balanced connectors, as well as an amplifier designed for balanced operation, and is described in greater detail later in this chapter, under "Headphone Amplifiers."

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Fig.5 Contemporary electrostatic headphones are prized for their lifelike realism, speed, and resolution. (Courtesy Stax)

Wireless Headphones: Wireless headphones free the user from being tethered to the amplifier, but that convenience comes at a price: sound quality. Wireless headphones often use Bluetooth for transmitting the signal between the base station and the headphones, compromising fidelity. Bluetooth employs a coding and decoding system to reduce the bit-rate and thus the wireless signal's bandwidth. For that reason, wireless headphones aren't recommended except for casual use, or with the multichannel headphones described later in this chapter.

Dynamic, Electrostatic, and Planar-Magnetic Headphones

As is the case with loudspeaker designs, an electrical signal can be converted into sound by various technologies, includ-

ing the dynamic moving-coil driver, the electrostatic panel, and the planar-magnetic transducer. You'll find a similar array of technologies among high-end headphones. Each of these headphone technologies is simply a scaled-down version of the dynamic, electrostatic, and planar-magnetic drivers found in freestanding loudspeakers.

The vast majority of headphones have dynamic drivers. *Dynamic* headphones are rugged, small in size, and low in weight relative to electrostatic and planar-magnetic headphones. Although some dynamic headphones are expensive, they are generally less costly than electrostatic and planar-

magnetic designs.

Electrostatic headphones are rare, but they have a cult following for their outstanding transparency, resolution, and speed. These qualities, which are shared with electrostatic freestanding loudspeakers, are conferred by the electrostatic diaphragm's large surface area and extremely low mass. The lightweight diaphragm can respond very quickly to input signals,



Fig.4 Closed-back headphones are the best choice when you don't want to disturb those around you. (Courtesy PSB Speakers)

infusing the sound with a lifelike realism and resolution of low-level detail that is generally lacking in dynamic designs. The treble of electrostatic headphones is free from distorting resonances and extends well beyond 20kHz. The downside of electrostatic headphones is the need for a high-voltage outboard power supply to charge the diaphragm, as well as an amplifier of sufficient voltage output to drive the 'phones. Because this power supply and amplifier must be plugged into an AC wall outlet, electrostatic headphones can't be used for portable listening.

The classic electrostatic headphones—the model that popularized the technology—are the Stax SR Lambdas. Released in 1979 at the then whopping price of \$340, the SR Lambdas brought unprecedented sound quality to headphones, and was a favorite model among audiophiles and location recording engineers. Fig.5 shows a set of contemporary electrostatic headphones.

The third primary headphone technology is the *planar-magnetic* driver: a very thin, lightweight diaphragm to which a conductor is bonded. The diaphragm is suspended in a magnetic field created by permanent magnets on both sides of the diaphragm. The audio signal passes through the conductor bonded to the diaphragm, creating a varying magnetic field. The variations in this magnetic field constitute an analog of the audio signal and interact with the permanent magnetic field, pushing and pulling the diaphragm to vibrate the air and thus create sound. The drivers in planar-magnetic headphones have much lower moving mass than dynamic drivers, a larger

surface area, faster transient response, lower distortion, and greater frequency extension. Planar-magnetics can deliver exceptional sound quality, with resolution, dynamics, and tonal fidelity that rival those of state-of-the-art loudspeakers. Fig.6 shows a pair of high-end planar-magnetic headphones. ^{tas}

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Fig.6 Today's high-end planar-magnetic headphones deliver state-of-the-art sound quality. (Courtesy Audeze)

Special Preview

The Absolute Sound's Illustrated History of High-End Audio, Volume Two: Electronics

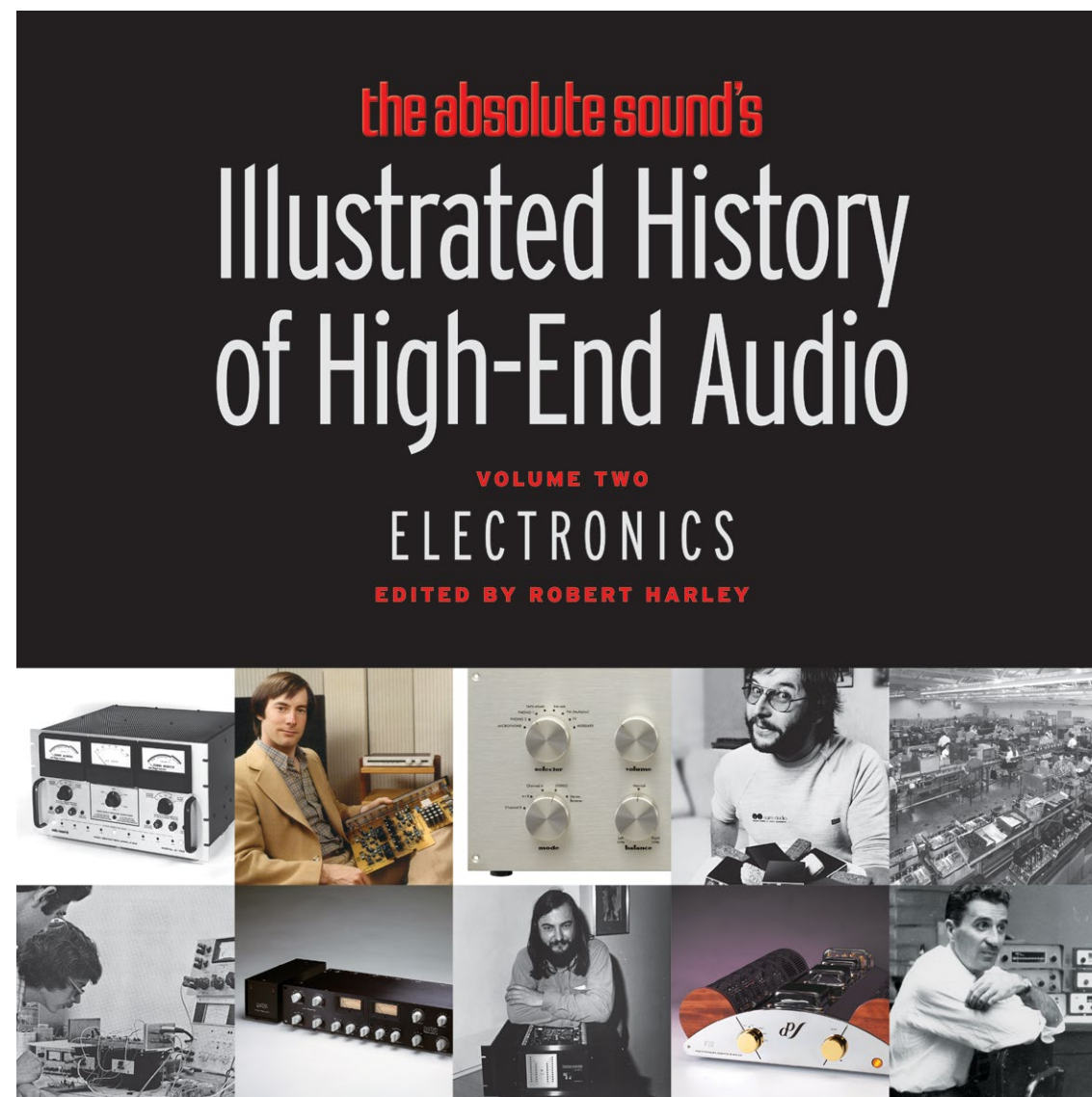
Robert Harley

I'm pleased to report that the second volume of *The Absolute Sound's Illustrated History of High-End Audio* is now shipping. As you may know, the Illustrated History is a series of richly illustrated, large-format books celebrating high-end audio's most legendary designers and their iconic products. Volume One on loudspeakers, published in 2013, has already met with overwhelming acclaim. The third and final volume, on analog and digital sources, will be published in 2018.

This new volume brings you the inside stories of the most fabled electronics designers, how they started their companies, and the secrets behind high-end audio's classic products. We cover the entire history of high-end amplification, from the Western-Electric SETs of the Twenties and Thirties to the famous Williamson Amplifier of 1947 through to today's cutting-edge products. You'll find detailed histories of legendary brands like Marantz, McIntosh, Dynaco, Threshold, Mark Levinson, Audio Research, Spectral Audio, and Krell. And those are merely eight of the 97 companies we profile. We've even included special sections on

SET and OTL amplifiers, Japanese artisanal audio, legendary British companies, and switching amplifiers. More than a collection of company resumés, Volume Two puts the evolution of high-performance amplification into historical context with insightful essays, informative interviews, and expert commentary by the TAS writing team and industry luminaries. What were the reasons for the explosion of creativity in the early 1970s? Why did the vacuum tube—all but forgotten for nearly a decade—make such a spectacular comeback? How do the world's most famous amplifier designers view their art and contributions to the high end? It's all here in Volume Two of the *Illustrated History*.

This lavishly produced book includes never-before-published interviews with the founding fathers of the high-end amplifier industry in addition to informative profiles of each of their companies, timelines detailing the most significant advancements in each company's history, classic and contemporary TAS commentary on the company's landmark products and technical milestones, and an overall assessment of each company's contributions to the high end.



TURNTABLES & TONEARMS

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Equipment Report

GEM Dandy PolyTable

The Little 'Table That Could (and Does)

Julie Mullins

Don't let its unusual looks fool you. Ditto its odd name. Deceptively simple in design and eminently user-friendly, this belt-driven turntable was created for those who want to purchase a quality analog source without breaking the bank. GEM Dandy company founder George Merrill—whose initials make up the “GEM” part of the ‘table’s name—designed the GEM Dandy PolyTable especially for analog fans seeking a high-performance unit that is a cut above mass-market offerings. I found that the GEM did, indeed, deliver solid sound and a positive user experience—from basic assembly and setup to hours of listening enjoyment. Made in the U.S. (in a suburb of Memphis, Tennessee), this ‘table is, in fact, so good it won our 2015 Product of the Year Award in the Affordable Analog category.

About the PolyTable's design: It avoids fuss and frills, and though it has a small footprint—another plus for those with less-than-palatial living spaces—to a large extent its form follows its function. Its trio of sturdy, knob-like, adjustable feet gives it a sort of spaceship vibe. Of course, beauty is famously in the eye of the beholder, but I find the PolyTable to have a certain spare, straightforward appeal that is also kind

of sleek and modern. Moreover, its streamlined look befits its streamlined operation, suitable for both budding and more experienced audiophiles. It's as if this little “gem” of a turntable has nothing to hide.

The PolyTable's unsuspending plinth, sub-platter, and platter are made of polyvinyl-chloride synthetic plastic, which is produced by polymerization of vinyl-chloride monomer.

George Merrill, who has been designing and building turntables for more than three decades, pioneered the use of such materials and holds related patents (applicable to some of his other turntables). “These polymers manage energy to an overwhelmingly better degree than any metal can,” he says. “None of the turntables since my first Heirloom design (1979) has had any metal in the critical signal path.” The catchy PolyTable name—and those of its Poly-Cover and PolyWeight accessories—comes from the use of polymer plastics.

Arrival and Assembly

My PolyTable review sample arrived in a larger box than I expected; it was well packed and included a helpful, four-page, color instruction manual. The PolyTable turntables are shipped



with Japanese-made Jelco tonearms; upon ordering you can choose from one of three models at tiered prices: the entry-level SA-250 (which was supplied with my sample), the SA-750D, or the 10" SA-750E. The PolyTables do not come bundled with a cartridge, so you'll have to buy one for yourself, although a range of Ortofon models is available through Merrill's store online.

Assembly instructions for the 'table and tonearm—and assembly itself—were simple. The aforementioned brief guide contains photos that make setup even easier. The PolyTable is a subplatter/platter design that uses an oil-well bearing and shaft that require the addition of about 10 drops of oil (included) when you fit the platters together. There are three leveling feet

(adjustable via internal screws) on the bottom of the plinth. The platter is lined on its surface with a rubber and cork compound, and there's a small bubble level built into the plinth. I moved house partway through the audition period, so that little level came in handy for readjusting the feet to compensate for my new home's not-quite-level hardwood floors. Like any 'table worth its salt, the PolyTable allows for VTF, VTA, and azimuth adjustments to enable optimization of a wide range of cartridges.

Spinning and Listening

Now for the fun part: spinning vinyl. I began auditioning the PolyTable with the supplied Jelco tonearm and a Shelter 201 moving-magnet cartridge during the review period for the PS

Equipment Report **GEM Dandy PolyTable**

Audio Sprout (another affordable Product of the Year winner). For a time, I used it as a source for HiFiMan HE400S headphones, listening to LPs ranging from Khachaturian's *Masquerade Suite* in Analogue Productions' marvelous Living Stereo reissue to the energetic Mobile Fidelity-re-mastered *Special Beat Service* by The English Beat. The former shone with powerful climaxes that exceeded my expectations. The latter, a recording that's prone to sounding slightly bright on a few systems, was reproduced quite cleanly, with its midrange-centric instrumentation and percussive punches rendered intact. In general, timbre veered somewhat towards the warmish side—certainly one of the Shelter mm cartridge's characteristics—though realism on voices was untouched. (In my Sprout review, I described how, when I was using the PolyTable as a source for the HiFiMan cans, a layered-in backup vocal—which seemed to come out of nowhere from right behind me—actually made me jump and turn around to see who had crept up. How's that for realistic reproduction of a voice?)

Once I switched to a moving-coil cartridge, namely the entry-level PS-7 from Air Tight, the sense of realism only increased. My setup at this time included a Walker Procession phonostage and a NuPrime IDA-8 integrated driving Raidho D-1 two-way loudspeakers and a pair of JLAudio e-110 subs. "Dance Me to the End of Love" from Leonard Cohen's wonderful *Live in London* album filled the room with his smooth, smoky baritone and the powerful swells of Neil Larsen's accordion. With this setup, I spun so many records across so many genres that I have a hard time culling examples.

To take in a true "gold standard" reference system, I spent a great deal of time listening to LPs at JV's house in the room with the Magico M-Pros and JLAudio Gotham subs, driven by Souolution's 725 preamp and 711 stereo amp. The source? The new, massive, and enormous Invictus turntable from Acoustic Signature. For reference purposes, I listened to recordings that I was very familiar with and that were, naturally, great-sounding across various criteria.

From setup to playback to overall musical enjoyment, I found the PolyTable to be a delight to use.

I'd brought Elvis Costello's *My Aim Is True*—which I happen to own in an original 1977 Stiff Records pressing. Quite the well-recorded gem, its unabashed attack and slam blew us both away on JV's reference system (not surprisingly), but wow, did it also rock my new home! No, it didn't have all the grip and definition of JV's super-system, or the resolution, transient speed, dimensionality, and color. But, honestly, it wasn't utterly embarrassed by the comparison. "Welcome to the Working Week" delivered impressive drive and percussive energy. The transient attack of Costello's Fender guitar strums resonated and decayed with far greater impact and realism than I would have expected. On "No Dancing," the kickdrum beats and tambourine strikes were similarly satisfying. No, you don't get all the low-end texture that you do on JV's reference systems, but the bass seldom went muzzy, and by and large had respectable definition—thanks in part to the JL subs. Costello's

raw vocal emotion was powerfully rendered on the melancholy ballad "Alison," while "Sneaky Feelings" boasted detailed, rapid-fire cymbal taps that were as crisp and clean as you please.

I also cross-compared the excellent live LP *Lost and Found* from Buena Vista Social Club on World Circuit Records, which Greg Cahill reviewed favorably in TAS, and the GEM PolyTable once again held up quite well. JV's reference system captured the magic of the ensemble's live performance with spectacular imaging and finesse. The snap and speed across a plethora of percussion were thrilling. The delicacy and power of Ibrahim Ferrer's tenor vocals emerged in incredibly lifelike detail. On my setup with the PolyTable, perhaps the most noticeable differences were the degree of transient response, bass definition, and overall resolution. The GEM sounded rather polite by comparison.

The point I'm making here is one of scale—of cost-to-performance ratios. We know JV's reference system—hell, just his turntable, tonearm, and cartridge—costs upwards of 120 times the price of the PolyTable. The point is that the performance it provides, as great as it is, is not 100 times better than that of the PolyTable. Overall, the system with the PolyTable delivered a very solid, very musical presentation, albeit with a midrange emphasis, across a broad spectrum of instruments. Although it might not have been the last word in any single audiophile criterion, it offered an impressive degree of detail and a quite respectable sense of verisimilitude. I kept on wanting to listen—and listen more. And isn't that what this hobby is about?

Regarding any downsides, I have only a few nits to pick with the PolyTable. One concern

SPECS & PRICING

Type: Belt-driven turntable with two platters

Tonearm: Jelco SA-250 (SA-750D or SA-750E can be specified)

Speeds: 33rpm and 45rpm

Dimensions: 18" x 7" x 12" (18.5" with SA-750E 10" tonearm)

Weight: 12 lbs.

Price: \$1495

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arose after I had borrowed the stellar Constellation Perseus phonostage preamp from JV. As it turned out, I could not actually connect the PolyTable and the Perseus because the RCA plugs of the Jelco 'arm would not separate far enough to span the distance between the preamp's widely spaced right and left-channel inputs. Obviously, this would not be a real-world pairing anyway, but I wanted to mention this just in case folks at home have phonostages with inputs that aren't positioned in a close side-by-side configuration.

On the aesthetic front, some might find the GEM a little too light and stripped-down-looking. Personally, as noted, I think it has its charms. The PolyTable is actually more substantial and somewhat heavier than photos of it suggest. In keeping with its minimalist overall design, changing

Equipment Report



will inform you of any major problems. Not that I foresee a problem with the GEM. Even though we're talking about a 'table that's intended to be fairly entry-level and basic, it has still been designed and built with a care and quality that should keep it running happily (and keep you listening happily) for years and years to come.

Conclusion

If you're an analog lover who doesn't have a big living space and/or a big budget, this high-value, small-footprint, belt-driven turntable could be just your ticket. From setup to playback to overall musical enjoyment, I found the PolyTable to be

speeds from 33 1/3 to 45rpm involves removing the top platter, lifting the little rubber belt, and moving it from the smaller sheave on the pulley to the larger one beneath it. Talk about hands-on! A certain analog-hound audiophile I know (who shall remain nameless) was vaguely appalled by this, but I didn't mind it at all. I felt more "in touch" with the 'table—kind of like my preference for cars with manual transmissions. I feel like I'm actually driving the thing.

Of course, keeping an eye on belt or general mechanical/motor wear-and-tear is part of belt-driven-turntable ownership. Listening

a delight in every way. It avoids fuss and frills, boasting a sleek, modern form, while its sturdy, two-piece platter, easy-to-install bearing, and adjustable feet make for easy assembly and operation. Additional optional accessories include a clear PolyCover (\$49) and a PolyWeight (\$59). If you're seeking more features and flexibility than a typical mass-market turntable offers, give this rather unique-looking number a look—and a listen. With both the mm and mc cartridges I tried, the PolyTable delivered serious analog pleasure worthy of far bigger bucks. A gem, indeed. **tas**

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Equipment Report

Pro-Ject RPM 9 Carbon Turntable

Carbon Dating

Neil Gader

If you feel as if you've seen this turntable in a past life, fear not. For indeed, the new Pro-Ject RPM 9 Carbon bears a strikingly close resemblance to the well-regarded RM-9.2 belt-drive 'table that was reviewed by Wayne Garcia in Issue 206. It's the same handsome profile and its compact, open-chassis, outboard motor design is *déjà vu* familiar. And yes again, it's similarly equipped with the top-notch 9cc EVO tonearm—a traditional pivoted design. But oh boy, there are some major differences and not all of them visible to the naked eye. It's like they say in the hot-rodding world: It's what's under the hood that counts.

The \$3000 RPM 9 Carbon is Pro-Ject's "tuner" special and it's been kitted out with three significant upgrades over the stock RM-9.2. There's a new motor that's both quieter and uses the same quartz-lock technology derived from the firm's outboard Speed Box II. Also there's a new DC-driven power supply that features an improved AC generator for speed stability. The major takeaway is that the electronic speed control allows single-button selection between 33 and 45rpm, a handy improvement over the pulley switching required with the

RM-9.2. Available in the near future will be a 33/78 pulley, as well.

Also hidden from view is the attention that's been paid to the newly upgraded chassis. The plinth is a mass-loaded design that incorporates a CNC-machined MDF plate that uses hard, resin-coated steel pellets to form the heavy sandwich construction. A special heat treatment and a woven-carbon-fiber surface-coating suggest low resonance levels. It also looks very cool and is, as they say, "track ready."

The platter is new, as well. Gone is the acrylic of the RM-9.2, replaced by a specially polished aluminum platter with internal TPE damping and a vinyl mat layer on top. The inverted ceramic main bearing offers stable turntable speed and extra-low levels of rumble. Effectively decoupling the chassis are a trio of height-adjustable magnetic footers that fit beneath the plinth and are designed for precise leveling. Beautifully constructed devices, the magnetic footers reportedly allow "for isolation and mass to work in tandem to help filter resonances out of the chassis." Speaking of mass, included with the RPM 9 Carbon is a heavy brass record clamp capable of flattening even stubbornly bowed records.



SPECS & PRICING

Type: Belt-driven turntable
Dimension: 17.4" x 7" x 12.8"
Weight: 24 lbs. + motor 4.5 lbs.
Prices: \$3000 with SuperPack

SUMIKO AUDIO

2431 Fifth Street
Berkeley, CA 94710
(510) 843-4500
sumikoaudio.net

Carried over from the RM-9.2 is the 9cc EVO arm, which uses a one-piece conical carbon-fiber armtube with integrated headshell and inverted bearing design. In its current iteration it incorporates a denser carbon-fiber weave to reduce resonances, plus a substantial C-collar for added rigidity in the bearing housing—an improvement which Sumiko (Pro-Ject's importer) says allows the 'arm and cartridge to have greater agility in the grooves. The 'arm's counterweight is Sorbothane-damped and taller and shallower than the previous version—changes that place it closer to the bearing's pivot-point for greater freedom of movement. All in all the EVO arm is a nicely crafted, highly adjustable component that permits cartridge tweakers a panoply of optimization options including overhang, azimuth, and VTA.

My review sample was also equipped with Sumiko's "hit the ground running" SuperPack that adds the Sumiko Blue Point Special EVO III (a 0.5mV moving coil and a \$549 value) and 5P Connect-it tonearm cable with a five-pin female DIN on one end and single-ended RCAs on the other (an XLR version is offered as an option). An optional dust cover is available and in my view, advisable. First, turntables attract

dust like bees to honey. And second, a cover can protect a stylus from an inadvertent swipe of a Swiffer—especially in an open chassis design where the headshell end of the tonearm is essentially floating in free air and almost begging for the Stephen King treatment. This is just one reason why I like a dedicated base protecting the essentials of a turntable. I know the arguments against them, but I also know from experience that when properly executed—like my Sota Cosmos' Corian base—they make a table highly immune to airborne and mechanical resonances.

Setup was glitch-free. A handy template is provided for optimally positioning the motor vis-à-vis the edge of the platter, thus allowing proper tensioning of the belt. And operationally it's also a breeze. The one-touch motor gets the table up to 33 speed fairly quickly—45rpm is a little more on the languid side. To switch speeds from 33 to 45 merely press the button

Equipment Report Pro-Ject RPM 9 Carbon

a second time and quickly release. To stop the table, hold the button down a few additional seconds. The damped cueing is commendably gentle on the stylus, but I was a little surprised at how powerfully the magnetized armrest seated the tonearm each time I returned it home. Clack. I kept thinking of the Starship Enterprise caught in a Klingon tractor beam.

If there was a system that could show up the Pro-Ject as a playback poseur it was the one it faced during this evaluation. One of the highest-resolution setups I've had in my room recently, it was composed of the Parasound JC 3+ phonostage, the Classé CP-800 preamp, CA-D200 amplifier, and TAD CE-1 loudspeakers (review forthcoming). Synergistic Research supplied its all-new Atmosphere Level 4 cabling (with red tuning modules). My own LP setup is the Sota Cosmos vacuum-hold-down 'table with SME V tonearm, Sumiko Palo Santos Presentation cartridge, and Audience Au24SE phono cable.

Just prior to actually dropping the stylus onto a record for the first time I have a particular (some might say peculiar) habit reserved for turntable evaluations. Given that they are the only components (excepting reel-to-reel) in audio chains with mostly visible, mechanically operated systems, I like to sit back and observe the 'table and tonearm behavior—the quality and control of its operation. How fluid and stable is the 'table in full motion? Does the platter/mat waver during rotation? Is there any vibrational noise, or motor noise? Long story short, the system should present a platform so placid and stable that at a glance the stylus/groove interface should appear as if there

is nothing moving at all—frozen in time like a still photo. The RPM 9 Carbon passed this initial test so impressively it looked as if it were unplugged.

The sonic performance of the RPM 9 Carbon is devilishly good. Backgrounds are jet black and softly tinted to the warmer end of the tonal spectrum. Its character is one of overarching balance across all criteria, a trait that makes LP reproduction sound elegantly composed and well nigh effortless. Imaging and soundstage stability are excellent with a wide comfortable spread of images across the stage. String sections, winds, brass are all nicely differentiated from another and there's little to no image smearing.

On the classic Reference Recordings LP *Nojima Plays Liszt* my ears instantly go on red alert. If there is any hint of pitch instability or tonal warble it's going to raise its head during this recording's quietest passages—especially on long, sustained single notes. The Pro-Ject was rock-solid at these moments, each note decaying unwaveringly into the deepest corners of the soundspace. *Presto* arpeggios were liquid and articulate, as well. Plus, there was an impressive sense of air and lift in the upper octaves. And equally and literally striking were the artist's percussive keyboard stabs, which were deep and authoritative. As these aggressively played passages built in intensity, the harmonic aura enveloping the soundboard and rippling the air around the concert grand was superb.

When evaluating turntables I invariably return to the deep, widely spaced grooves of twelve-inch 45rpm pop remixes. They've been

re-engineered and cut for maximum effect on the dance floor, and are usually overflowing with bass information and mixing board trickery. Although these can be a bear for cartridges to track I'm still amazed at the delights and oddities that I continue to discover in these old pressings—and way long after assuming I'd extracted every sonic treasure. Take for example, Lionel Richie's "All Night Long" (I hear groans). The depth and detail in this recording have evolved steadily upward with the improvements in LP playback equipment. In the case of the RPM 9 Carbon it was all about the detail exhibited from the dense crowd of background partyers. There was enough specificity and transient snap that I was ready to do a head count. (And then go find the party's bartender.) The vibes solo was also richer harmonically, more stable and articulate. And the blazing horn section could now be broken down into individual instruments, not just white sheets of sound. Similarly David Bowie's "Let's Dance," the Nile Rodgers-produced twelve-inch remix, sent chills down my spine with its percussive energy, smirking sax-play, and every searing note that exploded forth during Stevie Ray Vaughan's famous guitar solo.

Another example was Joan Baez's cover of "Let it Be" from her live concert LP *Diamonds and Rust in the Bullring*, a wonderful remastering and pressing from Analogue Productions. Accompanied by the gospel-inflected piano, organ, and backing chorus, this was the sort of emotionally open performance so filled with artistic conviction that I was whisked into the appreciative audience, where the sense of the live event was evident in the ambient immer-

siveness of the recording and the assuredness of Baez's terrific pitch control and lively vibrato.

There are no blatant weaknesses to this turntable, rather just some very minor subtractions. In subtler ways it lacks the final level of dark harmonic ripeness in the lower octaves of certain super-'tables. The palpability and the full palette of dynamic action and tonal color during Stravinsky's *Pulcinella* [Argo] seemed slightly attenuated. The low-level resolving power that finds spaces between notes was more apparent on my own front end. Finally, I could spot some general soundstage foreshortening and a modest hint of treble constriction from orchestral strings, cymbals, and tams, but to be fair, the choice of cartridge needs to be factored into this impression at least as much as the turntable/tonearm combination. Probably more. The Blue Point Special is a good one and a good value, but to be fair it's no Palo Santos Presentation.

The Pro-Ject RPM 9 Carbon continues the brand's outstanding run of sonic and technical improvements in affordable vinyl playback. In fact, throughout my evaluation it never seemed out of its league, even facing the heady heights of upper-crust setups, including my own much pricier kit. Interested parties should also know that the RPM 9 Carbon is a worthy addition for the *long term*—it's got enough resolution and sheer musicality to ensure that audio upgrades elsewhere in the chain can be confidently purchased without fear of outdating the Pro-Ject. Without qualification, the RPM 9 Carbon is a terrific package, certain to give a great many lucky owners years of vinyl-spinning thrills. **tas**

Equipment Report

Avid Diva II

A Bold Beauty of a Turntable

Steve Dickinson

I'm not what you would call an early adopter. I resisted getting a mobile phone for years, and smartphones and tablets have only lately entered my life. It was the same with CD players, and even after getting my first player, it was a long time before the silver disk displaced vinyl in my affections. But displace it did, and my turntable has languished if not unloved, then certainly disregarded, for rather longer than perhaps is good for it—or me. The trouble is, good though a well-fettled Rega Planar 3 undoubtedly can be, it isn't in the same league as a dCS Puccini, with or without its U-Clock. I want to enjoy my longtime unplayed vinyl again, but anything I listen to it on is going to have to raise its game a fair bit.

So, where to go from here? Like many people, having bought My First Turntable™ in the form of a lower-end Rega or Pro-Ject, the obvious place to look would be further up those manufacturers' ranges. But, I've always had a bit of a thing for the Avid turntables. Until recently, even the entry-level models were a bit of a leap, but the introduction of the \$1999 Ingenium has put Avid firmly in the "possibles" pile. Add an 'arm upgrade and cartridge, and we enter the price bracket occupied by the higher-perfor-

mance part of the Rega range, for example, so if we're going to get a bit serious about vinyl, the Ingenium is a contender. And if the \$1999 Ingenium is a possibility, would it be worth the stretch to the \$2795 Diva II? With these questions in mind, Conrad Mas from Avid dropped an Ingenium and a Diva II off, together with a Project Carbon tonearm fitted with the excellent Ortofon 2M Blue moving-magnet cartridge.

Happily for this thumb-fingered ignoramus, installing the 'arm on each table was straightforward and, having established a setup of 'arm height and tracking weight within limits, a little tweaking was done by ear to find each turntable's sweet-spot. Listening was done through the rather good, built-in mm phonostage in my Albany AP11, feeding the M1108 monoblocks to my regular Focal Electra 1028Bes or the Tannoy XT 8F floorstanders.

The Ingenium and the Diva II share some common features, but differ in some important ones. Unlike the more expensive Avid designs, neither Ingenium nor Diva sports a suspended subchassis. This is obvious in the Ingenium, whose T-shaped chassis sits atop three free-standing Sorbothane feet, one at the end of each limb of the T. The Diva looks more like

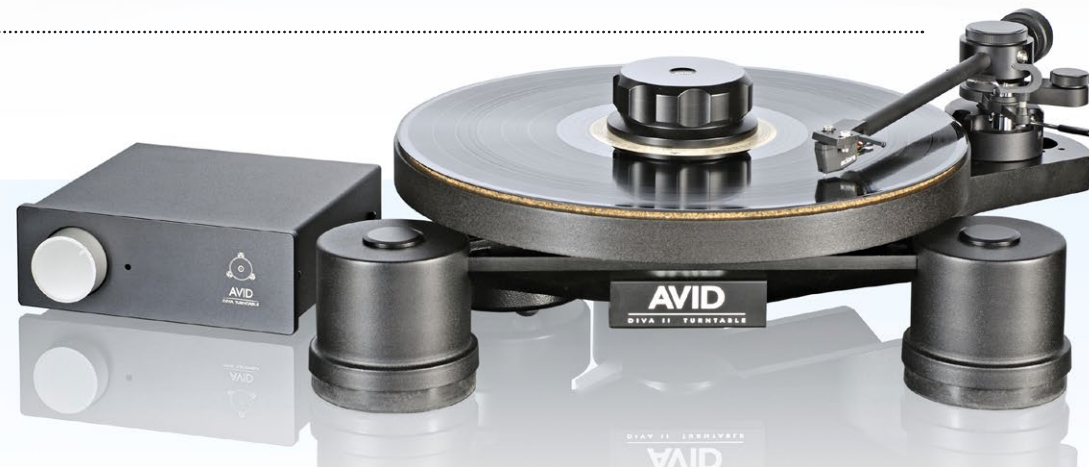
the Volvere, Sequel, and Acutus models, sitting on three pods arranged in an equilateral triangle. I assumed this was some form of suspension, like the Volvere's but probably simpler. In point of fact, the pods house more Sorbothane rather than any form of suspension and are part of the chassis rather than having the chassis resting atop them; ultimately, both the Ingenium and the Diva II are rigid designs. Both use free-standing motors; the Diva II upgrades from the Ingenium's 240v unit with on/off switch in the mains cable, to a considerably heavier 24v motor and dedicated power supply. Speed control is by alternative diameter pulleys in both cases. The main bearing, subplatter, and platter are common to both, and the Diva II comes with a record clamp as standard, whereas this is an option on the Ingenium. Given that these two models share an identical 'arm and cartridge, the obvious question is: What benefits do the differences between the designs bring, and are they worth the financial stretch?

The Ingenium provides an undoubtedly confident and authoritative sound, making those typical entry-level turntables sound somewhat diffident. Its presentation was big, beefy, and dynamic with strong bass definition and power;

it feels more like a full-range transducer, with more of the fundamental of notes in evidence. It's a sound that a habitual CD user would appreciate, eschewing any sense of vagueness that cheaper vinyl sometimes uses to paper over the cracks. Large-scale orchestral material, such as *Rhapsody in Blue* [Decca SPA 525] is more spacious, with depth and body to the image, and a more expansive dynamic range. And the Ingenium was, for me at least, a definite contender.

If you're going for the Ingenium, by the way, then the optional record clamp is worth the extra cost. Without it, you lose important levels of midrange definition and texture; pace, drive, and solidity are clearly improved and the musicianship in general is tightened up. You can assume that any comparisons with the Diva in this review used the clamp for both turntables.

So then I tried the Diva II. I could sum it up as "more of the same, with a definite nod toward the big Avid turntables like the Sequel and Acutus" which would be both true and unfair at the same time. Unfair because it might give the impression that you can get Sequel performance for Diva II money, which you don't, and also because at twice the price of the Ingenium,



Equipment Report **Avid Diva II**

getting “more of the same” probably isn’t stating things strongly enough.

The difference, and what would have me drinking a little less each week until I’d saved the extra funds for the Diva II, is that the Diva II also brings a degree of extra control, authority, and musical integrity to supplement the additional scale, weight, and dynamic range of the Ingenium. Instruments such as marimba (“The Animals” from *Sky’s Five Live* [Ariola]) or xylophone (the closing track from Mike Oldfield’s *Incantations* [Virgin]) have a woody depth, resonance, and sense of mass the Ingenium only hints at, and in particular the decay to notes, notably anything with a degree of bass, or drums, is longer and all the more satisfying. The effect on the Oldfield track is to give the xylophone playing more of a sense of bounce and forward motion, musical purpose wrought from a rightness in the timing married to a satisfying depth of tonal color.

... piano in particular, and any music with sustained notes or lengthy decay, is both more satisfying and less irritating.

The overall effect is that music works more effectively; “Anitra’s Dance” from the Marriner/St. Martin-in-the-Fields recording of Grieg’s *Peer Gynt* incidental music [EMI] does feel more like a dance than simply a set-piece, and “In the Hall of the Mountain King” builds not only in tempo, but also in intensity. That Decca *Rhapsody in Blue* also contains a recording of Copland’s

Fanfare for the Common Man which, via the Diva II, has not only a sense of space and distance to the opening fanfare, but the sheer power of the timpani is quite arresting; they have impact in the truest sense yet, despite their power, the timpani don’t disturb or unbalance the performance. The Diva II keeps its head while lesser ‘tables are losing theirs.

Having listened almost exclusively to CDs for the last decade, I’ve become more sensitive to the small instabilities in pitch that can bedevil vinyl replay systems. Both the Avid turntables acquit themselves respectably in this regard, and fooling around with belt tension by shuffling the motor this way and that definitely gets results, but the Diva II’s heavier motor and dedicated PSU are clearly ahead in this particular aspect. On paper, the motors have similar output, but the 24v unit used for the Diva II does appear to generate more torque, noticeable when, for example, cleaning the surface of discs with a carbon-fiber brush. The upshot is that piano in particular, and any music with sustained notes or lengthy decay, is both more satisfying and less irritating. It also usefully benefits musical timing. The title cut of Dave Grusin’s *Mountain Dance* [Arista] trips along nicely, and with a better sense of how the percussion is being played, with the speed and subtlety of the cymbal work being brought out particularly well. There was a time when I dismissed this track as just West Coast noodling, but it now it has regained a sense of performance it had somehow lost.

Voices, whether spoken or sung, are more natural and expressive. Vocal leads take proper place front and center, rather than shuffling meekly further backstage, and voices have a

natural balance of timbre without obvious emphasis. Richard Burton’s narration on *The War of the Worlds* [CBS Records], for example, avoids any tendency towards reverberant chestiness and remains both intimate and authoritative, without being declamatory.

As mentioned earlier, the Ingenium is offered with a record clamp as an option, but the same clamp is standard for the Diva II. I tried a few tracks on the Diva II *sans* clamp and it quickly becomes apparent that this is no mere accessory. Without the clamp, first impressions may be that the turntable has more bass, but anything more than a cursory listen shows that this is an illusion borne out of the fact that what bass there is, is loose, diffuse and flabby, ill-defined, and less tuneful than when the clamp is applied. Without the provision of that essential underpinning support, the bass dominates and overpowers, which is why the ear is drawn to it. The clamp literally tightens everything up; bass is firmer, more agile and more tuneful, and allows the rest of the music to assume its proper place.

This helps keep bass-heavy pieces, such as “Montagues and Capulets” from Prokofiev’s *Romeo and Juliet* [Philips], from becoming ponderous. There is power and energy, the bass propels the music forward rather than dragging it down, and there is good scale. The orchestra has mass and energy, rather than simply occupying space. The Diva II gives a good account of the way large and powerful musical forces can be controlled and kept in check, so sudden loud or quiet passages are all the more effective. There is a sense that the Diva II is more rhythmically confident. On another Prokofiev album, *Lieutenant Kijé* [EMI] struts and strides boldly, while

SPECS & PRICING

Avid Diva II

Type: Belt-driven

Motor: 24v 12mNm ac synchronous

Dimensions: 450mm x 140mm x 390mm

Weight: 9 kg

Price: \$2795, standard SME mount, without tonearm

Avid Ingenium

Type: Belt-driven

Motor: 115/230v 12mNm ac synchronous

Dimensions: 370mm x 130mm x 305mm

Weight: 5.9 kg

Price: \$1999 (with Jelco tonearm)

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also providing that added depth of tonal color—the timbral and spatial differences between the various woodwind parts, for example, become more apparent, so you begin to appreciate how the composer has chosen the musical forces at his disposal and has set about using them to best effect.

Equipment Report Avid Diva II



The upshot is that the extra scale and authority the Diva II brings, coupled with the greater control and rhythmic integrity, makes the Diva II a very worthwhile step up from the Ingenium. The Ingenium is a very engaging and entertaining listen, extracting way more from your vinyl than a budget table can hope to manage and presenting it to you with an ebullience and infectious enthusiasm that engages and holds your attention. Imagine a Labrador puppy, grown to full size but still full of youth and enthusiasm. Now take that puppy after two years of guide dog training. Still a youthful and enthusiastic companion, but also purposeful, reliable, and worthy of your trust. This is the Diva II. It remembers how to have a good time, but knows how to keep things under control so you don't end up with an almighty mess. It's a grown-up turntable that remembers how good it can be to be a teenager. (Maybe that's why I enjoyed revisiting so many of the albums from my for-

mativ e years for this review's critical listening.)

It's a fair jump pricewise, and once you've factored in a suitable 'arm and cartridge, the Diva II isn't something you'd buy on a whim. There is no doubt in my mind that, had I only the funds for the Ingenium, it's exactly the sort of turntable I'd want because it has the fundamental qualities I wouldn't want to be without. But yes, the Diva II is almost twice the price. With the same 'arm and cartridge you'd be looking at around half as much again. But it offers so much more in terms of making your music make more sense. I suspect that if I bought the Ingenium, I'd wish I'd gone for the Diva II, and if I went for the Avid Diva II, there is much less likelihood that my vinyl would once again be relegated to the cupboard under the stairs. An extra 800 bucks or so to reacquaint myself with an important chunk of my music collection? You betcha. **tas**

Editor's note: This piece was first published in HiFi+.



Equipment Report

Clearaudio Performance DC Turntable System

Clear Sound, Clear Value

Dave Berriman

Clearaudio prides itself as a manufacturer of precision vinyl replay systems, offering a wide selection of turntables, tonearms, cartridges, phono preamps, record-cleaning machines, and accessories. The Performance DC is more affordable than a number of the celebrated manufacturer's upper-tier models, especially as this package offered for review includes a tonearm and Virtuoso V2 Ebony moving-magnet cartridge for just \$4410. It's not quite beer-budget, but affordable nonetheless, and very easy on the eye. Built in Germany, the turntable employs a newly designed decoupled and resonance-damped DC motor with precision bearings, driving the platter via a flat rubber belt. Power for the motor comes from a DC wall-wart, which plugs into the rear of the turntable. The platter is a 40mm-thick, CNC-machined slab of polyoxymethylene (or POM, otherwise known by its trade name of Delrin), a dense and inert plastics material, which combines high inertia and internal damping.

Unusually, the platter rides suspended on a patented Clearaudio magnetic support bearing which features a precision, low-friction, ceramic shaft in a sintered bronze bushing to keep it running noise-free, true, and vertical. The

weight of the platter causes the height of the bearing to drop slightly under its weight on a magnetic cushion, so that the platter floats on an invisible spring.

Conventional thrust bearings in turntables create noise at the physical contact point due to supporting all the weight of the platter, whereas the Clearaudio bearing surfaces are relieved of this task. This may in part explain the very low claimed rumble figure of 92dB A (DIN IEC98, method A).

The Performance DC is built to a construction principle that Clearaudio calls "resonance optimized". Its motor, platter bearing, and 'arm are all fixed to a solid, well-damped plinth made from a sandwich of two aluminium plates on a high density fiberboard compressed wood core. It feels very solid and heavy, which is no illusion, as the whole turntable weighs just over 25 pounds. To support and level the turntable, there are four adjustable feet.

Speed is electronically controlled, with 33 1/3, 45, and 78rpm, all selectable by small, crisply operating, top-mounted buttons on the left-hand side. There is no need to flip the belt up and down to change speeds, as on many turntables, making it very easy to use.

The Clarify tonearm fitted to the turntable is

a beautifully jewel-like piece of engineering, which is as pleasing to look at as it is to operate. Like the platter, it uses magnetism, but this time to pull the 'arm-tube upwards, against gravity and the restraining tension of a single pivot wire. The 'arm bearing is therefore a unique kind of inverted-wire suspension, or unipivot, with very low friction. The 'arm-tube itself is made with woven carbon fiber, which in addition to its high strength and low mass, provides a sharp high-tech appearance.

Torsion is applied to the 'arm's restraining pivot wire to achieve bias correction. This is set for a tracking force of 2.4 grams, which is typical of most modern mm and mc cartridges. If necessary, this may be altered by a rotary adjuster under the tonearm bearing that applies torsion to the support wire. It's a clever system, but to avoid mistakes, bias should only be altered with the aid of a test record, such as Clearaudio's own.

Vertical tracking force is set by altering the position of the counterweight, as clearly described in the instruction manual. Because the magnetic bearing also applies a slight restraining force at the pivot, great care must be taken to adjust the tracking force with the stylus at the same height as the record-playing

surface (but with no record on the platter). The Clearaudio tracking force gauge is ideal for this job, because it virtually replicates the thickness of an LP. Many other gauges are thicker and may give rise to the wrong force settings.

All of which brings us to the cartridge fitted in this package: the Virtuoso V2 Ebony moving-magnet. Housed in a polished ebony body, Clearaudio claims it has "optimized resonance" for low coloration, while the low-moving-mass generator system employs powerful magnets.

My review sample arrived with the 'arm not fitted and the cartridge supplied in its presentation box. However, it turned out to be extremely simple to assemble and set up, guided by Clearaudio's easy-to-follow instruction booklet. It was similarly easy to install the cartridge and adjust the 'arm, and all the tools and parts required were included. In any case, your dealer would normally do this for you. For the review I partnered it with a two-box Clearaudio Basic Plus mm/mc phono preamp, which proved ideal for the task, because not only was it low in background noise, but it was also transparent and smooth-sounding.

Once the turntable was fixed up and running, I played a random selection of vinyl to get a



Equipment Report Clearaudio Performance DC Turntable System

general feel of the subjective performance. It was obvious right away that this turntable is true to its maker's name. Music reproduced by this setup was clear, well focused, crisp, and nicely-timed. This combination of benefits made it easy to follow complex rhythms and parts of the mix, and I liked the drive and energy it conveyed.

The Performance DC does not have the benefit of a spring suspension system, relying instead on mass to limit vibration transfer from the environment. Despite the high mass and lack of resonance in the plinth, it does transmit some vibration to the cartridge and so shares with others of its genre a degree of sensitivity to the surface on which it is placed.

I tried the Performance DC turntable in a few places. The best, but hardly the most practical, was directly on a carpeted concrete floor, second best an Ikea Lack table. So, I recommend some experimentation with different support tables. A dedicated wall shelf would be ideal, too.

Once suitably positioned, I admired the open-sounding midrange, but felt slightly uneasy about the treble. It was not coarse or harsh, but felt slightly dominant. This suspicion was confirmed by a test record and spectrum analyser, which showed a treble lift from the cartridge of about 4dB on one channel and 3dB on the other. This results in an overall balance that on the plus side can bring life to dull-sounding speakers or systems, but bear in mind that the cartridge could also sound a bit thin and wearing, especially with brighter sounding auxiliaries.

I deliberately chose something with a firm, driving bass line, so I spun George Benson's track "Off Broadway" from his LP *Give Me the Night* [WB 56 823]. The Performance DC combo pre-

sented George's vocals in a clear and open way, with lots of reverberation, which was impressive, but seemed just a bit lispy. Bass lines were crisp and well timed, but with a marginal lack of ultimate power in the deeper fundamentals. Lee Ritenour's contrasting guitar style was reproduced with an amazingly rich and complex tonal quality that was a delight to hear. I loved the open clarity and fast-paced character, even though the deep bass did not quite have the grunt and warmth of some heftier (and costlier) turntables. However, the turntable, 'arm, and cartridge were clearly extracting substantial levels of information and detail, so that Bert Swedian's microphone wizardry and Quincy Jones' legendary production were laid bare for all to hear.

I moved on to Miles Davis with John Coltrane [CBS 88029]. Again, the sound was beautifully clear, but with a thinning to Miles' horn and JimmyCobb's brushed drums. Bass quality was enjoyable and easy to follow—just slightly less deep and solid than I have heard it.

Playing a few classical records reinforced my impression that a more neutrally balanced cartridge would be ideal, and so I requested an alternative. This turned out to be the Clearaudio MC Concept, with boron cantilever and micro-line stylus. Taken separately, the MC Concept is slightly cheaper than the Virtuoso V2 Ebony, but as the latter is part of a package deal, the turntable combination with the moving-coil cartridge ends up costing about \$90 more.

My first impression after the changeover was that the MC Concept was clearer, cleaner, and smoother. For instance, Frank Sinatra's voice on



"Strangers in the Night" from *The Most Beautiful Songs Of Frank Sinatra* [Reprise REP64011] sat better with its reverberation; his vocals were now rich and smooth, and the music had swing.

With the Piano Concerto No. 2 from *Sviatoslav Richter: Rachmaninov* [DGG 138 076], the orchestra was rich and sonorous, with more natural string tone, while the piano had much more power and presence. The instruments in the orchestra had a more tangible presence and simply sounded more realistic. Likewise, when playing the LP of Delibes' *Coppélia Ballet Suite* [DGG 2535 189], the orchestra was simply more tangible with the Concept MC cartridge.

Not only was the MC Concept better balanced tonally, it also had greater power, body, and presence. While others might disagree, I never totally relaxed with the moving-magnet cartridge, but with the MC Concept, to my ears the Performance DC seemed totally transformed into a much more enjoyable combination. The upgrade is well worth the extra roughly \$90, in my view.

Summing up, the Performance DC turntable may not have the vibration isolation of some (often rather more expensive) suspended sub-chassis turntables, but it offers a high standard of vinyl record reproduction, is beautifully made, looks great, and is easy to use. I really liked the clear, open sound and fast-paced bass rhythms served up on its turntable's platter—especially when partnered with Clearaudio's MC Concept cartridge. **tas**

Editor's note: This piece was first published in HiFi+.

SPECS & PRICING

Clearaudio Performance DC Turntable

Type: Belt-driven
Motor: DC motor
Dimensions: 420mm x 143mm x 330mm
Weight: 11.5 kg; 25 lbs., 5 ounces
Price: \$2400

Clarify Tonearm

Type: Carbon fiber with friction-free magnetic bearing
Length: 335mm overall
Effective mass: 320 g (410 g incl. counterweight)
Price: \$1600

Virtuoso V2 Ebony Cartridge

Type: Moving-magnet
Tracking force: 2.2 g +/- 0.3 g
Weight: 8.4 g
Body: Ebony
Price: \$900; \$810 with 'table purchase

CLEARAUDIO ELECTRONIC GMBH

Spardorferstraße 150
D-91054 Erlangen
Germany
+49 1805-059595
clearaudio.de

U.S. Distributor

Musical Surroundings

5662 Shattuck Ave.
Oakland, CA 94609
(510) 547-5006
musicalsurrroundings.com

Equipment Report

Pear Audio Blue Kid Thomas Turntable with Cornet 2 Tonearm and External Power Supply

Silent and Smooth

Andre Jennings

While the Pear Audio Blue Kid Thomas turntable (\$5995) has a unique look, there are some things about its appearance that may seem very familiar. There is good reason for this because the Kid Thomas was designed by the late Tom Fletcher (of Nottingham Analogue fame)—as were all the Kid 'tables in the Pear Audio Blue lineup. Some of those visual similarities are the look of the motor pod, the dampening rings around the platter circumference, and the shape of the tonearm.

Peter Mezek, the principal of Pear Audio Analogue, was a longtime friend of Tom's. The two worked together to create the Pear Audio Blue lineup. According to Mezek, Tom Fletcher wanted to advance the performance of his older designs; to do so, he started with a clean slate. According to Mezek, the new design ideas "led to great improvements in sonics, musicality, realism, phasing, coloration, etc., which would never have been possible trying to further develop the old designs."

Pear Audio Blue's production initially took place at the Nottingham Analogue factory

(before Fletcher passed away). Today, all Pear Audio Blue products are hand-built by Mezek and his team in Slovenia.

One of the key principles in creating the Kid Thomas was the careful mix of materials. Pear Audio Blue's goal is "sonic harmony." The idea is to marry materials in a way that results in the turntable system that performs as a whole better than the sum of its individual parts. To achieve this, Pear considers the size and shape of all turntable and tonearm components, and their effect on music reproduction. Each part, no matter how small, is tested for resonance characteristics and listened to in the system for optimal performance. If a part doesn't measure up, it isn't used; if making something prettier results in poorer sound, a different finish is applied. One outcome of this approach is that less metal is used in the Pear Audio Blue 'tables and 'arm than in previous Fletcher designs.

The Kid Thomas has two plinths, each approximately 30mm thick, in an isolation sandwich. The isolation is provided by eight rubber feet recessed in cavities under the top plinth. (The plinth is made from an unspecified

wood with properties that, Mezek says, Fletcher had been searching for most of his life.) The lower plinth has three height-adjustable support feet with smaller rubber feet attached underneath for additional isolation. There are two support feet in the front corners of the Kid Thomas and one in the center rear of the 'table. The front support feet have two small half-sphere-shaped rubber feet under them while the rear support foot has nine. There are two circular cutouts in the lower plinth for the platter bearing and tonearm wires to pass through. An additional circular cutout holds an insert with what looks like a flexible closed-cell rod that (when fully assembled) touches the bottom of the platter. The flexible rod is said to aid in maintaining speed stability. The upper plinth has one open circular cutout for the flexible rod. The two additional circular cutouts hold the lower bearing assembly for the platter and the tonearm base with mounting collet. When both plinths are properly aligned at their corners, a U-shaped cutout on the left side can be used to enclose the motor.

The motor is nested in a housing that is



friction-fitted into an outer housing. There are three adjustable that allow for setting the proper height. The twenty-five-pound aluminum-alloy platter (approximately 58mm thick) has four concave grooves along the outer edge that hold rubber dampening rings. These rings effectively attenuate what would otherwise be a high-pitched metallic sound that can be heard if the platter is struck when the rings aren't in place. Attached to the lower center of the platter is a bearing shaft that mates to the bearing assembly on the upper plinth. Once the proper amount of oil is added to the outer bearing assembly, the platter/bearing can be inserted to complete the main 'table assembly. The final

Equipment Report Pear Audio Blue Kid Thomas Turntable with Cornet 2 Tonearm and External Power Supply

piece of the platter assembly is a foam platter mat that provides additional isolation.

The Cornet 2 tonearm (\$2295) is said to be a unipivot, but the actual design is a bit more complicated than a typical unipivot. The tonearm pivot comprises two short parallel metal bars (traveling in the same plane as the headshell to counterweight) that are located horizontally on either side of a roller bearing. The roller bearing sits atop a unipivot shaft. The roller bearing and horizontal bars restrict 'arm movement in unwanted directions and help keep azimuth settings stable. The armtube is made of carbon fiber with the long grain oriented between the headshell and pivot point. The brass counterweight is secured to the 'arm by a springy, friction-fit, open C-shape clamp. Tracking force is adjusted by sliding the weight back and forth in this spring clamp. The 'arm has a collar with height-adjustable screw for fine VTA/SRA adjustment, once VTA has been roughly set with the base collet. Offset angle and overhang, as well as provisions for anti-skate and azimuth, are also user-adjustable.

The optional external power supply (\$1995) accepts connections from the 'table motor and the AC inlet. (There is a power switch on the rear of the unit.) The external power supply has a rotary frequency control on the front that allows the user to precisely set the speed of the turntable. Once adjusted, there should be no need to change the setting during normal use. The motor used on the Kid Thomas is a low-torque design that helps to reduce motor vibrations that otherwise could be transferred to the platter via the drive belt.

The complete turntable package (Kid Thomas,

Cornet 2, and external power supply) arrived in a single triple-walled cardboard box with an additional triple-walled internal cardboard surround. The assembly was divided into four sections separated by foam inserts. The lower section contained the platter, the second level from the bottom held the double plinth, and the third section from the bottom had accessories. The final top section contained three boxes that held the tonearm, motor assembly, and external power supply. Assembly of the 'table was fairly easy when following the instructions in the user manual. The manual mentions, whenever possible, letting the dealer set up the tonearm to get the best sound from the system. Without going through the cartridge set-up routine, there are some things to be aware of. All of the fittings are friction-fit and the adjustment screws are nylon (except the VTA/SRA fine-adjustment screw). Pear Audio recommends just enough pressure to secure the fixtures and no more. The distributor mentions that making screw connections too tight will result in brighter sound.

One of the many reasons vinyl playback is enjoyable to those who delight in the format is the hands-on experience: touching a record; placing the LP on the platter; positioning the tonearm; watching or hearing the needle seat itself in the record groove; marveling at the way such an old technology can bring so much life to music. While vinyl may not be for everyone, music played back on a finely tuned analog setup is something to behold for those inclined to experience joy from this wonderful audio-playback medium. The Kid Thomas adds to this hands-on nature of playing vinyl

by literally requiring *hands* on the platter to give it a spin. The low-torque motor of the Kid Thomas is always on and always running. In order to get the motor's spindle to move and sync with a rotating platter, the operator must give the platter a healthy nudge to get things going. What seemed like an extra step initially quickly became a satisfyingly engaging step in the process of playing the LP. To stop the rotation, the same procedure is done in reverse with the placement of hands (fingers actually) on the outer side of the platter to slow it to a stop. This is a simple and effective platter start (and stop) tradeoff for the low-torque motor implementation.

Regardless of which cartridge was mounted on the tonearm, music never ventured into aggression, never lost drive, and never lost macro-dynamic impact.

A first listen to the Kid Thomas was conducted with the Ortofon Cadenza Bronze supplied by the U.S. distributor. This combination was played as set up by the distributor for a couple of weeks before I performed a full reinstallation of the cartridge. The initial sound was promising but the goal at that moment was to put some playing time on the 'table until a full cartridge setup could be performed.

Once the full setup of the Cadenza Bronze was complete, the sound of the Kid Thomas system was very quiet, full-bodied, rich in the midbass to lower midrange, and smooth albeit

somewhat reduced in amplitude in the high frequencies. Resolution was very good on medium-to-loud music but low-level signals had a slightly opaque character. On Chris Isaak's "Kings of the Highway" from his *Heart Shaped World* LP, the Kid Thomas blended his overdub vocals into a slightly diffused single entity. On the plus side, the bass (while a tad full in the power region) was big and powerful with a soft starting transient that was made up for by a larger development of the notes. Every LP played was delightfully listenable, approachable, and entertaining. The sound was how the 'table had performed at some of the U.S. audio shows—full, rich, musical, and never aggressive.

To kick things into a higher gear, the van den Hul Colibri XGP was drafted for cartridge duties. The established character of this particular cartridge is clarity, speed, low-frequency warmth, non-aggressive behavior (with careful setup), and well controlled (but generous) high frequencies. Playing "Kings of the Highway" with this cartridge tightened up the bass substantially and added more transient drive; guitars sparkled, with individual notes sounding better delineated; the soundstage became more saturated with energy; and Isaak's overdubs were clearly discernable. Every aspect of the Colibri's performance was on display to one degree or another.

Regardless of which cartridge was mounted on the tonearm, music never ventured into aggression, never lost drive, and never lost macro-dynamic impact. The soundstage was always wide and deep with the degree of saturation dependent of the cartridge

Equipment Report Pear Audio Blue Kid Thomas Turntable with Cornet 2 Tonearm



SPECS & PRICING

Kid Thomas turntable
Type: Belt-driven turntable
Motor: AC synchronous
Dimensions: 19.6" x 14"
Weight: 70 lbs.
Price: \$5995

11.22cm
Weight: 5.7 lbs. (w/ packing)
Price: \$1995
Kid Thomas/ Cornet 2/External Power Supply Package Price: \$9995

Cornet 2 tonearm
Type: Unipivot tonearm
Distance from tone-arm center to spindle: 222mm
Effective mass: 12.50 grams
Arm length: 295mm
Tone-arm effective length: 239mm
Price: \$2295

PEAR AUDIO ANALOGUE
 Cankarjevo Nabrezje 15
 1000 Ljubljana Slovenija
 pearaudio-analogue.com

External power supply
Dimensions: 4.13cm x 2.55cm x

AUDIO SKIES
 (U.S. and Canada Distributor)
 Los Angeles, CA (310) 975-7099
 audioskies.com

installed at the time. The noise floor remained subjectively low—a trait not often found to this degree on sub-\$10,000 'tables. With either cartridge, it didn't matter if the music played was jazz, classic rock, heavy metal, hip-hop, folk, blues, or classical. Whether solo piano or orchestral crescendos, the 'table performed with the same fundamental sonic character.

Having been able to contrast the Kid Thomas/ Cornet 2/external power supply with different cartridge types, it is safe to say this analog combination serves as an excellent platform to play music and host your cartridge of choice (within reason and compatibility). Given the admirably low noise of the Kid Thomas, the materials-management approach to the design of this \$5995 turntable appears to have been a success. The entire package offers subjectively quiet playback and reproduces music in a way similar to more expensive turntable systems. This system's smooth playback, coupled with the level of silence displayed, earns a recommendation for an audition. Just be sure to choose the phono cartridge that fits your listening tastes—the reward is waiting. *tas*

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Equipment Report

EAT C-Sharp Turntable with Ortofon Quintet Black Cartridge

A High-Performance Turntable for the Rest of Us

Andre Jennings • Photography by Dennis Burnett

While I truly enjoy using my somewhat costly, 100-plus-pound, isolated-suspension, vacuum-hold-down, large-footprint turntable, it is only sensible to acknowledge the fact that it is not what every audiophile is looking for. There are plenty of music lovers who feel that financial outlays of this magnitude are best allocated elsewhere and who, quite possibly, don't have the space (or desire) to house a vinyl playback system of such size and weight in their homes.

The C-Sharp from the European Audio Team, the fourth turntable in the EAT lineup, may be a sensible alternative to mega-tables for many listeners. EAT is an offshoot of Pro-Ject, which is perhaps the world's largest turntable manufacturer. The three other turntables in the EAT line are the Forte, Forte S, and the E-Flat. After the success of these three previous efforts, EAT set out to make a model that had a smaller, retro-modern footprint. With a profile that EAT calls "superflat," the \$4000 C-Sharp (\$4500 when ordered with the Ortofon Quintet Black cartridge) may actually fit perfectly in many users' homes, and potentially supplies

standard-setting performance for its price.

Constructed from what EAT calls "highest-density" MDF, carbon fiber, and thermoplastic-elastomer, inverted-cone-shaped, internal sandwich supports, the low-profile double chassis is what gives the C-Sharp its "superflat" silhouette. I measured a height of approximately 27.5mm (1 1/8") for the chassis combination. At the bottom are three elastomer-damped, adjustable feet to provide clearance and to allow leveling of the 'table. Finished in a high-gloss piano-black lacquer, the lower chassis is 25.4mm high. The motor is attached to it to keep any vibrations from coupling to the platter bearing and tonearm. On the rear of the lower chassis are two connectors (one for the external speed controller and another for the tonearm cable). Seven additional recessed cutouts located on the inside of the lower chassis hold the elastomer dampers used to isolate the lower section from the upper section of the assembly.

The constrained-layer MDF and high-gloss, carbon-fiber-finished upper section of the chassis supports the platter bearing that accommodates the sub-platter. A polished anti-static



Equipment Report EAT C-Sharp Turntable with Ortofon Quintet Black Cartridge

belt connects the sub-platter to the motor. The sub-platter mates with the main platter to form the drive system and top surface for playing records. The main platter, made from solid aluminum, is extended in diameter for added rotational inertia and features a bonded mat (constructed from recycled vinyl to achieve optimal coupling with the record.) The upper section of the plinth also holds the tonearm assembly.

The tonearm is exclusive to, and specifically built for, the C-Sharp. This completely new design incorporates what EAT calls a traditional Cardan bearing for horizontal movement that's been optimized for high stability, ease of use, and very low friction. Made from hardened steel with zircon tips, the Cardan bearing is lubricated with silicon-based grease that dampens tonearm resonances by more than 50 percent from baseline measurements taken without its incorporation in the assembly. Vertical movement is achieved via a pair of traditional, but very high precision, ABEC7 ball-race bearings positioned 180 degrees from each other. An additional uni-pivot damping pin serves as a final part of this hybrid bearing assembly. The uni-pivot damping pin plunges into a silicon-based gel that is said to further dampen vibrations and to provide additional support for the horizontal bearing. EAT says the headshell is made from a light, but inflexible aluminum that makes for a stable foundation for cartridge mounting. A rigid, carbon-fiber armtube connects the headshell to the tonearm bearing assembly. All key features for cartridge alignment and adjustability are available on the tonearm (VTA/SRA, VTF, azimuth, anti-skate, and a slotted headshell for overhang and offset angle).

The C-Sharp arrived in a well-designed box

with a three-tiered internal section. Just above the top section were the user manual and all the set-up tools needed (except for a tracking-force gauge). The top section itself contained the counterweight, record clamp, two of the three feet, and the sub-platter. The middle section housed the assembled chassis with tonearm, including the pre-installed Ortofon Quintet Black cartridge (if ordered with the 'table). The lower section contained the platter. The motor controller was located in a side pouch that traversed all tiers.

The combination of the C-Sharp and Quintet Black produced appealing sound that had rhythmic drive and made nearly everything I spun fun to listen to.

The user manual details setup in a step-by-step fashion to allow easy installation and assembly. I had no issues with it other than *Section f of Step 4*, which references the use of a 1.5mm hex key to remove a locking screw. A small slotted screwdriver is actually required to remove the uni-pivot locking screw, which secures the uni-pivot cover, in order to access the azimuth adjustment. One other item in the manual worth mentioning is that EAT recommends that when using the record clamp, it should not be screwed down. The screw-down function is only to be used as a means of installing and removing the main platter during assembly and disassembly.

If the 'table is ordered with the Ortofon Quintet

Black, EAT will install and set up the cartridge for a Lofgren A/Baerwald alignment. As a value-added benefit, VANA Ltd. (the U.S. distributor) offers the option of changing to Lofgren B or UNI-DIN alignment at the time of ordering at no additional charge. Using the Acoustical Systems SMARTractor cartridge-alignment system, I cycled through all three options and settled on the Lofgren A/Baerwald alignment that I find most appropriate for my taste, which spans multiple genres of music, as well as early to modern pressings.

The legendary jazz trumpeter, Clark Terry, passed away at the age of 94 the day before the C-sharp was assembled and ready to play records. I became aware of the loss of this great talent the day I set the 'table up. As a sort of tribute, I wanted the first piece of music I played to be something from Clark Terry, so I reached into my vinyl library, without looking for anything in particular, and pulled out one of his later works titled *Portraits* on the Chesky label. Although Terry was sixty-eight when this recording was made (on the day after his birthday, in 1989, at RCA's Studio A on 44th Street in Manhattan) his playing is delightfully youthful yet masterfully controlled. From the first track, "Pennies from Heaven" to the last, "I Don't Wanna Be Kissed," I listened nonstop—with the exception of getting up to turn the record over, of course. There was no compelling reason to adjust anything. On "Pennies from Heaven" Victor Gaskin's bass solo was crisp and tight, and on time. Bass lines were easy to follow and the rhythmic flow of all tracks was a joy to hear. I derived added pleasure from how well the C-Sharp/Quintet Black was able to keep up with drummer Lewis Nash's delicate brushwork. My favorite title on this LP

is "Jive at Five"; Terry's scatting and playing is filled with so much dynamic expression that it becomes difficult to do anything *but* listen. With this random pick, the C-Sharp allowed me to remember one of jazz's great trumpeters.

Next, I queued up "Got My Mojo Working" from Clarence "Gatemouth" Brown's *Standing My Ground*, an album produced in the same year (1989). I was struck by this track's propulsive drive and slightly rounded but stronger bass. As presented by the C-Sharp/Quintet Black, Gatemouth's guitar had less bite and dynamic expression than I'm used to hearing, but everything still possessed musical flow. Although I only intended to listen to one track, I found myself playing the whole side of the LP.

Switching to Simply Red's *Picture Book*, the "Holding Back the Years" track produced a similar slightly rounded sound that was big on lower frequencies; as a result, the bass and drums moved closer to sharing center stage with Mick Hucknall's vocals. At the same time, the cymbals moved back a little bit in the presentation. Playing "Red Box" yielded similar results, with the same tendency towards lower-frequency instruments moving to the forefront and higher frequencies taking a step further back.

From the Pablo record label, I listened to Joe Pass and Ella Fitzgerald's 1983 album *Speak Love*. On the track "Comes Love," the C-Sharp preserved Ella's wonderful, timeless voice and dynamic expression, while Joe Pass' Ibanez guitar had dense body and generous amounts of pleasing tone color. (As with the some of the other albums mentioned, I couldn't resist listening to both sides of this LP.)

The C-Sharp/Quintet Black maintained the

Equipment Report **EAT C-Sharp Turntable with Ortofon Quintet Black Cartridge**

tempo and dynamic drive captured on the Klavier Records reissue of the original EMI recording of Massenet's *Le Cid* ballet music. Once again, this turntable/cartridge combo appeared to prioritize the lower registers of instruments, while still preserving the tracing of high-frequency percussion—although at levels reduced in amplitude vis-à-vis the low end. (I'll explain what accounts for this below.)

Given my observations about the behavior of the C-Sharp/Quintet Black, I wanted to discover which characteristics were attributable to which component. So, I first switched out the Quintet Black and installed the van den Hul Colibri cartridge. Spot-checking some of the same records mentioned above (as well as many others) revealed the C-Sharp tonearm's ability to let this cartridge showcase most of its attributes without any losses of composure on any records played. Some of the notable characteristics of this particular Colibri are its clar-

ity, speedy transient response, liberal but well controlled high frequencies, and slightly warm but reduced bass output. With it installed in the C-Sharp, the music gained sparkle in the top registers—a trait that the Quintet Black also had, only at a much lower output level. Overall, the Colibri was more generous in its top registers, while the Quintet Black tended to fill in the bottom ones. Like chocolate or vanilla, there was nothing inherently wrong with either of these cartridges on the C-Sharp; which you'd prefer would be a matter of personal preference.

I began to muse about the Quintet Black's sound character because it tended to remind me of the "ideal" EQ curves programmed into many digital signal processing-based (DSP) room-correction systems, which tend to have a slow but steadily declining frequency response slope from the lows to the highs. In an effort to satisfy my curiosity, I checked the frequency response of the Quintet Black, and the results (regardless of SRA setting) showed something similar to the target curves of room-correction devices. This observation helped me understand why the Quintet Black successfully traced high frequencies, albeit at reduced output levels, but had more generous low-frequency output relative to some of the other cartridges that measure more linearly. I want to point out that this isn't such a bad thing given the multitude of hot- and/or thin-sounding, non-audiophile recordings in circulation. To the contrary, reducing a little upper-octave energy and ultra-detail can yield more enjoyable listening sessions in these cases. This is especially true for those who want to re-experience some not-so-well-recorded music of the past—and the present.

Isolation is always something to consider when purchasing a turntable and finding the right location for it in your listening room. While the C-Sharp has internal damping within its sandwich chassis as well as elastomer-damped feet, care should be taken with its placement. The top chassis is a bit lively when touched or tapped—enough to hear sound through the speakers. This liveliness can result in the 'table being susceptible to airborne or robust floor-borne vibrations. Acoustic feedback, especially from powerful bass-heavy transients, can potentially cause turntable systems to oscillate. For my evaluation, placing the C-Sharp on a rigid corner shelf provided sufficient isolation for all but the most demanding music played back at amplitudes far beyond normal listening levels. If you tend to play very loud, you may either need to consider some additional isolation or to find a different location for the 'table. (These comments are not exclusive to the C-Sharp and should be considered with any turntable.)

The speed stability of the C-Sharp was excellent. The main reason for the head-bopping drive and remarkable timing I experienced during my evaluation was the 'table's drive system—with which I could find no fault. Well done.

The combination of the C-Sharp and Quintet Black produced appealing sound that had rhythmic drive and made nearly everything I spun fun to listen to. While not the most detailed presentation, the combo just played the music on nearly everything I threw at it. Although it lacked the ultimate resolution and complete neutrality of pricier analog front-ends, the C-Sharp/Quintet Black had a way of convincing this listener that

SPECS & PRICING

Type: Belt-driven turntable
Speed: 33/45rpm, driven by microprocessor
Speed variance: 33rpm +/-0.08%, 45rpm +/-0.09%
Wow and flutter: +/- < 0.01%
Signal to noise ratio: -40dB (mechanical noise)
Downforce range: 0–3.0g
Effective tonearm mass: 16.5g
Effective tonearm length: 254mm
Dimensions: 500mm x 400mm x 115mm
Weight: 13.5 kg (turntable) + 0.5 kg (separate control panel)
Price: \$3495 with Ortofon Quintet Black cartridge; \$2995 without cartridge

VANA LTD. (U.S. Distributor)

2845 Middle Country Road
Lake Grove, NY 11755
sales@vanaltd.com
(631) 246-4412



Equipment Report

JR Transrotor Orion Reference FMD With TR 5009 Tonearm

Three-Dimensional Sound,
Three-Dimensional Appearance

Andre Jennings

Sometimes an image just doesn't do justice to a subject. Although the Transrotor Orion Reference FMD is extremely camera-friendly, an actual look at this turntable will reveal more elegance and beauty than any photo can.

The first thing that will strike you is the way light reacts with the polished clear acrylic and mirror-finished, hand-polished aluminum used in the external construction of the \$30,000 Transrotor, creating a visual delight of reflected colors near and around the 'table. The second thing you'll notice is the true three-dimensional footprint of the German-built Orion Reference FMD. Most turntables (some impressively so) have a wide footprint to accommodate the platter, motor, and tonearm mount. However, height is typically between 20 and 40 percent of the length or depth of the 'table—and not much of a standout feature. With a 52cm length, a 52cm depth, and a 34cm height, the Transrotor Orion FMD's height is nearly 60 percent of its footprint. I've seen other 'tables with decent

three-dimensional proportions, but none with the visual appeal or the massive vertical look of the Orion Reference FMD's drive system and platter.

As the old saying goes, "Beauty is *sometimes* only skin deep." With the Orion Reference FMD, however, beauty extends to the engineering of the drive system. As I will describe below, the Orion Reference is a bottom-up design. This three-motor, fully isolated, dual-bearing 'table—called Free Magnetic Drive (FMD)—powered by a Transrotor Konstant KM-3 motor controller, is more than the analog equivalent of a "trophy wife."

Usually the motor (or motors) of most belt-drive 'tables are either housed in external pods or tucked into the 'table's chassis, with an exposed pulley for the drive belt. The Orion Reference FMD takes a different path, locating three motors in a circular housing made of aluminum that, when completely assembled, is approximately the height of the 80mm platter that hovers beside it. The motors are encased in



this aluminum housing, sectioned 33.3 degrees apart. Each motor has three grooved pulleys for the belts. Machined into the center of this same circular aluminum motor chassis is the housing for (what U.S. distributor, Arturo Manzano of Axis Audio, calls) the Inverted Hydro Dynamic oil-fed bearing. The bearing housing has a reservoir for the bearing oil that is supplied in

a measured syringe. Once filled with oil, the upper portion of the bearing is set in place. Operationally, when the drive is in motion, oil is pumped and circulated around the bearing to keep the whole assembly lubricated. At the top of the bearing is a three-grooved pulley. The drive belt for each motor is set in this grooved pulley and in the matching grooves

Equipment Report JR Transrotor Orion Reference FMD With TR 5009 Tonearm

of the bearing pulleys. Once all three belts are installed, each motor has a belt-connection between itself and the corresponding bearing-pulley groove. A machined aluminum flywheel cover/cap is installed over the entire bearing, completing the lower part of the FMD module. This flywheel cover/cap, which rotates with the bearing, contains ten very strong neodymium magnets in a circular arrangement near the center of the top cover. This full assembly forms the foundational heart of the drive system and never touches the rest of the 'table.

After an intense three-week period of about 60 hours of playing time, the sound completely shook off all these constrained and fuzzy characteristics, giving way to the level of clarity one would expect from a 'table of this magnitude.

Supported by three pillared aluminum towers, a 50mm-thick, concave-edged, triangular acrylic baseplate sits above the lower portion of the FMD drive. The outer housing of a second Inverted Hydro Dynamic oil-fed bearing is located in the center of this acrylic baseplate. This bearing is also equipped with ten neodymium magnets that line up directly above the lower FMD module when assembled. These two magnetically coupled bearings are vertically aligned and adjusted to have a 3mm air gap, where there is no physical contact between them. The embedded magnets have

stainless steel caps (above the lower bearing and below the upper) to help focus the magnetic field and provide shielding at the same time. An 80mm aluminum platter, with grooved rings machined into the top and bottom, sits atop the bearing. In a recessed area of the platter, a 10mm acrylic mat cushions the record while it is playing. Connected to the three pillared aluminum support towers, above the triangular acrylic base are two C-shaped clear acrylic baseplates separated by approximately 1.2". The top C-shaped baseplate has provisions for up to two tonearm mounts.

The Transrotor Orion Reference FMD provided for review was mated with the Transrotor TR 5009 tonearm. The TR 5009 is specially sourced from longtime tonearm maker SME. Although the external look of the TR 5009 bears some resemblance to the SME 309, the precision bearings and internal wiring have more in common with the SME Series V family, according to Transrotor's Dirk Räke. If for some reason a different 'arm is desired, Transrotor can fit the Orion Reference FMD with any tonearm because the C-shape 'arm mount can be drilled and/or extended to accommodate any 'arm (even a 12" one).

Although the above description might make the assembly of the 'table seem complicated, that wasn't the case. The Orion Reference FMD arrived in two large, well-packed, triple-walled boxes. One box contained the three-tiered (triangular and C-shaped) acrylic bases with pillars attached. The other box contained all of the bearing, motor, and controller items. Putting the 'table together was pretty straightforward.

The first cartridge I mounted on the Transrotor

Orion Reference FMD was the Lyra Skala, a familiar pickup that enabled me to quickly assess the initial performance of the turntable. Additionally, using the Skala allowed me to judge break-in, after the TR 5009's tonearm cables and wiring had accumulated some hours of use. (The tonearm cables took about three weeks to settle down.) Upon initial installation, the sound was very good, but appeared to be somewhat constrained dynamically and a bit fuzzy, although not hard or etched, especially in the higher frequencies. After an intense

three-week period of about 60 hours of playing time, the sound completely shook off all these constrained and fuzzy characteristics, giving way to the level of clarity one would expect from a 'table of this magnitude.

Once everything settled in, the Orion Reference FMD began to show its full capabilities. With the Skala installed, Pink Floyd's *The Wall* sounded viscerally engaging. The sheer weight of the bass line produced by the dynamic drive of this album on "The Happiest Days of our Lives" and "Another Brick in The Wall" brought

Free Magnetic Drive (FMD)

As I said in the review, the FMD module is made up of a dual-bearing drive system, in which the two bearings are vertically positioned above one another but never physically touch (there is an adjustable 3mm air gap between them). The bearings are magnetically coupled by twenty neodymium magnets (the ten embedded in the top bearing are aligned with the ten embedded in the bottom bearing). These magnets are strong enough to synchronously lock the top bearing/platter to the lower bearing of the drive unit, which contains the three motors and the flywheel. Thus, when the lower section of the flywheel turns, the upper section turns in tandem. Transrotor calls this Free Magnetic Drive. The magnetic field (set by adjusting the 3mm gap) between the two bearings is not only strong enough to drive the platter and keep the magnets sync'd, but also to allow some play (magnetic compliance) in order to damp out any drive irregularities (e.g., belt flutter). The observed result is very smooth and steady platter rotation.

An additional benefit of the FMD approach is the increased isolation of motor noise and vibration from the platter on which the LP sits. Since the top platter is still resting on the stable Inverted Hydro Dynamic oil-fed bearing, there is no vertical transmission of vibration through the FMD interface. Unlike a fully levitating magnetic bearing, which will have a vertical resonance frequency, this approach doesn't attempt to lift or relieve any of the weight of the massive platter and top bearing. Because the lower section of the FMD module is physically isolated (except for eight very small elastomer feet that connect it to the level surface on which the entire 'table sits), the tiny bit of motor vibration and noise remaining are also more isolated from the platter than they would be through the belt interface of a traditional belt-driven 'table. **AJ**

Equipment Report JR Transrotor Orion Reference FMD With TR 5009 Tonearm

that sense of energy and flow that makes this LP special. In my system, this driving force nearly compelled me to increase the volume to levels at which hearing damage, amplifier clipping, or driver displacement occurs. Thankfully, I was able to summon enough restraint to stay away from all of those problems, yet still bring the volume up to respectably louder levels during playback. When I listened to "I Don't Stand a Ghost Of a Chance" from the wonderful Linda Ronstadt/Nelson Riddle Orchestra album *What's New*, the dynamic strength of Ronstadt's vocals (and Bob Copper's lovely-sounding tenor saxophone) were captured beautifully, while the sumptuous flow of the orchestra was ever-present in the background. (As an aside, *What's New* is a forgotten treasure of an album that is easily obtainable on the used record market and should be a part of every LP collection.)

Later, I played The Great Jazz Trio's "A Night in Tunisia" off the *Direct From L.A.* album—an East Wind-produced, Nautilus-distributed LP that is sonically excellent, featuring a wonderful trio of players. Listening to this track, I felt the pace and weight of the music delivered in a powerful but slightly rounded way—a sonic characteristic of the Skala. However, when the bass solo started, it was big and full, followed by a drum solo that literally shook my floor. You can't get that level of slam if the 'table isn't a low-noise, speed-stable platform. The Orion Reference FMD was more than capable of delivering the aural traits of the cartridge installed at the time.

Switching to the outstanding Air Tight PC-1 Supreme cartridge revealed a different flavor with less dynamic weight and flow in the power

region but greater resolution of inner detail, and quicker transient starts and stops. Playing the same tracks from Pink Floyd's *The Wall* produced a higher level of clarity in the guitar interplay within the mix. With the PC-1 Supreme installed, every instrument, including vocals, gained much better separation. Roger Waters' overdubs of his own lead were readily audible, as were other small details in the mix. Even though the synth and bass lost some punch and drive, the picture was clearer for sure. Playing "I Don't Stand a Ghost of a Chance" from *What's New* showed similar contrasts. Linda Ronstadt's vocals, seeming to emerge more clearly from her mouth and throat, had much more delicate vibrato. The backing orchestra went from sounding like a holistic group to sounding like individual instruments that were easily distinguishable from each other within the ensemble. Bob Copper's tenor sax had more of a reedy sound, and was projected as if it were being played in a larger space than what I'd previously heard. Moving to "A Night in Tunisia," the tempo of the music sounded a bit quicker because of the increased resolution and faster transient response of the PC-1 Supreme. In isolation, the stick work of Tony Williams' drumming was much more easily followed throughout the entire performance. When the bass solo came in, the fingering of the strings sounded more agile and persuasively realistic. While the drum solo wasn't quite as stunning in weight and fullness, it still carried a hefty dynamic punch with greater resolution. Paired with the Orion Reference FMD, this combination was highly enjoyable.

Combining the Transrotor Orion Reference FMD with each of the two cartridges above

provided an interesting contrast between the Skala and PC-1 Supreme. On one hand, the Skala plays to its strengths of generating raw musical flow, evoking a visceral emotional reaction to music in the process. On the other hand, the PC-1 Supreme traces better and resolves much more of the inner detail embedded in the LP, while providing a particularly enticing cerebral musical experience.

Although not specifically part of the Orion Reference FMD review, I will mention that I conduct fairly lengthy cartridge exercises several times a year. In addition to the two cartridges mentioned in this 'table review, the Clearaudio Goldfinger Statement, the van den Hul Colibri, and the Jan Allaerts MC1 Boron MKII were also a part of this particularly long test process. I mention this because the entire exercise took place over a fourteen-hour period that included extensive set-up procedures performed on each device, followed by non-stop listening to several different albums. This type of cartridge characterization cannot be thoroughly achieved without a solid foundation on which to do the work. With the Transrotor Orion Reference FMD in place, I completed the exercise without any listening fatigue during the entire duration of this fourteen-hour marathon.

After all the time I spent installing five different cartridges and logging a couple hundred hours of listening, what performance characteristics and features have I observed? The first thing is the Orion Reference FMD's isolation provides a very quiet, low-noise platform for vinyl playback. I could not detect the noise floor of the 'table no matter how loud

SPECS & PRICING

Type: Belt-driven turntable
Dimensions: 52cm x 30cm x 52cm
Weight: 40 kg (88.2 lbs.)
Price: \$30,000 without tonearm

AXISS AUDIO

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the volume was turned up. This feature is what makes the cost of 'tables near and above this price point justifiable to those who are willing and able to invest the kind of money this analog platform demands. The other item of note is the choice of cartridge will be a larger contributor to the final performance of the entire system. Now, many are thinking this would be true for *any* 'table, and that is a valid point. However, the ability to extract as much from a cartridge as possible—without contaminating (in one way or another) the results—is a large part of a 'table's job. The Orion Reference FMD does this admirably. Add an outer ring clamp like the optional Transrotor Rotor Ring (be sure to use the center weight when doing so) for those less-than-flat records, choose your cartridge (and tonearm) carefully, and you may never have to think about the hardware in your analog front-end again. You will have a very quiet 'table that is visually and sonically reference quality. **tas**

Our Top Picks Turntables and Tonearms



Pro-Ject Debut Carbon DC \$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 armtube 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—because, after all, that's what good entry-level models should provide, a solid foundation for musical pleasure. New DC model offers a higher-precision power supply. sumikoaudio.net (226)



Clearaudio Concept \$1400 (\$1600 with Concept mm; \$2200 with Concept mc)

Clearaudio's Concept turntable and cartridge offer a hugely rewarding analog experience at a very attractive price. The sleek, belt-drive 'table and new magnetic-bearing Verify 'arm, which the company calls "friction free," sell for \$1400; when bundled with the \$800 Concept MC cartridge, the pre-set-up package sells for a trim \$2000. And though the Concept's performance may not equal that of the very finest out there, its combined strengths in resolution, dynamics, low-noise, and sheer musical engagement won't leave you wanting. Couple this with terrific German build and finish, and the Concept is a hands-down bargain. musicalsurrroundings.com (218)



Merrill-Williams GEM Dandy PolyTable \$1495

If you're an analog lover who doesn't have a massive living space and/or a massive budget, this high-value, small-footprint, belt-driven turntable could be just your ticket. From setup to playback to overall musical enjoyment, JM found this American-made 'table to be user-friendly in every way. It comes with a Jelco tonearm of your choice: SA-250, SA-750D, or 10" SA-750E (the Japanese maker's SA-250 'arm was supplied with the audition unit). Like any 'table worth its salt, the PolyTable allows for VTF, VTA, and azimuth adjustments. Deceptively simple in design, it avoids fuss and frills, boasting a sleek, modern form, while its elegant two-piece platter, easy-to-install bearing, and adjustable feet (with a built-in bubble level) make for streamlined functionality. With both the mm and mc cartridges JM tried, the PolyTable delivered serious analog pleasure worthy of far bigger bucks. A gem, indeed. hifigem.com (260)



Acoustic Signature Wow XL \$2395

If you're looking for a solid foundation upon which to build your analog front end, the German-engineered-and-built Acoustic Signature Wow XL is about as rock-solid as you get in this price range. Precision bearings and speed control, technology from Acoustic Signature's upper-tier Ascona, and build-quality are what make this turntable one killer setup. Choose your favorite tonearm (Acoustic Signature manufactures several excellent options) and cartridge combo, and you're ready to go. The possibilities are endless when you have a solid base for your vinyl, and the Wow XL is a good one. fidelisav.com, acoustic-signature.com (244)

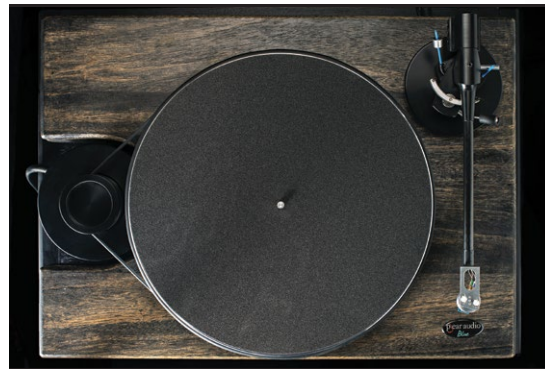
Our Top Picks Turntables and Tonearms



Rega RP10

\$5495 (w/o cart)

Via a "skeletal," amoeba-shaped plinth, Rega tried to create the lightest and most rigid platform possible for the RP10's motor, platter, and 'arm to work from. The plinth's core is made from a nitrogen-expanded, closed-cell polyolefin foam core, sandwiched between Rega's time-tested phenolic skins. Rega says that the core material was created exclusively for this use over a three-year period, and that this new plinth is a remarkable seven times lighter than the one found on the original Planar 3. A new motor and power supply are employed here, as well as the new hand-built RB2000 tonearm, which sets an impressive new standard for a Rega 'arm. All told, there's a feeling of immediacy, transparency, detail, bass control, depth, and musical involvement here that sets the RP10 far beyond the already impressive results Rega has achieved with other members of the RP family. [soundorg.com](#) (249)



Pear Audio Blue Kid Thomas

\$5995 (Packaged with Cornet 2 tonearm and external power supply, \$9995)

Based on the pedigree and designs of the late Tom Fletcher (of Nottingham Analogue fame), the Pear Audio Blue Kid Thomas is an advancement over Fletcher's older products. Pear Audio's goal with the Kid Thomas is "sonic harmony." In this case, every aspect of the Kid Thomas' design was tested, down to the smallest parts, in an effort to optimize performance. The act of merging art and craftsmanship with measurements and science allows this turntable package to become a subjectively quiet playback system that can reproduce music in a way that is similar to more expensive turntable systems. [audioskies.com](#) (263)



AMG Viella 12

\$17,500 with cherry skirt, \$18,000 with black lacquer skirt (\$1500 for Reference tonearm cable)

Like the \$15k Raidho C 1.1 (or the now-discontinued \$4k Ortofon MC A90), the beautifully machined Analog Manufaktur Germany Viella 12 is that relative rarity—a truly first-rate (and truly original) audio component that, while by no means cheap, is still within the financial reach of folks who aren't made out of money. The V12 may not (in fact, it does not) give you everything that a Walker, Da Vinci, or Acoustic Signature gives you, but what it does supply on select recordings—the extended sense that you are in the actual presence of real performers in a real space—is more than enough to earn the rave review it got and its place on this select list. A genuine marvel of engineering smarts and manufacturing finesse. [musicalsurroundings.com](#) (229)



Acoustic Signature Ascona

\$33,995

This massive, gorgeously made turntable from Germany was designed to eliminate resonances (in part, via constrained-layer-dampening brass inserts in its nearly fifty-pound platter), and to JV's ear it succeeds wonderfully well in achieving its goals. Fitted with a super-high-resolution tonearm like the Kuzma 4Point, and a super-high-resolution cartridge like the Ortofon A90 or Goldfinger Statement, the Ascona is capable of retrieving information that few other turntables in JV's experience have uncovered as clearly. Because of its phenomenally low noise floor, it is particularly good at telling you where instruments are located and how they are being played (and recorded). This makes for an exceptionally transparent and realistic presentation, in many ways on a par with that of the best record players that money can buy (for considerably less moolah than the best record players cost). A good deal considering what it competes with on a near-equal footing. [fidelisav.com](#), [acoustic-signature.com](#) (225)

CARTRIDGES

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Equipment Report

Koetsu Blue Onyx

Magnificent Japanese Mystique

Jimmy Hughes

In an age of hype, where everyone ceaselessly self-promotes to gain attention and market share, Koetsu represents an oasis of calm. Founder Yosiaki Sugano (1907–2002) was a man of many roles—artist, musician, swordsman, calligrapher, business executive, and father. He drew inspiration from the 17th-century Japanese artist Honami Koetsu (1558–1637).

So what else but to adopt the name of his hero Koetsu when deciding to manufacture high-quality mc pickup cartridges back in the late 1970s? Amazingly, the company seems never to have advertised its products, nor produced any sales leaflets. All the same, word quickly spread among audiophiles, and the Koetsu legend was born. As of 2014, Koetsu still didn't have an official website (today it does). With Koetsu, Hearing was Believing. Once you'd experienced a Koetsu, little else sufficed. The original models were quite large, with a rosewood body covering. Later models slimmed down a little, and featured exotic body materials, from lacquered Urushi finishes, to the use of natural gemstones including Jade and Onyx.

Sugano's minimalist approach soon earned him mythical status in hi-fi circles. It's said his

"death" was erroneously reported no fewer than three times—something that apparently pleased him to no end! It all became part of the Sugano legend, adding to the mystique of this most unusual of brands. Finally, though, reports of his death were not greatly exaggerated, and the legend passed away just a couple of months short of his 95th birthday. However, the Koetsu name lives on through Sugano's son, Fumihiko, who was trained to take over his father's legacy—and who keeps the brand clouded in mystique to this day.

Koetsu cartridges still enjoy near-mystical status; the creations of a quiet infinitely patient sage, steeped in ancient wisdom, slowly and painstakingly crafting transcendental products—and all this passed down the line from father to son, master to new master. Inevitably, the legend is somewhat at odds with the reality. But still the myth lingers on, and with good reason.

There is a magical quality to the sound of a Koetsu—something beyond measurement and statistics. Naturally, precision engineering and using only the best materials have long been an essential part of the mix. But the end result exceeds the sum of the parts. Call it art; call it alchemy; call it BS, but for those with ears, a



Koetsu was (and is) special.

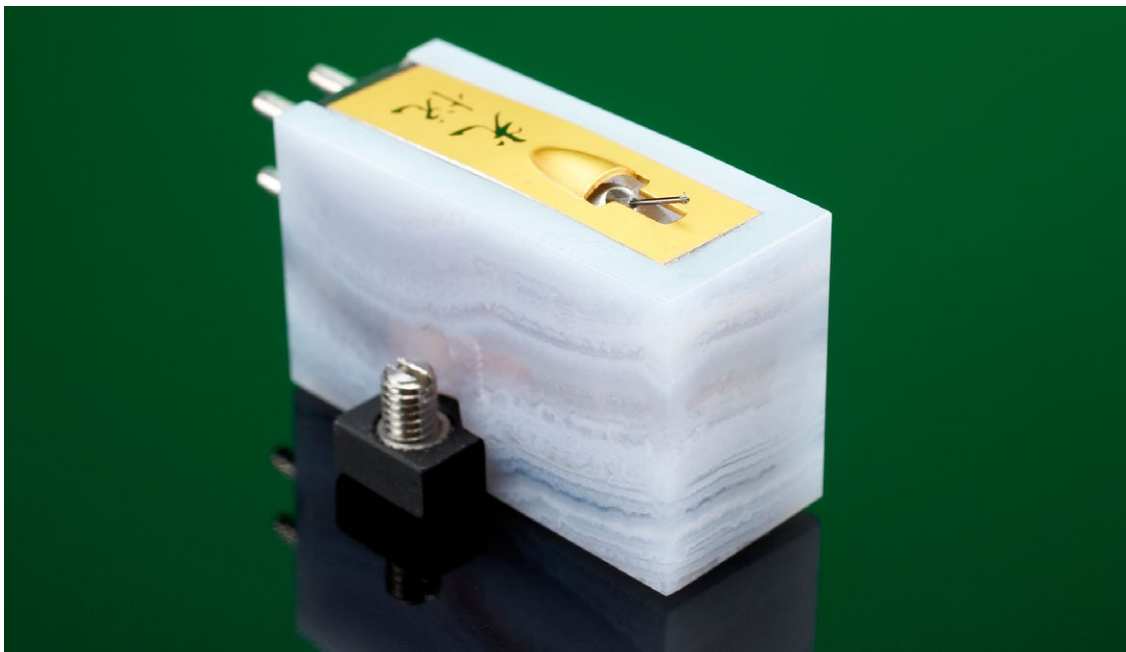
The Koetsu experience comes at different price points, from (relatively) affordable to "is that a misprint?" figures. Even the basic models sound excellent, but as you move up the range, the sound grows increasingly rarefied. Many Koetsu pickups feature 99.9999 purity copper wire for their coil windings with a special silver cladding that consists of a silver sheath slowly drawn over the copper conductor. Rare platinum magnets are used in this model.

The cantilever is made from boron, but perfectionists with even deeper pockets can go for

an optional one-piece diamond cantilever and tip. This avoids the interface between stylus tip and cantilever, and increases rigidity, albeit for an extra \$5,495.

The body shell is fashioned from powder blue Onyx, so each cartridge has a uniquely beautiful appearance, like a piece of exotic jewelry. It's not a small cartridge, incidentally—23mm long and 14mm deep—and also quite heavy at 14.8g. Your chosen tonearm will benefit from a heavy counterweight. Optimum tracking force falls between 1.8g to 2g. 1.8g offers slightly greater transparency and fine detail, but 2g

Equipment Report Koetsu Blue Onyx



reduces surface ticks and improves tracking slightly. Now, we're always told not to trust our first impressions when evaluating hi-fi. But calm rational objectivity can be difficult once something like the Koetsu Blue Onyx begins to play.

The Blue Onyx sounds impressively sharp, yet at the same time, beautifully refined with an effortless velvety smoothness that's almost uncanny. It's every bit as detailed and dynamic as you could wish for, yet wonderfully poised and relaxed-sounding. In musical terms, the presentation is effortless and natural. The music seems to happen between your loudspeakers; voices and instruments materialize before your very ears.

The timbre is somehow both mellow and

sharply focused, smooth and subtly shaded, yet crisp and tactile. It's a beguiling mix of opposites; sonorous warmth and silky smoothness, hand in glove with immediacy and crisp attack. Dynamically, the Blue Onyx projects with an impressive sense of power. The sound is very energetic and colorful, yet unexaggerated and truthful, too.

With a full and solid bottom end, liquid mid-band, and brilliant translucent highs, there's much to ravish the ear. Transient detail is pinpoint sharp, yet without aggressiveness, and always wonderfully homogenous. This ability to produce vivid, sharply-focused detail without sounding hard or over-driven is very much a Koetsu trademark.

I found the Blue Onyx musically engaging and positive sounding, while remaining relaxed and refined. This mix of opposites is apparent on most sorts of music, particularly human voice. Whether it's an unaccompanied solo singer, massed choral forces, or the lead vocals in a rock or pop track, the Blue Onyx delivers natural, believable results.

Clarity is quite stunning. The way this cartridge separates individual vocal lines and allows subtle instrumental passages to be heard borders on the miraculous. It's also good at recreating a sense of aural space, revealing the natural hall ambience behind individual voices or instruments. As a result, each retains more of its identity.

Yet, for all its vividness, the Blue Onyx is surprisingly easy to listen to. It delivers a very coherent sound. Opposing contrasts—high and low, loud and soft, sharp and smooth—co-exist in perfect balance. So the end result is harmonious and cohesive, and the music unfolds in a way that gives you more time to listen, more time to unravel the individual strands that form part of the whole.

It's the polar opposite of a sound that is aggressive and forward—bombarding the ear with a welter of unrelated leading edges so the brain struggles to make sense of it all. The Blue Onyx is delightfully easy to listen to. It delivers a very "ear-friendly" sound. Your brain has less processing to do, so it's better able to take in the entire musical scene, and make better sense of its entirety.

But please understand, the refinement of the Blue Onyx is something innate, not something false that's simply grafted on to each recording. It's very much a pickup that faithfully reflects

SPECS & PRICING

Type: Moving-coil

Weight: 12.5 g

Body: powder blue onyx

Price: \$14,995 boron cantilever (mono option w/ specially cut mono styli add \$500); diamond cantilever upgrade add \$5495

KOETSU

koetsuaudio.com

U.S. Distributor

MoFi Distribution

1811 W. Bryn Mawr Ave.

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mofidistribution.com

the individual qualities of each recording—an open transparent window to the music. It will sound sweet and beguiling one moment, then tack-sharp and crisp the next, often during the same track.

Clearly, the Blue Onyx is one magnificent cartridge. It's among the finest you could ever hope to hear, with few peers when it comes to turning those curved grooves into living, breathing music. You'll listen to it with rapt attention—much as you'd listen to real musicians playing live in front of you. Each Blue Onyx is made to order, so there may be a long delay before you get one. But, don't let that put you off; the wait will be worth it! *tas*

Editor's note: This piece was first published in HiFi+.

Equipment Report

Ortofon MC A95

Beefed-Up Neutrality

Andre Jennings

In 2009, Ortofon introduced the \$4200 MC A90 phono cartridge to commemorate its 90th year of operation. The A90 was a limited-production item only available to 500 owners. As it was a unique and ambitious product, the A90 positioned Ortofon to compete in the upper tier of cartridges available. Within the pages of an earlier issue of *The Absolute Sound*, our very own HP and JV (Issue 208) shared opinions about the A90 set up and auditioned in their individual systems. Having been involved with the installation of the A90 in JV's system (among many others), using the set-up procedure documented in the pages of Issue 244 and now available online, the cartridge's performance proved to be the best Ortofon had achieved at the time.

Two-and-a-half years later, Ortofon released its flagship phono cartridge, the \$8924 MC Anna. Building on the successful Selective Laser Melting (SLM) manufacturing process first used in the MC A90, the MC Anna continued the theme with a larger, closed-body design made of titanium. Along with a new magnet system, enhanced damping, and a host of additional adjustments, the MC Anna easily became Ortofon's highest-performing (and highest-cost) cartridge to date. Its reputation as a top-tier performer in

capable systems is well deserved.

Fast-forwarding to 2015, Ortofon's 95th anniversary is being celebrated in a similar fashion with a 500-piece, limited-run moving-coil cartridge. This time the cartridge is the MC A95. Five years of experience designing the most advanced cartridges has allowed Ortofon to combine all the technical advancements and knowledge gained from producing the A90 and Anna into what appears to be an ideal mix of the two cartridges. The resulting performance of the A95 (\$6499) is much closer to the performance of, but not better than, that of the MC Anna in most respects, and surprising in others. At a cost that is roughly half the difference between the A90 and the Anna, which could make it more affordable to a greater number of readers, the MC A95 may be considered the next step by those who desire to go beyond the A90 but can't quite reach the higher-priced Anna.

Arriving nicely packaged in a silvery wooden box within the same-color, foam-insulated cardboard outer box, the MC A95 (Serial #001) was mounted to a clear plate. Included with the cartridge are three sets of mounting screws, a screwdriver, a stylus brush, a set of headshell wires, and the user manual.

The cartridge uses the Anna's semi-magnetic armature design to give the A95 more stable reproduction of cantilever movements, which (in concert with the Field Stabilizing Element [FSE] controlling the movement of magnetic fields) produces greater height, depth, and dynamics, according to Ortofon. Further paraphrasing Ortofon's literature, the Wide Range Damping system is integral to the cartridge's above-average tracking abilities, low distortion, and resonances; the Replicant 100 diamond is responsible for the A95's groove-tracing ability. Ortofon also claims that the Aucurum coils of gold-plated, 6Nx oxygen-free copper, the "zero-loss" transmission of stylus motion to the motor, and its resonance-damping Thermo Plastic Elastomer contribute to the A95's performance. (Much of this information is available online at Ortofon's website.) The body of the MC A95 has the shape of the A90 as opposed to that of the Anna, but is made (using the SLM process) of titanium rather than the A90's stainless steel. The main visual differences at first glance are the "A95" identification tag, the absence of the A90's three circular holes in the front support for the magnetic assembly, and the new (much better) stylus guard.

Taking a glance at the specifications, the A95's



output voltage is identical to that of the Anna at 0.2mV (vs. the A90's 0.27mV). The A95's channel separation of >25dB is also identical to that of the Anna (vs. the A90's >28dB). The frequency response of 20Hz–20kHz has a tolerance of +2dB/-1dB (vs. +/-1dB for the A90 and +/-1.5dB for the Anna). Tracking ability is split between the two cartridges at 90µm (the Anna is 80µm and the A90 is 100µm) along with lateral compliance at 13µm/mN (vs. 9µm/mN for the Anna and 16µm/mN for the A90). Tracking-force range matches the A90 at 2.0–2.5 grams with 2.3 grams recommended compared to the Anna's recommended tracking force of 2.6 grams. The final electrical difference has the coil impedance at 7 ohms (vs. 6 ohms for the Anna and 4 ohms for the A90). The A95's cartridge weight is lowest among the trio at 6 grams (16 grams for the Anna and 8 grams for the A90).

The A95 was first set up according to Ortofon's basic suggestions in the user manual. Ortofon makes a point of stating that there are a host of approaches to cartridge setup, and it encourages users to explore the options available but also states that alignment consideration must be made for azimuth, anti-skating, and VTA/SRA in order to maximize cartridge performance. Fol-

Equipment Report **Ortofon MC A95**

lowing Ortofon's approach to setting azimuth yielded objectively measured results that exceeded the specifications for channel separation at 27.7dB (left) and 28.0dB (right) with channel balance just above specifications (but still good) at 0.8dB when referenced to 1kHz. Electronically adjusting azimuth improved the measured results for channel separation (and consequently the sound) to 33.6dB (left) and 32.7dB (right) with 0dB of difference in channel balance. A tracking force of 2.25 grams produced the most favorable sound with an SRA set slightly greater than half-way between 91 and 92 degrees in this specific setup. Loading varied depending on the phono-stage in use, but in the case of the solid-state units without step-up transformers, a loading north of 100 ohms was sonically ideal.

During the evaluation, the A95 spent all its time mounted in a Basis Vector IV 'arm connected to either a Basis 2800 Vacuum or Debut Vacuum 'table. The phono-stages available for the duration of the cartridge review included the Lamm LP2 Deluxe, Ayre P-5xe, Tritschler Precision Audio Devices TPAD 1000, Musical Surroundings Phenomena II+, and a custom-designed modified unit called The Raptor.

One of the questions a current A90 owner would ask first is: Is the A95 a worthy upgrade if I'm ready to replace an aging cartridge or interested in taking the next step up in performance? This is an easy question to answer. Having listened to both cartridges (the A90 in multiple locations) in the same setup, there is no area in which the A95 isn't a better performer than the A90. The A95 produces much bigger dynamic swings, and is more at ease while doing so. Where the A90 tended to be less generous with instrumental

sustains, the A95 holds each note's decay longer, giving the entire presentation a richer sound that is similar to (but different than) that of the MC Anna. An excellent example of this difference is observed when playing the title song from Simply Red's *Picture Book* LP. With the A90, the sound is well controlled but somewhat overdamped in the bass with a bit less decay on the electronically processed instruments and voice. With the A95 playing the same track, the bass drum feels like the stick is twice as large (if not more that that) resulting in a much more substantially authoritative note that decays longer. Speaking of decay, every instrument's engineering is now reproduced in such a way that it is heard clearly—even the cymbals' processed decay, hidden from the A90, is now audible. The third movement from Reference Recordings' LP of Rachmaninoff's *Symphonic Dances* takes this a step further, making the big bass drum sound as though it is being struck by the same double-sized mallet, while also increasing the size of the perceived space around the entire performance three-dimensionally in every direction.

A comparison with MC Anna using the same music led to a much more interesting observation. The biggest surprise, which led to a full day's worth of installation/reinstallation A/B's between the A95 and Anna, is the sheer macro-dynamic weight and power the A95 shows compared to the more incisive and controlled Anna. On "Picture Book," the Anna plays the music with greater grace and poise in direct comparison with the A95. However, the A95 packs more of a wallop in the low registers and seems to continue that trend macro-dynamically up the scale. Mick Hucknall's voice soars with dynamism

on the A95 while being more composed and controlled with the Anna. The bass line and drums are noticeably stronger on the A95, standing out with each guitar note and beat. Unsurprisingly, these same observations held true with the third movement of Rachmaninoff's *Symphonic Dances*. The A95 produces a bigger and fuller soundstage that appears dynamically more muscular. The Anna counters with incredible control in the upper midrange on strings and better instrumental separation. In some respects, the A95 plays with more perceived warmth due to its more generous bottom octave and subjectively stronger macro-dynamics—surprising, indeed.

On its own, the A95 has shown itself to be one of Ortofon's best efforts. While almost, but not quite, as controlled and composed in the upper registers as the MC Anna, the A95 does some things the MC Anna doesn't, with its perceptively greater dynamic contrasts and power (at least in my observation).

When compared to any other Ortofon cartridge I've had experience with, the A95 is ahead in subjective performance by a significant margin. It seems to me as if Ortofon has voiced the A95 to allay any concerns about its tonality veering toward the cool and threadbare. Even so, the A95 seems to stay in the neutral lane with the perceived addition of greater weight and dynamic expressiveness when compared with the A90 (or even the Anna in some regards).

While the A90 was Ortofon's highest-performance cartridge nearly five years ago, the A95 is much better sounding in every respect. Although it doesn't outperform it, the A95 nips at the heels of the highest-quality cartridge (the MC Anna) in the manufacturer's current lineup, and it does so

SPECS & PRICING

Type: Moving-coil

Output voltage at 1000 Hz, 5cm/sec: 0.2 mV

Channel balance at 1 kHz: <0.5dB

Channel separation at 1 kHz: >25dB

Channel separation at 15 kHz: >22dB

Frequency range at -3dB: 10Hz–50kHz

Frequency response: 20Hz–20kHz (+2dB/–1dB)

Tracking ability at 315Hz at recommended tracking force: 90um

Compliance, dynamic, lateral: 13um/mN

Stylus type: Special polished nude Ortofon Replicant 100 on boron cantilever

Stylus tip radius: r/R 5/100um

Tracking force range: 2.0–2.5 g (20–25mN)

Tracking force, recommended: 2.3 g (23mN)

Tracking angle: 23°

Internal impedance, DC resistance: 7 ohms

Recommended load impedance: >10 ohms

Coil wire material: Aucurum

Cartridge body material: SLM titanium

Cartridge weight: 6 grams

Price: \$6499

ORTOFON INC.

500 Executive Blvd Ste., 102

Ossining, NY 15062

(914) 762-8646

ortofon.us

Equipment Report

Lyra Etna SL

Addictive

Jacob Heilbrunn

Over the years, the Lyra line has been a mainstay in my stereo system. I've had everything from a Titan Mono to a Helikon to an Atlas. Each seemed to improve on the previous one, with the Atlas offering prodigious dynamics and bass slam. I remain quite smitten by the Atlas, which offers a healthy 0.56mV output and really brought to life big orchestral recordings with a vividness and immediacy that were difficult to resist. I knew Lyra had brought out an Etna cartridge that some preferred to the Atlas, but I wasn't convinced I wanted to transfer my affections to it.

Then came word about a year ago that Lyra had come out with a super-low-output version of the Etna. Like the Atlas, the Etna uses a titanium center structure, but it also features an outer body constructed from aircraft-grade aluminum, which is supposed to help reduce vibrations. It's a line contact stylus with a diamond-coated boron cantilever. I set the tracking force at 1.72 grams, as Lyra recommends.

The reduced windings and lower internal impedance of the Etna are supposed to improve resolution and detail, though a step-up transformer or phonostage capable of supplying sufficient gain are musts. Memories of the Helikon

SL and its superior performance started to flit through my mind. How could I not take the Etna for a test drive? A few months ago a phone call ensued to importer Joe Harley of AudioQuest. A day later a spanking new Etna SL was on my doorstep. All that remained was to install it and break it in. Or so I thought.

The truth is that immediately upon installation the Etna SL mesmerized me, even before it had logged some real playing time. I plopped on an album of French trumpeter Maurice Andre and his brother Lionel playing Albinoni duo concertos on the Angel label. I have always adored this LP, which I procured as a lad at the late lamented National Record Mart—remember when record stores were ubiquitous?—in Pittsburgh, PA, but more for the music and the verve with which the Andres played than for the sonics. Nutty as it may sound, I've always been hoping that I could hear these tracks in their full glory, *sans* distortion and fuzziness. The Etna SL pulled it off. Brass is always treacherous to reproduce on LP—the explosiveness of the bore of trumpets seems often to engender a bit of haze and smearing—but the transient precision of the Etna SL was so accurate that it nailed the trumpets in each channel. There was also a

blackness to the background and a creaminess to the midrange that seems to suppress noise while widening the dynamic envelope.

I heard similar qualities on an EMI pressing of Andre playing piccolo trumpet of concertos by Telemann and Johann Wilhelm Hertel. The layering of the soundstage seemed to open up as the oboes echoed the trumpet. Each instrument was firmly located in its space rather than wavering, thereby adding a notable sense of verisimilitude to the proceedings. Nor did the cartridge fracture the sound in the highest reaches of the piccolo trumpet, an area where Andre excelled. The Etna SL focused the image to such a degree that I felt it was coming a lot closer to the lithe and jaunty sound that I recall hearing from attending several concerts by Andre several decades ago when he was in his prime.

The Etna SL also doesn't appear to give up anything on dynamics. I place a premium on jump factor. It's what makes music come alive. The Etna benefits from its superbly low noise floor. By playing softly so well it sets up the terrain for thunderous fortissimos to emerge as something of a surprise.

I found the Etna so easy to listen to that it

had me reaching for albums that I either haven't heard or forgotten about. One such LP was *Trinity* on the Inner City Records label. It was recorded in 1975 and features an all-star cast of Tommy Flanagan, Ron Carter, and Roy Haynes. On the tune "52nd Street Theme," I was taken aback both by the increased clarity of the cymbal swishes and the refulgent power of the drums, which the Etna conveyed with ease. Haynes has never been shy about cutting loose, and the Etna displayed his prodigious whacks to great effect. On the next cut "Smooth As the Wind," the sound had an ineffable quality to it that seduced me into listening through the rest of the album out of sheer curiosity—just to hear how the Etna would fare.

The same thing occurred on a Duke Ellington LP on the Fantasy label simply called *The Pianist*. Some of my favorite jazz recordings are of Ellington with small groups. On this album he plays for the most part with John Lamb on bass and Sam Woodyard on drums. The percussive effects of Ellington's piano playing came through very well and the bass lines were firm and solid. So relaxed was the Etna that I found myself listening to both sides almost before I knew it.



Equipment Report

SPECS & PRICING

Type: Moving-coil
Output: 0.25mV
Frequency response: 10Hz–50Hz
Cartridge weight: 9.2g
Price: \$9995

U.S. Distributor
AudioQuest
2621 White Road
Irvine, CA 92614
(949) 585-0111
audioquest.com

It was the ease of listening to the Etna that I found most riveting. The greatest contrast between the Etna and Atlas comes down to musicality. The overt excitement of the Atlas does come at a bit of cost. In comparison, I would have to concede that the Atlas does sound a bit hyped on some recordings.

Consider piano. On a Deutsche Grammophon pressing of Wilhelm Kempff playing the *Goldberg Variations*, I was bowled over by the delicate shadings and colors that the Etna extracted. One step closer to what Kempff really intended when he produced this recording. Above all, it's the ability of the Etna to render a true *pianissimo* with utter clarity that makes it such a breathtaking cartridge. There is a gravity to the sound—unrushed, unhurried, unforced—coupled with great resolution. If the transients are precisely sounded, it's also the case that the decays seem to linger on a pinch longer than with the Atlas. The sound, for lack of a better

word, is more analog. This lack of grain endows the Etna with a sense of gliding through the grooves rather than tracking an LP. A sense of space and time is suspended, leaving only music hovering in the air.

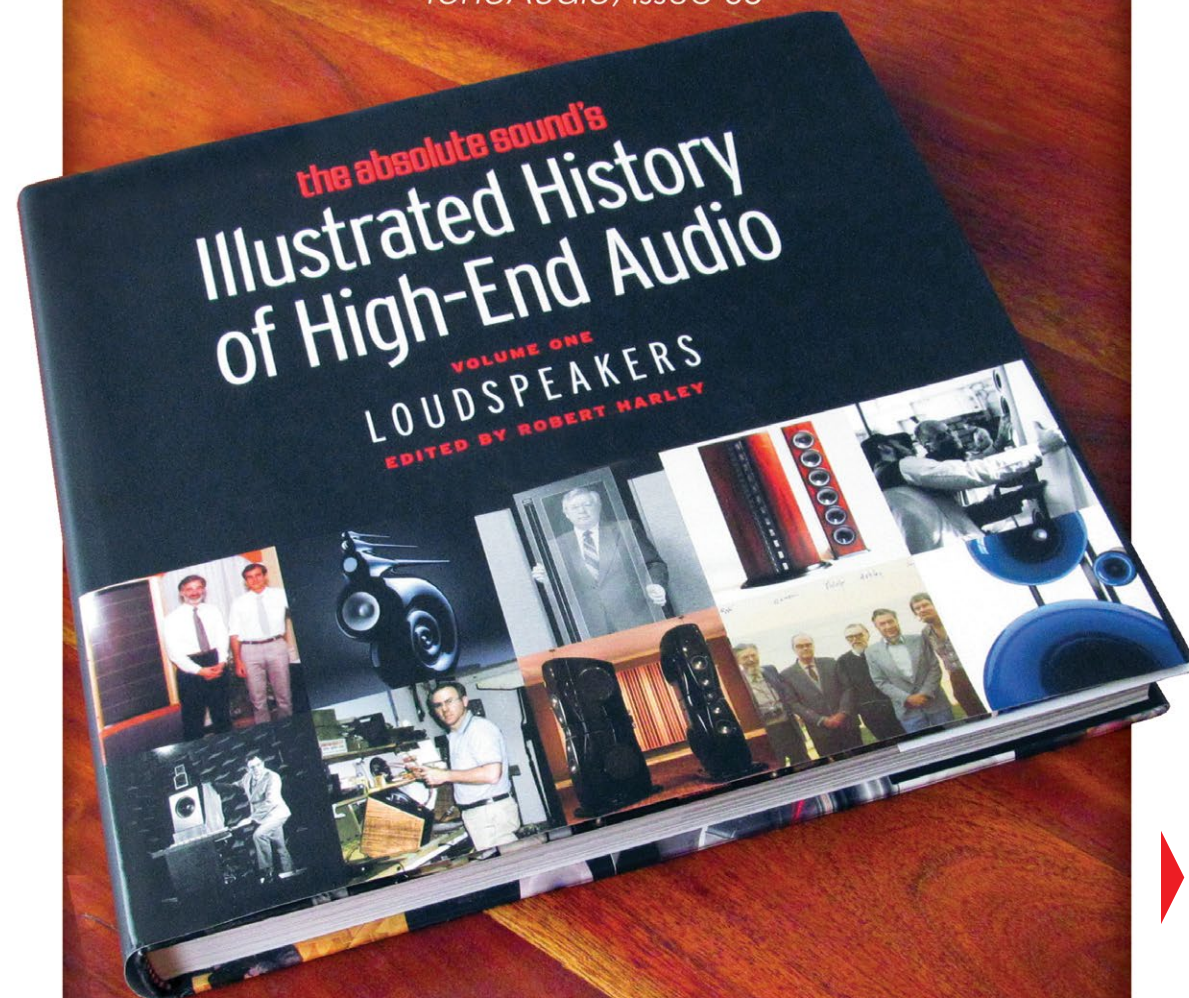
Immediately upon installation, the Etna SL mesmerized me—even before it had logged some real playing time...It was the ease of listening to the Etna that I found most riveting.

Nowhere was this more poignantly conveyed than on a Harmonia Mundi recording of Bach's cantata *Actus Tragicus*. If voice is the most difficult instrument to capture, then the Etna came through with flying colors. I'm not ashamed to admit that I was deeply moved listening to the legendary Dutch soprano Elly Ameling singing about the transience of life—her voice rendered with greater fidelity by the Etna than I have ever heard before. To hear her consummate artistry reproduced at this level was simply riveting.

While the name Etna may bring to mind volcanic eruptions, the fact is that this cartridge's greatest strength is its ability to permit your system to capture the most ethereal aspects of a recording. It may require a waiting time to acquire one as Lyra can only produce a limited number. But ultimately your real concern is likely to be whether you can pull yourself away from it. The Etna SL is the most addictive cartridge I have heard. **tas**

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Equipment Report

Air Tight Opus-1 Ermitage

Magnum Opus, Indeed

Jonathan Valin

Though Air Tight's Atsushi Miura may not be well known to American audiophiles, this modest, gentle, dignified man has come to epitomize the Japanese high end for me. Formerly the head of Lux Audio—Japan's oldest electronics company—Mr. Miura founded A & M Ltd. (the parent company of Air Tight) in 1986 solely "to contribute something to the development of world audio culture." At the time, semiconductors were the kings in Japanese electronics; analog had been pronounced dead; home-theater and car stereo were booming, and Mr. Miura's company, Lux Audio, had been sold to Alpine, where this former bastion of high-end tube electronics would be turned into yet another solid-state marque. Wealthy, middle-aged, and successful, Mr. Miura had no commercial reason to continue in the high-end-audio business. And yet he did, because, in his own words, he felt that high-end audio was "losing its original peerless 'dream' in the general shift from valves to transistors."

With his engineering design partner (and A & M's co-founder) Masami Ishiguro, Mr. Miura began work on the original Air Tight ATM-1—a

36Wpc, 6CA7-based tube amplifier of extraordinary build-quality (Hashimoto transformers, hand-soldered point-to-point wiring) and drop-dead-gorgeous looks. Rather like a Japanese take on the Marantz 8B (but much more beautiful), the ATM-1 was followed by the Marantz 9-like ATM-3 and ATM-4 and many other beam-pentode and single-ended-triode amplifiers. True to his ideals, each of Mr. Miura's amplifiers pays homage to the Golden Age of High Fidelity while improving on Golden Age sonics.

For Mr. Miura, LPs are part and parcel of the "peerless dream" that animated the hi-fi industry in its prime. So it was not surprising that, in 2006, he and his colleague, Y. Matsudaira, developed an Air Tight phono cartridge based on Mr. Matsudaira's research at My Sonics Labs. (The "My" in My Sonics Labs are Y. Matsudaira's initials arranged in the traditional Japanese fashion—last name first. Just for the record "A & M" are Atsushi Miura's initials, arranged in Western fashion.)

For forty years, Mr. Matsudaira has been, perhaps, the most illustrious designer of moving-coil cartridges in the Far East, having devised celebrated cartridges for Supex, Koetsu,



Equipment Report **Air Tight Opus-1 Ermitage**

and Miyabi, among many other marques. In 2006, he claimed to have solved a longstanding technical problem: how to achieve high energy from a low-impedance circuit. The problem in a nutshell was this: A higher-output (i.e. higher-impedance) moving-coil cartridge (on the order of 0.3 to 0.7mV output) typically has more coil windings, which leads to higher energy, richer tone color, and increased "liveliness," but lower resolution of fine detail; a lower output (lower-impedance) moving-coil cartridge (on the order of 0.1 to 0.25mV output) has fewer coil windings, which leads to higher resolution and transparency but reduced density of tone color and dynamic clout. For thirty years, Mr. Matsudaira has written, nothing substantial was done to solve this "output voltage versus internal impedance puzzle." You could have high energy and color or high resolution and transparency, but not both.

After years of exhaustive research, Mr. Matsudaira discovered a way to minimize coil windings (for higher resolution) and increase output (for higher energy) simultaneously. Many factors played into the design of Mr. Matsudaira's new cartridge—including the geometry of the stylus and the design of the cantilever and cartridge body—but the fundamental breakthrough was the development of an ultra-high- μ core material (named SH- μ X), which, because of its high saturation flux density (three times higher than conventional high- μ materials) allowed for a dramatic reduction in the number of coil windings (thus suppressing core-saturation losses and lowering impedance), while also generating the high voltage necessary to energize music from the top octaves to the bottom ones.

Mr. Matsudaira's original design was released by Air Tight as the PC-1, and was an immediate critical and commercial success, primarily because it did exactly what it claimed to do—lowered noise and coloration and greatly increased resolution and energy. Details were clearer, timbres were truer, air was more plentiful, dynamics were more lifelike, and stage width, depth, and height were expanded in comparison with other moving-coil cartridges then on the market.

Several years later, Mr. Miura released Mr. Matsudaira's improved version of the PC-1, the PC-1 Supreme, which was said to reduce internal impedance even further (down to 1 ohm, thanks to 40% fewer windings), as well as improve the cartridge body's susceptibility to resonance. The sonic results of these and other changes, according to Air Tight, were improved bandwidth, dynamic range, transient response, and phase behavior. And in my review of the PC-1 Supreme I confirmed those claims. To quote my conclusion: "The new cartridge goes lower with much better timing, focus, and resolution, goes higher with greater incisiveness, detail, and speed, plays big dynamic passages with greater power and control, and stages with even greater width and depth and focus than the PC-1 (which, let me remind you, was and is no slouch in any of these regards). It is also a much more neutral cartridge than the PC-1, which sounds a bit dark (a bit weighted toward the bass and softened in the treble) by comparison, with considerably higher low-level resolution at both of the frequency extremes (and in the middle)."

Even though it was quite a bit more expensive

than the PC-1, the PC-1 Supreme was and is a top-seller (Robert uses one as his reference), and is widely regarded as one of the über-cartridges currently on the market. [*One of the world's most famous speaker designers visited me to set up his flagship speaker, and after hearing the PC-1 Supreme, bought two for his own use.—RH*]

... the Opus-1 is an exceedingly neutral cartridge ...

Comes now the Air Tight Opus-1 Ermitage cartridge, released in honor of Air Tight's thirtieth anniversary. And, folks, it is just as much of a winner as its two distinguished predecessors—and certainly the best Air Tight yet. Of course, the competition has stiffened since the PC-1 was introduced in 2006, with the Goldfinger Statement, the Lyra Atlas, and the Ortofon Anna (Ortofon seems to have taken a cue from Mr. Matsudaira, as its recent cartridges are now higher in output, richer in color and energy, but still high in resolution) leading the way.

Like the PC-1s, the Opus-1 uses an SH- μ X core for even higher-efficiency output (0.5mV) at low impedance (1.4 ohms). However, the Opus-1 uses windings whose "cross-sectional dimensions are 10% larger" than those in the PC-1 Supreme. The Opus-1 also boasts a semi-line contact stylus with a 0.1mm square tip, an ultra-hard duralmin (an alloy of aluminum that contains copper, manganese, magnesium, iron, and silicon) cantilever, and a "hyper-solid duralmin" base for superior freedom from resonances.

How does it sound? In a word, solid. The Opus-

1 may be the most three-dimensional-sounding cartridge I've heard in my home. Where (on my fabulously high-resolution system) a low-impedance/low-output cartridge like the Ortofon A90 will reproduce Dean Martin's voice (on Analogue Productions' superb reissue of *Dreamin' with Dean*) with so much fine detail you can tell how much spit (or bourbon) Dean-o has in his mouth on any given note, the Opus-1 *slightly* dials down the analytics but turns up the volume, converting Dean from a highly detailed albeit paper-flat acoustic image to a fair semblance of an actual human being standing in front of you. As I once said of another remarkably three-dimensional transducer (the MBL X-Treme), it's like the difference between watching a film and watching a play.

In addition to this remarkable dimensionality, the Opus-1 is an exceedingly neutral cartridge. While not at all rolled in the treble, it is also not at all aggressive up there either. (If you're used to the sensational brilliance and speed of something like a Goldfinger in the top octaves, the Opus-1's lifelike smoothness may come as a pleasant surprise.) In the bass it is a veritable powerhouse, with simply sensational extension and resolution in the lowest octaves, reproducing really deep notes on synth, organ, piano, bass drum, or five-string bass guitar, with superb definition, lifelike speed, tremendous power, and the same unflappable neutrality and transparency that it brings to the mids and treble. Nothing thickens or darkens or simply goes black and indecipherable in the Opus-1's bottom end—or anywhere else. Kickdrum and Fender bass or synth? Top-octave cello and bottom-octave viola, as, say,

Equipment Report Air Tight Opus-1 Ermitage

on the churning ostinatos of the Penderecki String Trio in Yarlung's superb recording of the Janaki emsemble? You've never heard them distinguished more clearly—or realistically. Trust me. (On an imperturbable 'table/'arm like the Acoustic Signature Invictus/T-9000, this thing tracks and traces at least as well and as cleanly as anything I've had on any 'table.)

Like its PC-1 brethren, the Opus-1 is also a superior soundstager. Though I don't think its stage is quite as wide and deep as that of the Goldfinger (my benchmark in such matters), it is at least as good as that of the Ortofon Anna. Probably better. With its inherent transparency and superior trackability, it will certainly give you a clear picture of who's playing what and where, no matter how busy or dynamic the music gets.

Speaking of dynamics...the Opus-1 has almost tape-like smoothness, speed, and power. Here is a cartridge with the dynamic "continuousness" of the real thing. (Don't confuse this with a lack of transient punch—the Opus-1 has punch aplenty. But unlike certain other cartridges—and digital all the time—this cartridge doesn't give you a sense that its reproduction of dynamics is subtly "stepped," proceeding in a slightly mechanical fashion from one level to another. As in life, the Opus-1 reproduces changes in intensity, large and small, as a continuum, making the presentation that much more realistic and easy to listen to. If you're used to something as thrilling as the Goldfinger, you may feel you're losing a little zip, but listen for a while and see if what's lost hasn't been offset by the natural ease that has been gained.)

Bottom line. This is by far the best Air Tight yet, and at \$15k it is priced accordingly. For that kind of money, you're gonna want to listen to the competition, none of which sound much like the Opus-1. One of the great virtues of analog—or one of its most damning flaws, according to the analog-is-like-dragging-a-stick-through-a-ditch crowd of digital-philes—is that you can tune your system to sound any way you want it, and still end up with a simulacrum of the real thing. You can, if you choose, get a marginally more detailed presentation than that of the Opus-1, though you may do so at a price in sterility. You can certainly get a more scintillant top end, though you may do so at a price in aggressiveness and brightness. You can get an inherently riper, darker tonal balance, and a slightly wider, deeper soundstage. What you can't get is a more neutral, continuous, three-dimensional presentation top to bottom. Whatever you end up choosing, you're not going to get something that sounds substantially more like real musicians in a real space.

You see, folks, those ditches that we LP lovers drag those diamond-tipped sticks through are literally filled with music—replicas of the actual soundwaves that struck the membranes of the microphones in concert halls and recording studios, sometimes fifty, sixty, or many more years ago. They *are* the real thing engraved in vinyl—not approximations of it passed through field-programmable gate arrays churning ones and zeroes.

The Air Tight Opus-1 gets my highest recommendation, and joins the Goldfinger Statement and Ortofon Anna as one of my references. **tas**

SPECS & PRICING

Type: Ultra-low-impedance moving-coil cartridge

Frequency response: 10–50kHz

Output voltage: 0.5mV

Internal impedance: 1.4 ohms (DCR)

Magnet: Neodymium #50

Stylus pressure: 1.9–2.2g

Channel balance: Within 0.5dB (1kHz)

Crosstalk: More than 30dB

Terminal pins: Rhodium-plated

Weight: ca. 12.5g

Price: \$15,000

AXISS AUDIO

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JV's Reference System

Loudspeakers: Magico M Project, Raidho D-5, Raidho D-1, Avantgarde Zero 1, MartinLogan CLX, Magnepan .7, Magnepan 1.7, Magnepan 3.7, Magnepan 20.7

Subwoofers: JL Audio Gothams

Linestage preamps: Soudution 725, CH Precision L1, Audio Research Reference 10, Siltech SAGA System C1, VAC Signature

Phonostage preamps: Audio Consulting Silver Rock Toroidal, Soudution 755, VAC Signature Phono, Constellation Audio Perseus, Innovative Cohesion Engineering Raptor

Power amplifiers: Soudution 711, CH Precision M1, VAC 450iQ, Siltech SAGA System V1/P1, Odyssey Audio Stratos

Analog source: Acoustic Signature Invictus/T-9000, Walker Audio Proscenium Black Diamond Mk V, TW Acoustic Black Knight, AMG Viella 12

Tape deck: United Home Audio UHA-Q Phase 12 OPS

Phono cartridges: Clearaudio Goldfinger Statement, Air Tight Opus-1 Ermitage, Ortofon MC Anna, Ortofon MC A90

Digital source: Berkeley Alpha DAC 2

Cable and interconnect: Crystal Cable Absolute Dream, Synergistic Research Galileo LE, Ansuz Acoustics Diamond

Power cords: Crystal Cable Absolute Dream, Synergistic Research Galileo LE, Ansuz Acoustics Diamond

Power conditioners: Synergistic Research Galileo LE, Technical Brain

Accessories: Stein Music H2 Harmonizer System, Synergistic ART and HFT/FEQ system, Shakti Hallographs (6), Zanden room treatment, A/V Room Services Metu panels and traps, ASC Tube Traps, Critical Mass MAXXUM equipment and amp stands, Symposium Isis and Ultra equipment platforms, Symposium Rollerblocks and Fat Padz, Walker Prologue Reference equipment and amp stands, Walker Valid Points and Resonance Control discs, Clearaudio Double Matrix SE record cleaner, Synergistic Research RED Quantum fuses, HiFi-Tuning silver/gold fuses

Our Top Picks Cartridges



Ortofon 2M Red
\$99

The swansong design of Ortofon's former chief engineer Per Windfeld, the entry-level 2M Red uses a elliptical-tipped stylus. Though a little dry in the treble and lacking the Ortofon Black's velvety finesse and harmonic finish, the 2M Red is still one sophisticated cartridge for the money. ortofon.us (191)



Shelter 201
\$310

It's moving-magnet time. Made in Japan with the same painstaking precision as the company's renowned moving-coil cartridges, the 201 marks Shelter's first-ever foray into moving-magnet territory. With an output of 4mV, this exceedingly easy-on-the-pocketbook model leverages the design principles of Shelter's esteemed mc siblings. Sonically, the 201 possesses many quintessential moving-magnet traits: a honey-smooth midrange, true-blue vocal realism, and a subtle, yet ear-pleasing overall warmth. If you've been screaming "Gimme Shelter," but still felt left out in the cold by cartridge cost, consider the 201 your chance to seek Shelter at an incredibly reasonable price. axissaudio.com (Review forthcoming)



Ortofon Quintet Red
\$346

At just under three-hundred bucks, the Quintet Red (0.5mV) is on the lowest end of the price scale for moving-coil cartridges, but it doesn't sound like a cheapskate. Its transient speed and sure-footed tracking make it a slam-dunk for any thoughtful starter system. It lacks some resolution of micro-detail and tonal purity at the frequency extremes, yet retains the distinctive musicality that is the essence of LP playback. ortofon.us (244)



Clearaudio Maestro V2 Ebony
\$1200

The successor to the redoubtable Maestro Wood, the Maestro V2 Ebony sports a higher 4.2mV output. It uses an ultra-low-mass Micro HD stylus mounted to a solid boron cantilever and an overall assembly that's identical to those used on Clearaudio's upper-crust moving coils. Tonally it hews straight down the rich-and-wide middle of the sonic spectrum. Its innate midrange energy and overall balance brings symphonic recordings to life unifying each section into the greater whole of the orchestra. Low-level detail is elegantly resolved. There's a lightness and speed in the way it reproduces transients. The Maestro Ebony has shed some of its predecessor's excess warmth for a more faithful and quicker sound. As musical as they come, the Maestro V2 Ebony should be required listening for mm and mc fans alike. musicalsurrroundings.com (239)

Our Top Picks Cartridges



Ortofon MC A95

\$6499

With a Titanium cartridge body literally built from the ground up using the Selective Layer Melting (SLM) manufacturing process, the MC A95 replaces the discontinued MC A90 in the Ortofon lineup and improves performance in every area. The MC A95 does this impressive feat by building on the past few years of Ortofon's in-house technical advances in cartridge design. Combining what are the complementary attributes of MC A90 and Anna into a must hear creation, the A95 does some things the MC Anna doesn't - which are perceptively greater dynamic contrast and power. The MC A95 does it at a more favorable price, and is a clear upgrade for any other cartridge in the Ortofon lineup. ortofon.us (258)



Lyra Etna SL

\$9995

The Lyra Etna marks a new era for the fabled cartridge company. The Etna may be named after a volcano, but it is not a tempestuous cartridge. If anything, it moves away from the somewhat rebarbative treble that could intrude upon its enticingly dynamic reproduction, in favor of a more linear and tranquil sound. This does not mean that the Etna is a saccharine performer; rather, it offers the most winning set of attributes that Lyra has produced. Vocals have a physicality and palpability to them that provides an unprecedented sense of realism. The sense of snap and pacing is also exemplary. A silky continuity that eluded previous Lyra efforts is also abundantly in appearance, partly a product of the very quiet backgrounds that the Etna offers. Careful matching with a phono stage will be necessary, especially in the case of the Super Low output version, which supplies as mere .25 mv. But this amazing cartridge will take most vinyl reproduction to a new level. audioquest.com (Review premiere on p. 49)



Air Tight PC-1 Supreme

\$11,000

As good as the Air Tight PC-1 is, this new considerably pricier moving-coil from AT is substantially better in every way. The original PC-1 used a new high- μ core and winding material said to have three times the saturation flux-density and initial permeability of conventional core materials. In plain English, its magnets produced a much stronger magnetic field, greatly lowering noise and coloration and greatly increasing resolution. The Supreme literally takes this low-internal-impedance/higher-magnetic-energy technology to a new level. Killer good on transients top to bottom, with phenomenal grip and definition in the low bass, the Supreme is also exceptionally lifelike in the midband, with even more of the gorgeous density of tone color, high resolution, and superior soundstaging that made the original PC-1 one of JV's mc references. Along with the Ortofon A90, the Benz LP S-MR, and the Goldfinger Statement, the Supreme is, in JV's opinion, one of the best mc's on the market. RH's reference. axissaudio.com (191)



Air Tight Opus-1

\$15,000

Air Tight's new top-line moving-coil cartridge adds even more resolution, dimensionality, and energy to the beautiful reproduction of tone color and superior soundstaging that the PC-1 Supreme is justly famous for. Though not quite the non-stop thrill-machine and sonic vacuum cleaner that the Clearaudio Goldfinger Statement is, the Opus has a smoother, better-behaved upper midrange and treble and (building on one of the strengths of the Supreme) phenomenally deep-reaching, superbly defined, extraordinarily quick and powerful bass. Quite neutral in balance (when loaded at about 400–500 ohms), it has much of the speed and resolution of über-cartridges, without any trace of the analytic. One of JV's references. axissaudio.com (261)

PERSONAL AUDIO

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Equipment Report

HiFiMan HE400S Headphones

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 $\frac{3}{4}$ 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 snugest 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 $\frac{1}{4}$ " 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 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.



Equipment Report HiFiMan HE400S Headphones

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 midrange 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 tone-arm 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 Wake-ling'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 enjoyed the overall sense of involvement and envelopment within the music ...

I compared a few tracks on this analog set-up 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.

SPECS & PRICING

Type: Open-back headphones with planar-magnetic drivers

Frequency response: 20Hz–35KHz

Sensitivity: 98dB

Impedance: 22 ohms

Weight: 350 grams

Price: \$299

HIFIMAN

(201) 443-4626

hifiman.com

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**

Equipment Report

Audeze EL-8 Headphones

Audezes Designed for Odysseys

Steven Stone

Audeze burst onto the audio scene a couple of years ago as one of the new wave of manufacturers dedicated to high-performance headphone products. Its first headphone design, the LCD-2, has gone through several versions, but is still currently in production along with the newer and more expensive LCD-3 and LCD-X, and LCD-XC. At RMAF, Audeze unveiled its latest flagship model, the LCD-4, with an eyebrow-raising price of \$3995. All of these 'phones offer similar technology, fit, size, weight, and open-back design. The LCD-2, LCD-3, and LCD-X (no one has the LCD-4 yet) have all had similar criticisms aimed at them: They are heavy, power-hungry, offer little isolation, and are not travel-friendly because they do not fold or flatten.

Given that so many 'phone fans require cans that are portable, lightweight, affordable, and easy to drive with a cellphone's limited power output, Audeze was missing out on a good portion of the headphone market with its LCD designs. Cue the music for the Audeze EL-8 and EL-8C headphones. Priced at \$699, these two models are virtually identical-looking except that one is an open-backed design (EL-8), while the other (EL-8C) is a closed-back version using

a solid piece of milled metal instead of an open grille.

Apart from a 2dB drop in sensitivity in the closed-back version and a slight weight difference, their specifications are identical. Weighing only 460g or 480g (for the closed-back) and able to fold flat, the Audeze EL-8 represents the company's thinking on how to incorporate its sound and technology into a lighter, more travel-friendly, more portable player-friendly package. How did Audeze do? Let's find out.

The Technological Tour

Designed by the BMW Designworks, USA, the EL-8 uses a planar magnetic driver that employs an ultra-thin diaphragm with a large surface area to generate sound. Since it can start and stop so quickly, the resulting sound can be more precise and lower in distortion than a multi-driver dynamic headphone. The EL-8 is the first Audeze headphone to utilize its trademarked Fluxor magnetic technology, which delivers nearly double the magnetic flux density of the highest-grade neodymium magnetic circuits previously available. Fluxor magnets are magnetized at a 45-degree angle instead of vertically or horizontally. When these mag-

nets are placed side by side with north/south corners touching, the magnetic fields are forced to arch out and go around to reach the corresponding magnet's pole. This pushes the magnetic field into the diaphragm area where it can be used by the headphone's diaphragm system instead of being wasted outside that working area. This driver technology results in reduced weight with greater efficiency, perfect for mobile devices.

The Fluxor technology is combined with something Audeze calls Uniforce diaphragm technology that employs variable trace widths in the voice-coil to capture variations in the magnetic field within the magnetic gaps by equalizing forces in the individual traces. This creates a uniform driving force across the entire diaphragm surface. Where the conductor is weaker at the outside edges, the traces are reduced so the same amount of current will be flowing through the entire conductor trace. This "industry first" was created to reduce overall distortion as well as to allow for higher resolution and improved imaging.

The EL-8 also uses proprietary Fazor technology developed for Audeze's LCD series. Fazors are special acoustical elements positioned on



either side of the magnetic structures. They enhance transparency by interacting with the sound waves generated by large planar diaphragms. According to Audeze, "a few of the benefits include extended frequency response, improved high-frequency extension, and lowered distortion, with better imaging."

Fit, Finish, and Ergonomic Considerations

The more headphones I review, the more I realize that a headphone's fit and comfort level are as important to an end user's experience as how well it reproduces music in the audible spectrum. Both versions of the EL-8 are comfortable, but depending on your head size and tastes in side-pressure, you may find that one of the two fits better than the other.

The differences is largely because the closed-back EL-8C weighs 20 grams (.7 oz.) more than the open-back version, so it may also feel a bit heavier. While both versions of the EL-8 were far more comfortable than the Audeze LCD-2—es-

Equipment Report Audeze EL-8 Headphones

pecially during long listening sessions—I would rate their overall comfort to be slightly better than the new HiFiMan HE560, but not quite as good as the Sennheiser HD-700. The reason the EL-8 is more comfortable than the HE560 is because the EL-8's ear pads are softer and conformed more easily to my head than the HE560's stiffer pads. The Sennheiser HD700 outpointed the EL-8s on comfort due to their lighter weight, greater headband padding, and softer velveteen-covered ear pads. The EL-8's ear pads are made of leather but they do not breathe, so if the outside temperature is hot and sticky, your ears will soon be hot and sticky, too.

The EL-8 gave me a more accurate sonic picture in inner detail and upper frequencies—and was certainly a more accurate headphone—but the NightHawk has an engaging character that is hard to resist.

The EL-8 headphone has a flat, lightweight, and flexible removable cable that uses a unique connector scheme. Instead of the more standard mini-stereo-style plug, or a screw-in connection, the EL-8 employs a flat connector that looks like an iPhone 6 power connection on steroids. The male section attaches into the headphone's female section just like Apple's, but unlike the iPhone's connection, which can be inserted either way, there is only *one* correct way to attach the EL-8's cable. And if you try to force the cable when it's in the wrong position,

you can damage the connection permanently.

There is also a second potential problem with Audeze's new cable connection—it can and most likely will loosen up with use. Both of the EL-8 review samples have gotten to the point that even a slight tug can pull out the cable's connections. While an easy-to-disconnect attachment scheme is great for those times when something bad happens like catching the cord on a doorknob while you walk through a door, it's not great when merely vigorous head-shaking results in an intermittent connection. I predict that a lot of EL-8 users will be complaining about the excessive "play" in this connection, and there will be some warranty issues as a result. Audeze has reportedly improved the connectors since it shipped my review sample, and all current production features the new connectors.

Recently I reviewed a pair of \$70 headphones from Monoprice that included a very nice hard-formed travel case. Given that the EL-8 was designed to be a portable and portable-friendly headphone, it was disappointing to find that instead of a nice molded hard case for travel, the EL-8 only comes with a soft drawstring bag for "protection." Similarly-priced headphones from other firms including AudioQuest, Oppo, and HiFiMan all come with serviceable travel cases; why not the Audeze EL-8? (Audeze offers an optional hard travel case for \$39.)

The EL-8 comes with one 2m (6.56 feet) cable and one 3.5mm-to-¼" stereo adapter. There are additional cables available at extra cost for the EL-8, including a cable for Apple iOs device with controls, a balanced cable for Astell&Kern devices, and a balanced cable for use with Pono

players and the Sony PHA-3. Your choice of one of these cables is provided at no charge. Additional cables are priced at \$49 each.

I have a new way of testing and comparing the isolation abilities of headphones—I use my AKG "Harry" dummy-head microphone rig. I place the headphones on Harry and compare the aural leakage I hear at two feet away. Using this testing method I could hear that even the open-back EL-8 had better isolation than many other open-back headphones including the AKG K-7xx, and the aforementioned HiFiMan HE560 and Sennheiser HD-700s. The closed-back version (EL-8C) delivered even better isolation; I could hear nothing from two feet away. Yes, the EL-8C is definitely library-friendly.

Closed- Versus Open-Back EL-8: Which One Is Right for You?

In a perfect world, when a manufacturer releases two versions of the same headphone, one with an open and one with a closed back, they would sound identical and the end user could choose which one best suited his needs based on whether the 'phones were going to be used in a quiet or noisy environment. But this is not a perfect world, and the two versions of the EL-8 do not sound the same. If their sonics were identical, it would make more sense for most users to purchase the EL-8C (for closed) over the EL-8 because it could be used in more environments successfully. But because there *are* sonic as well as ergonomic differences between the two, your decision on which would be best for you will be more complex.

As for sonic differences, starting with the bass, the EL-8C goes deeper and has noticeably

better damping than the EL-8. When using a solid-state headphone amplifier, the damping differences are less obvious, but if you happen to have a single-ended tube 'phone amp available (and one that relies more on the headphone's own internal damping abilities), such as the new Inspire by Dennis Had Dragon IHA-1, you will notice how much tighter and faster the EL-8C's bass can be than that of the EL-8. The open-back EL-8 simply sounds looser and less controlled than the EL-8C when connected to the Inspire amp. With marginally powered portable devices, such as an iPhone, you will also notice the EL-8C's more controlled and extended low-bass output.

Moving up the sonic spectrum, the EL-8 has a slightly warmer, and more harmonically complex midrange character than the EL-8C. In comparison, the EL-8C has more upper-midrange energy that moves female vocalists forward in a mix, but robs male vocalists of some of their lower-midrange harmonic richness. Holding the palms of my hands about ¼" away from the open backs of the EL-8, I can almost duplicate these differences, so I suspect they are in part the result of the closed back creating some midrange frequency cancellations.

Treble response through the two EL-8 versions is virtually identical. Both have substantially more air and zing than the AudioQuest NightHawk headphones, for example, but aren't as airy as the Audeze LCD-2.

One last area where the two EL-8 designs sonically differ is in soundstaging. The EL-8C has a smaller and less dimensional soundstage than the open-back EL-8. The EL-8's soundstage dimensions were almost identical to the LCD-2's,

Equipment Report Audeze EL-8 Headphones



but the EL-8C had noticeably less immersive dimensionality and scope.

Whether you find one of the two EL-8 designs to be sonically superior to the other depends more on your own personal tastes in music rather than on some absolute sonic criteria. On modern pop the EL-8C's excellent bass and sub-bass damping and control made it my preferred option. But on my own live classical concert recordings the open-back EL-8 delivered a more accurate and detailed soundstage that was closer to what I heard when I was monitoring the recordings during the sessions. On pop selections I also preferred the EL-8C's lively and more prominent upper midrange response, but on classical chamber music and contemporary bluegrass tracks I found the EL-8 to be more harmonically neutral and representative of what I've come to expect from the recordings.

Comparisons with Other Headphones

LCD-2 and LCD-3 owners who are looking for a portable headphone that sounds identical to their beloved LCDs will find the EL-8 closer to their ideal than the EL-8C. The EL-8 captures most of the LCD's soundstaging dimensions and harmonic character, lacking only that last iota of resolution, specificity, and inner detail. The EL-8 may not "scale up" (scaling up is the ability of a pair of headphones to sound better as you upgrade the headphone amplifier or source) quite as dramatically as the Audeze LCD-2, but when I went from an iPhone 5 playing Tidal to the Sony NW-ZX2 playing the same Tidal tracks, it was quite clear that the EL-8 preferred the additional drive and delivered a more detailed, dimensional, and involving result when powered by the Sony.

Earlier I mentioned the upper-frequency differences between the AudioQuest NightHawk headphones and the EL-8s. Both these have well-above-average bass and sub-bass response but the EL-8s are more "hi-fi" and spectacular, while the Nighthawks have a more natural (but not neutral) and relaxed presentation both in harmonic balance and dynamics. The EL-8 gave me a more accurate sonic picture in inner detail and upper frequencies—and was certainly a more accurate headphone—but the NightHawk has an engaging character that is hard to resist.

Listening to Shawn Colvin's "Get Out of This House"

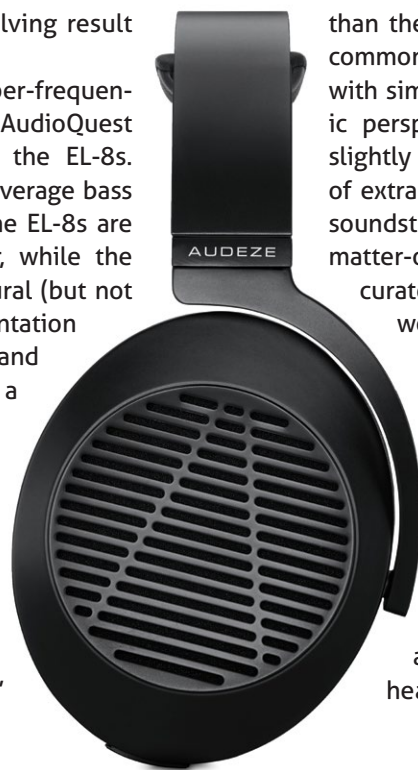
from *A Few Small Repairs* via Tidal, the Oppo PM-3's darker and smoother harmonic character compared to the EL-8 was quite obvious. On a better recording, such as Fences' "Arrows" via Tidal, the EL-8's higher resolving powers and cleaner upper midrange and lower treble outpointed the PM-3. In long-term comfort, the PM-3s won. The PM-3's secure, single-connector headphone cable connection was another point in its favor. But in absolute sonic terms, the EL-8 is a better headphone in the important categories—accuracy and fidelity to the original source.

Although it has a higher MSRP, the Sennheiser HD-700 open-enclosure headphones are currently available for about \$150 less than the EL-8. The two had far more in common sound-wise than I expected, with similar harmonic balances and sonic perspectives. The Sennheisers were slightly more "Technicolor" with a dollop of extra midbass air, and a bigger, wider soundstage, while the EL-8s were more matter-of-fact, and in the end, more accurate.

Comfort-wise the Sennheisers won with less side-pressure and lower weight. Unfortunately, if you want a headphone that travels well, the HD-700's relatively fragile metal mesh and lack of foldability take it out of the running.

Summary

Creating from a single design a closed-back and an open-back headphone that sound identical



SPECS & PRICING

Transducer type: Planar magnetic
Magnet type: Neodymium
Driver size: 100mm
Maximum power handling: 15W (into 200 ohms)
Maximum SPL: >130dB
Frequency response: 10Hz–50kHz
THD: <0.1% (1kHz, 1mW)
Impedance: 30 ohms
Optimal power requirement: 200mW–4W
Efficiency: Open-back, 102dB/1mW; closed-back, 100dB/1mW
Weight: Open-back, 460 grams; closed-back, 480 grams
Price: \$699

AUDEZE LLC

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in both versions is a difficult feat I have yet to hear accomplished. While the two Audeze EL-8 headphones are sonically similar, those differences in sound are sufficiently profound that most listeners will very likely have a preference based on their own tastes and program choices. And while neither EL-8 will completely satisfy an Audeze LCD owner looking for the perfect portable LCD surrogate, both do capture much of the speed, immediacy, and presence of the Audeze headphone lineup in an easy-to-drive and portable package. **tas**

Equipment Report

Oppo PM-3 Headphones

All-Around Sound Value

Steven Stone

You might say it's time for Oppo's round three of headphones. The esteemed Silicon Valley-based manufacturer—whose popularity appears to be on the rise—first offered the PM-1 headphones (\$1099), which were soon followed by the PM-2 (\$699). Now Oppo has added the PM-3 headphones to its lineup, priced at a modest \$399. Using technology trickled-down from its more expensive models, the PM-3 promises to deliver the Oppo sound in a smaller, more portable, closed-enclosure headphone. Will the new PM-3 provide the same level of sound, ergonomic elegance, and style as its larger siblings? Let's see.

Tech Tour

The PM-3 uses the same basic technology as the PM-1 and PM-2 with its sound emanating from a seven-layer planar diaphragm of double-sided spiraling coils made from flat aluminum conductors. Thanks to the double-sided diaphragm, the magnetic field is populated with twice as many conductors as a single-sided diaphragm. This, in turn, dramatically increases the headphone's sensitivity and ability to withstand higher drive forces. Combined with

Oppo's FEM optimized magnet system, which employs high-energy neodymium magnets, the Oppo PM-3 achieves a 102dB sensitivity figure. With such high sensitivity, even a smartphone will easily be able to drive a pair of PM-3s to satisfying volume levels.

The physical design of the PM-3 is reminiscent in many respects of Oppo's other models. It has a similar padded headband, except the PM-1 employs genuine leather while the PM-3 uses an artificial leather substitute. The PM-3's earpads are also man-made rather than genuine cowhide. Pivoting yokes on all Oppo headphones have the same elegant design, but are constructed out of slightly different materials. I could see that the PM-3 yoke and pivot had fewer parts than the PM-1, but in overall fit and potential longevity both headphones were equal.

There are two big differences between the PM-3 and Oppo's other headphones. The first is size. The PM-3 has a slightly smaller circumference than the PM-1 and PM-2, which means for some prospective users the PM-3 headphones will be an on-ear rather than an over-ear fit. Other users will discover that in actuality the PM-3 is an almost-over-ear design. On my 7-1/8-sized head the PM-3s cover my

entire ear and the outside edges rest on my head around my ear, delivering a more complete seal than most on-ear headphones I've tried. This better seal around the ears translates into better isolation and less bass leakage.

Besides their smaller size, the other major difference between the PM-3 and Oppo's

other headphones is that the PM-3 is a closed- rather than an open-back design. This means that the PM-3 should provide more isolation from outside sounds and reduce the amount of "bleed" from your music that anyone will hear nearby. But the disadvantage of closed "cans" is that they have to attenuate the sound



Equipment Report Oppo PM-3 Headphones

reflected off their closed backs, so it does not interfere with the direct sound coming from the headphones. This is a challenge. It is far easier to design and manufacture an open-enclosure headphone because there's no "back wall" to reflect sound, out of phase and out of time, back into the mix.

Ergonomics and Fit

Like other Oppo headphones, the PM-3 has a removable cable connection, but unlike other Oppos, the headphone cable for the PM-3 attaches only to the left side of the headphone. If you already own another Oppo headphone and have purchased custom cables for it, you'll be disappointed to know that, unlike the PM-1 and PM-2, which have the same connectors, the PM-3's connector is not the same, so no cable swapping between models is possible. The PM-3 does come with two cables—a short one with navigation and volume controls for iPhone/iPad built in, and a longer one without any controls.

As noted, unlike the PM-1's earpads, which are made of leather, the PM-3's earpads are made of a man-made leather substitute. Natural leather has some ability to breathe and absorb moisture, but the artificial material has an impermeable surface where moisture remains until it evaporates. That means if it's hot out or your ears are prone to perspiring when enclosed, you may find the PM-3 earpads are not as pleasant to use as the leather ones. Unfortunately, you can't swap out the PM-1 earpads with the PM-3's since their circumferences are different.

The PM-3's ability to isolate your ears from outside noise is slightly better than some on-ear

headphones such as the V-Moda M-80, but not as complete as the over-the-ear sealed-enclosure Mr. Speaker's Alpha Prime headphones or any in-ear monitor. In an open office environment, the PM-3s would shield fellow employees from your music, but would not insulate you from the sound of the approaching coffee cart. I like this level of isolation when I'm in an airport and need to hear the announcements, for instance, but it is not sufficient for the actual flight itself.

The PM-3 comes with a very nice selvedge denim carrying case. Like Oppo's other models, the PM-3s can fold flat so the overall package of case and headphones is compact and thin enough to fit easily into an attaché case. The denim case also has enough room for the headphones, both cables, and the supplied mini-stereo-to-1/4" headphone-jack adapter, with room left over for an energy bar or two.

The PM-3s' bass response was well controlled with excellent midbass definition...they did an excellent job of keeping the low end clean yet warm.

The PM-3's headband appears to be virtually indestructible, but this robustness does have a price—prospective users with larger than normal hat sizes could find the pressure from the headband oppressive. Adjusting the PM-3's side-pressure isn't an option, so if the fit is too tight, there's little you can do in the way of on-location modifications to reduce the pressure. For me the PM-3's side pressure and fit are perfect.

Sound

While it might be presumptuous to assume that a manufacturer with just three products in one category can already have a "house sound," the PM-3 does sound more similar to the PM-1 than different. I hesitate to call the PM-3 a PM-1 "lite," but it does have much the same sonic character as the PM-1, albeit in slightly lesser quantities.

The overall harmonic balance of the PM-3 is what I would call natural as opposed to razor-flat neutral, tipped-up, or bass-centric. The harmonic balance is relaxed without being dark or murky. The PM-3s are more forgiving of recordings with excess energy in the 2kHz to 4kHz regions than the PM-1s, but that also translates into slightly less sparkle and dynamic energy. I found the PM-3s were also less revealing than the PM-1s because they have less energy in the presence range.

The PM-3 displayed decent dynamic contrast throughout their frequency range, but were not quite as responsive as the PM-1 headphones. While I would not characterize the PM-3s as over-damped, they do not generate the same level of dynamic verve as the PM-1s.

PM-3 bass response was well controlled with excellent midbass definition. Although I wouldn't call the PM-3s bass monsters, they did an excellent job of keeping the low end clean yet warm. In comparison the PM-1 had greater bass extension, but the PM-3 was its equal in the midbass.

I expected that I might hear some of the less desirable aspects of the closed-enclosure coloring the PM-1's midrange, yet I found its sound was largely unaffected. The PM-3's

midrange character was very much like the PM-1's, except that it lacked some of the dynamic verve of its more expensive sibling. I detected no additive colorations that I could attribute to the PM-3's enclosure.

Upper-midrange and treble energy through the PM-3 was also a bit truncated when compared to the Oppo PM-1. While the PM-3 did not sound hooded or noticeably rolled-off when I listened to it by itself, compared with the PM-1 the lesser amount of upper-frequency air was immediately obvious.

Although the imaging that a headphone produces is quite different than what comes from a pair of loudspeakers, it is still three-dimensional, and different headphone designs do produce differently sized images with varying degrees of specificity and focus. The PM-3's images were well focused with excellent individualization within the soundstage. But when I compared the PM-3's imaging with that of the PM-1, it was obvious that the PM-1 produces a larger overall soundstage with more space between each instrument and vocalist.

Admittedly, it is somewhat unfair to compare a \$399 headphone with a \$1095 headphone from the same manufacturer—the more expensive model had better be superior, and in the case of the PM-1 and PM-3 that is certainly true. So it was time to compare the PM-3 with several other headphones that were closer to it in price. I began with the longtime audiophile go-to headphone, the Sennheiser HD-600, which has an MSRP of \$399, although its current street price is lower.

The HD600s lack the easily removable cable of the PM-3s, although its cable is replaceable.

Equipment Report Oppo PM-3 Headphones

Another difference is the HD600s are an open-rather than closed-can design, so they do not provide isolation from outside sounds or shield anyone nearby from your music. In terms of portability, the PM-3's folding design is a clear winner, allowing for a much narrower package that will fit more easily in your luggage.

Listening in a quiet environment to provide a level playing field between the two headphones, I immediately noticed how much less sensitive the HD600 headphones were. To achieve the same volume level on the HD600s as the PM-3s required turning the volume control on the headphone output on the Vinnie Rossi LIO modular system from 19 to 31. The HD600's upper midrange had a noticeable peak when compared to the PM-3's. This "tizziness zone" around 3kHz wasn't unpleasant on good recordings, but on anything with an even slightly hot top end the HD600 headphone took on an edgy and slightly grainy character. On the same material the PM-3 was more listenable. In overall comfort I preferred the PM-3's softer earpads and more padded headband to the HD600's harder pads with their around-your-ear fit.

My go-to headphone for use in airports and other places where I need some, but not complete, isolation has been the V-Moda Crossfade M-80 on-ear headphones (\$230). It didn't take more than a few seconds of listening to the same song that I had just heard on the PM-3s to note the M-80's added colorations in the lower midrange, almost like a hollow echo. Also, the M-80 didn't have the same level of control of the lower frequencies—its bass sounded somewhat sloppy compared with the

PM-3. Although the M-80s are an extremely well built headphone with an elegant overall design, sonically the Oppo PM-3 is clearly in another league with far less additive distortion and more musical finesse overall.

For a final comparison I chose the Sennheiser Momentum headphones. Although now superseded by the Momentum II, the last supplies of on-ear Momentum headphones have been getting blown out for anywhere from \$70 to \$160 (depending on color). The Momentums had a more bass-centric frequency response that gave every tune a bit more boom than I would consider neutral, but its bass was cleaner and more tuneful than that of the V-Moda M-80. The Oppo PM-3 delivered slightly better isolation than the Sennheiser and had a smoother upper-midrange and lower-treble response, but the Momentum and PM-3 were very similar in sensitivity. In comfort, the PM-3 won by a wide margin—the Momentums weren't uncomfortable, but they required a lot more fiddling and minor adjustments to get the fit right.

Near the end of the review period, the AK Jr portable player from Astell&Kern arrived. Priced at \$500 the AK Jr is A&K's new entry-level player. The PM-3 and AK Jr proved to be a potent combination. Even on my own live recordings, which are on average 10dB lower in level than commercial releases to allow for their wide dynamic contrasts, this combination produced adequate volume levels without turning up the level control to maximum. I was especially impressed by how well the soundstage was presented—all the depth cues on my recordings were apparent with little

truncation of three-dimensionality. Even on "thick" mixes such as a 96/24 digital recording of Brahms' *German Requiem* that J. Gordon Holt and I made several years ago, the AK Jr and PM-3 remained lucid and unfazed.

Conclusion

When I reviewed the Oppo PM-1, I found that "Oppo's PM-1 headphones take the prize as the best all-around general-purpose headphones I've ever used, even though they are not the best performers in any particular category." Although the PM-3s do not achieve quite the same level of overall sound quality as their larger sibling, for one-third the cost they deliver a good portion of the sonic goodness that made the PM-1 such a fine all-around performer.



SPECS & PRICING

Type: Closed-back, planar-magnetic, over-the-ear headphone
Impedance: 26 ohms
Frequency response: 10Hz-50kHz
Sensitivity: 102dB in 1mW
Max input power: 500mW
Pulse max input power: 2W
Cables: 3m detachable cable (3.5mm with 6.35 mm adapter); 1.2m detachable cable (3.5mm)
Output: 3.5mm stereo jack, 3.5mm stereo jack
Input: 6.35mm stereo jack, 3.5mm stereo jack
Weight: 320g (without cable)
Price: \$399

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If you're looking for a pair of headphones for situations where you still need to hear some outside sounds but don't want to bother others with your music, the PM-3 would be a savvy option. It's comfortable, extremely well made, and cleverly designed. Couple it with one of the new generation of portable players such as the Astell& Kern AK Jr, and for under \$900 (\$500 for the AK Jr and \$399 for the PM-3) you have a portable rig that will keep you enthralled for as long as the batteries last. **t&e**

Equipment Report

Stax SR-L700 Headphones

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-007tll (\$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-007tll, 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 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.

Equipment Report Stax SR-L700 Headphones

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 ear speakers 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 ear speakers 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 ear speakers, 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 '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-727I's soundstage and harmonic characteristics were definitely superior to the SRM-1 Mk II's, but not quite as precise or

Equipment Report Stax SR-L700 Headphones

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 HE-1000). 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

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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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

Astell&Kern AKT8iE In-Ear Monitors

Ace of Bass

Steven Stone

Someday, perhaps as little as ten years in the future, Harvard B-School will do a study on Astell&Kern as an example of how to grow a brand. In 2012, Astell&Kern introduced its first product, which was also the first “premium” portable music player, the AK100. When I reviewed it in 2013, I wrote, “When it comes to pure unadulterated sound quality, the AK100 leaves the iPod, iPhone, iPad, and all their imitators in the dust. Sure, it’s not inexpensive, but for anyone who demands the best sound quality currently available in a portable playback device, the AK100 is the device to own.” Since then Astell&Kern has introduced other, even more expensive players, including its current flagship, the \$3999 AK380 Copper.

But how much can a company grow with only one product category? And how far afield from its core products can a company venture without losing identity, focus, or corporate mission? These are the sorts of questions that Astell&Kern was facing a year ago. Its solution was to form strategic partnerships with technological and market leaders to create Astell&Kern co-branded headphone offerings.

Currently Astell&Kern has six universal-fit

Jerry Harvey-made in-ears, two in-ears from Final Design, and two headphones and one in-ear from Beyerdynamic, the full-sized over-ear AK T1P, the AK T5P, and the AKT8iE universal-fit in-ear monitor. The AKT8iE, which is the focus of this review, retails for \$999 and is the first Beyerdynamic in-ear to miniaturize Beyerdynamic’s latest “Tesla” technology. Astell&Kern is the only source for this in-ear monitor just as it is the only source for universal-fit (as opposed to a custom-fit) Jerry Harvey in-ear monitors.

Technical Tour

Depending on whom you talk with, dynamic-driver-based in-ear monitors are either the best or worst technology for in-ear monitors. Dynamic drivers, as compared with balanced armature designs, have higher mass. Their design requires more power and is therefore less efficient than a BA driver, plus dynamic-driver in-ears often sound “slower” and less detailed in direct comparison with BAs, as a result of having higher-mass diaphragms. But to its credit, a single-dynamic-driver design doesn’t require a crossover, which eliminates all the sonic issues caused by phase shifts at

the various drivers’ crossover points. The “best” full-sized headphones are almost all full-range single-driver designs, so why not in-ear monitors as well?

Currently most conventional single-dynamic-driver in-ear monitors are entry-level rather than state-of-the-art, but they are all based on something other than Beyerdynamic’s Tesla technology. The Tesla driver utilizes a ring magnet that has a high magnetic flux density. This higher magnet strength is combined with a new multi-layer diaphragm driver technology that has lower mass and less weight, as well as better damping than conventional dynamic drivers. According to Beyerdynamic, “additional attenuation at the heart of the Tesla driver eliminates even the last traces of resonance in the high-frequency range. Beyerdynamic has also optimized the geometry of the baffle design and replaced the single-layer baffle material with a more stable, high-tech compound. This reduces the vibration of the material to a minimum, which in turn delivers even clearer sound combined with ultra-precise bass.”

What you have with the T8iE is a single-driver system whose performance has been pushed well past what could have been



obtained from an off-the-shelf driver motor. The new driver system is housed in what Beyerdynamic calls a “special alloy used in high-tech medical products.” Neither Astell&Kern nor Beyerdynamic published a sensitivity specification, but the T8iE proved to be sensitive enough to be driven easily by the least powerful player I have, my iPhone 5. While I understand Astell&Kern and Beyerdynamic not wanting to release too much proprietary information that could tip off competitors, I do see the lack of detailed technical info about the T8iE on either manufacturer’s website as part of the unfortunate and almost universal trend toward publishing colorful prose in lieu of revealing technical information about new audio products.

Ergonomics and Fit

While fit is certainly important in full-sized, over- or on-ear headphones, it is even more critical for in-ear monitors. The T8iE comes with eight different tip options. Five are different-sized silicone tips while three are various Comply compressible foam tips. The T8iEs are lightweight and compact (especially when compared to a multi-driver balanced-

Equipment Report Astell&Kern AKT8iE In-Ear Monitors

armature design such as the Noble K-10) and are “anatomically shaped” with an oval molded design that rests in your ear’s auricle and puts the cabling over the ear so that light pulls or tugs won’t dislodge the phones.

The T8iEs come with two cable options. Along with a “standard” 1.3-meter cable terminated with a 3.5mm stereo plug, Astell&Kern includes a balanced cable terminated for the AK100 II, AK120 II, AK240, AK300, AK320, and AK380. This cable uses a 2.5mm 4-pole termination. Also, as you would expect from a premium offering, the T8iE comes with a nice hard leather case and a metal shirt-attachment clip. Astell&Kern also has several other cables available from Crystal and Mundorf at additional cost on its website.

I tried all the tips included with the T8iEs and settled on the largest of the Comply. My ear canals start wide and narrow quickly, like those of many other people, so I usually need to use either the largest tips for my outer canal or the smallest ones if the in-ear monitor’s design calls for a deeper insertion, such as with the Etymotic 4P monitors. The T8iEs’ design required the former because of where it sat in my ear and its fairly large diameter barrel. When properly seated the T8iE isolated me from the outside world nicely. Astell&Kern has no published isolation specifications for the T8iEs and I lack an ear coupler for measurement, but I will take a WAG (wild-a** guess) that it’s somewhere between -18 and -20dB.

I used a variety of devices with the Astell&Kern AK T8iEs during the review including the Aurender W1000 Flow, NuPrime DAC-10H, Grace m9xx, Oppo HA-1, Sony NW-ZX2, Astell&Kern AK Jr, Astell&Kern AK240, Calyx M, Sony PHA-2,

and Acoustic Research M2 players. In every case there was more gain in reserve than in use at my own personal maximum volume levels. Among all the in-ears currently at my disposal, the T8iEs rank among the most sensitive, requiring some of the lowest gain settings I’ve used. The problem with sensitive in-ears such as the T8iE is noise and hiss from some amplifiers due to the earphone’s high sensitivity. With all the portable players I had no issues with noise or hiss, but some desktop earphone amplifiers, primarily designed to handle hard-to-drive headphones, could be problematic if they lacked adjustable gain settings. Having said that, one of the best desktop combinations was the T8iEs paired with the Grace m9xx DAC/headphone amp. There was only the slightest amount of hiss when no music was present and the midrange clarity, bass extension, and dynamic drive were all first-rate.

Since I have no aspirations to design headphones I won’t speculate on why the T8iE’s imaging is so precise.

The T8iEs have removable/replaceable cabling that can present issues if best practices are not employed. Unfortunately, I could find nothing in the otherwise comprehensive owner’s manual describing what “best practices” for removing these cables might be. I noticed some comments in the Head-Fi T8iEs’ message section that a few owners have returned multiple sets of cables for connection

issues. I suspect these problems may be at least partially due to how users are removing and reattaching the T8iE’s MMCX connectors. From what I’ve seen so far, no manufacturer who makes in-ear monitors with a removable/replaceable cable has come up with a perfect connection scheme. The problem of balancing ease of attachment with reliability and comfort has yet to be completely solved.

In theory a single-dynamic-driver design like the T8iE should be more rugged than a comparable balanced-armature design because the dynamic driver can survive more drops and other abuse without it affecting its target frequency response. For prospective owners who know they’re hard on in-ear monitors the T8iE’s robust overall design could be an important factor in its favor.

Sound

The most impressive aspect of the T8iE’s sonic performance was its cohesion. Not only did it speak with one voice throughout its frequency range, but it also produced one of the most cohesive soundfields I’ve experienced. It’s easy to understand the T8iE’s harmonic cohesion because of the single full-range driver and lack of any crossovers, but what about its spatial characteristics? Since I have no aspirations to design headphones I won’t speculate on why the T8iE’s imaging is so precise and dimensionally convincing, but I can confidently state that once you hear the way the T8iE places each instrument in space it’s hard to go back to a less three-dimensional headphone’s presentation.

I am among one of the least head-transfer-function-sensitive humans on earth [see

Head-Related Transfer Function Explained

Head-related transfer function is the modification of a sound’s frequency response by the head, upper-torso, and particularly, the pinna (outer ear). Specifically, reflections from the head and the small folds and bumps in the pinna create comb filtering, or narrow notches in the frequency response that result from the out-of-phase combination of direct sound striking the ear drum and sound reflected to the ear drum from the pinna’s folds and bumps. The frequencies where these notches occur are determined by the sound’s direction. The brain then analyzes the specific notch pattern to help identify the sound’s direction.

These head-related transfer function cues can be artificially introduced by digital signal processing. DSP chips can be programmed to introduce comb filtering that replicates the comb filtering that occurs naturally. Consequently, it’s possible to fool a human listener into hearing sounds emanating from any point in space, even from two loudspeakers or via headphones. **RH**

sidebar]. Years ago Sony had a military-grade HTR calibration device at CES, which tested and dialed in your HTR settings. The device could never get the image to move all the way from the top of my head to the front. It got halfway there and stalled. But when I listened to the

Equipment Report Astell&Kern AKT8iE In-Ear Monitors

latest DTS-X demo through the T8iEs I was surprised to hear not only the front channels coming from in front of me, but also the front and rear height channels above me. On my own field recordings, most of which were made using the Ultimate Ears In-Ear Reference Monitors (IERM), the T8iE in-ears proved to be slightly more “real” in terms of their overall spatial rendition than the IERMs.

The T8iE’s second most impressive sonic characteristic was its bass response. I’ve never considered myself much of a “bass head,” so I wasn’t prepared for what I heard from the T8iEs. They have the deepest, most extended, most precisely detailed and controlled low bass I’ve heard from any in-ear monitor. This should not be confused with the sort of bloated “big” bass you’ll hear from some popular in-ears. Instead of “phat” bass the T8iEs generate true low bass. If you listen to EDM, techno, or modern pop, the T8iEs’ bass control will render what used to be low bass “stuff” into discernable parts and tracks. Unlike many headphones that are known for their “generous” bass response, the T8iEs’ bass rendition does not muck up its lower midrange response. The T8iEs’ upper bass and lower midrange resolution is just as articulate and detailed as the low bass.

Moving up to the midrange, you will be hard-pressed to find an in-ear monitor with a smoother, more even-handed presentation from the lower midrange up through lower treble. This even-handedness extends to the way the T8iE handles musical details. For example, the rhythm guitar’s flutter (as in tape wow and flutter) and the muffled piano in the left channel on James Taylor’s “Sweet Baby James,”

from the same-named album sourced from the 96/24 AIFF from HDtracks, were quite obvious through the T8iE. On older recordings you will hear all the warts along with getting closer to the sound than you thought possible. Just as great singers have, seemingly, all the time in the world to finish a phrase while luxuriating in a song, the T8iEs’ give your ear-brain ample time to examine the music’s inner fabric.

The T8iEs’ upper-mid and treble regions were as smooth and resolving as its midrange. The leading edges of the string section, especially the first violins on my own live concert recordings, had just the right amount of sheen and sparkle. The treble (up to 14kHz, which is where my hearing ceases) was airy and incisive and I never felt any desire to turn up the treble or add additional treble energy with eq. In comparison to the AudioQuest Nighthawk headphones, which also have excellent bass extension, the T8iEs’ don’t sound as dark or hooded on their top octave.

The T8iEs also do an impressive job on dynamics, both micro and macro. Take that old/new audiophile demo workhorse Daft Punk’s “Get Lucky” from an 88.2/24 version of *Random Access Memories* from HDtracks. The bass is big and plumbs the depths but is never slow or turgid. The multiple synthesizer lines each have their own individual dynamic emphasis, and the T8iEs preserve all of them. On modern pop the T8iEs excel, keeping the rhythmic drive pulsing while retaining the subtle dynamic interplay between parts.

If forced to come up with a performance area where the T8iE is less than state-of-the-art I would point to the size of its soundstage.

Several other in-ear monitors I’ve used generate a soundfield that is larger and that seems to extend outside your head, including the Westone ES-5 and the Jerry Harvey Layla. On my own personal list of negatives this is a relatively minor shortcoming, but one that experienced headphone users will notice almost immediately.

Competition

Any in-ear priced at just under \$1000 is bound to have some stiff competition. In this price range you will find custom in-ears including the Ultimate Ears UE Pro Remastered (\$999), which is a revision of the Ultimate Ears In-Ear Reference Monitor. When it comes to fit, the UE Pro Remastered wins easily. The UE Pro also has better isolation with a -25dB published specification. Sonically the T8iE has more low bass extension and more dynamic contrast, but it’s a dead heat in terms of imaging and low-level detail.

The Westone W60 is also priced at \$999, and also is a universal-fit in-ear monitor (but you can add custom tips). With six balanced drivers and three crossovers per side, the W60 has a radically different design than the T8iEs. Both fit equally well with multiple fit options. The W60 has a larger soundstage that rivals many full-sized open-ear headphones, but it lacks some of the T8iE’s dimensionality and directional specificity.

Conclusion

The Astell&Kern AKT8iE’s most outstanding sonic attribute is undoubtedly its wonderful bass, which will appeal to both EDM fans as

SPECS & PRICING

Transducer type: Dynamic
Operating principle: Closed
Frequency response: 8Hz–48kHz
Impedance: 16 ohms
Total Harmonic Distortion (THD): <0.2%
Power handling: 10mW
Dimensions: Not specified by manufacturer
Weight: 0.3 oz. without cable
Price: \$999

ASTELL&KERN

39 Peters Canyon Rd.
 Irvine, CA 92606
 astellnkern.com

well as any classical listener into pipe organs. The T8iEs go deep, cleanly without bloat, and they do it with dynamic acuity. After its killer bass the AKT8iE’s second outstanding sonic trait is its cohesive, three-dimensional, and exceedingly specific soundstage. While not the biggest soundstage, the T8iE’s level of dimensional precision is exemplary.

If you’re considering a \$1000 universal in-ear monitor, obviously you’re pretty darned serious about portable audio and you have well-developed tastes. The Astell&Kern AKT8iEs were created for people just like you. Once you overcome the principal weakness of any universal-fit in-ear, which is obtaining optimal fit, the T8iEs perform on a level that closely approaches the best I’ve heard from any headphone technology, including custom in-ears and full-sized reference headphones. **88**

Equipment Report

Westone W60 In-Ear Monitors

Par for the Course

Steven Stone

Westone opened its doors in 1959. In the beginning it made custom molds for hearing aids. It wasn't until the 1990s that Westone began to adapt its hearing-aid-related technologies to in-ear monitors for musicians and sound professionals. By 1995 Westone was collaborating with Van Halen sound technician Jerry Harvey to create Ultimate Ears. Since then Ultimate Ears and Jerry Harvey have gone on to create their own in-ear monitor brand. Westone has continued to innovate with multi-driver designs and state-of-the-art production and testing facilities.

Up until recently all of Westone's products were made in its Colorado Springs facility (which I visited and documented in Issue 263). In its nine separate production studios Westone produces not only custom in-ears, but also the UM line of universal in-ears, military earpieces, and hearing aid products. But the W Series, which includes the W10, W20, W30, W40, W50, and W60, are manufactured in China under Westone's supervision.

The Westone W60 (\$999) is the flagship of the W Series. It is a six-driver system with three crossovers; two drivers each are used for the treble, midrange, and bass. As with all Westone

designs the driver technology is balanced armature. The W Series drivers are custom made for Westone by Knowles, who is the largest independent manufacturer of balanced armature drivers in the world.

Technical Tour

Before we delve into the specifics of the W60 I think it would be a good idea to review the basic technology behind it. The primary "building block" of the W60 is a balanced armature driver. A balanced armature uses a pair of magnets with a movable reed situated between their magnetic fields. The reed is connected to a drive rod that is attached to a diaphragm. A signal sent to the magnets moves the reed, which moves the diaphragm. The diaphragm itself is housed in a sealed enclosure with a tube at one end. This driver mechanism requires less power than a dynamic driver because it is a much more efficient transducer. In many ways a balanced driver resembles a miniature compression driver. Like a compression driver, the increased velocity at the armature's throat moves air more efficiently than a dynamic driver can. And like a compression driver, most balanced armatures are not full-range transducers (some

single-driver balanced armature designs are relatively full range). Instead most are linear within a limited frequency range, which is why the "best" balanced armature designs employ multiple drivers to cover the entire audible spectrum.

Crossovers for multiple balanced drivers can be "active" with distinct high-pass or low-pass filters, or they can be "passive" where the native attenuation and roll-off of the drivers are used to combine drivers without additional crossover components. Both methodologies have their advantages and disadvantages. Keeping phase consistent through the crossover regions can be a problem for either methodology.

The Westone W60's crossovers use a "simple" first-order 6dB-per-octave slope combined with the natural roll-off of the balanced drivers to achieve a smooth transition with minimum phase shift. Karl Cartwright, one of Westone's principal designers, calls the final bit of crossover tuning "acoustic trickery" in that it uses the combination of first-order crossovers and tuning to achieve Westone's characteristic frequency curve.

Karl was also responsible for something that he calls "the lip test." This test involves moving

the plastic casings of Westone monitors around on his lip to see if there are any rough spots or seams that could reduce the overall comfort of the housing. You can, if you wish, try this at home with your favorite in-ear monitor. If it is well constructed, there should be absolutely no rough spots or edges that you can feel. And why the lips? They happen to be among the most sensitive spots on your body you can access in public without being arrested.

Ergonomics and Fit

The W60 comes with the sort of extras and accessories that you would expect from a top-tier in-ear. Along with five different sizes of Westone's patented STAR silicone ear tips, you'll find five different sized True-Fit foam ear tips. The W60 comes with two cables: a MFi three-button cable for smartphone use, and a 3.5mm braided EPIC cable, which is constructed of bifurcated, high-flex, ultra-low-resistance tensile wire reinforced with Aramid fiber. The W60 also has removable, exchangeable red, gold, and silver faceplates so you can customize your W60's look. Or, if you're like me, you might want to put the red faceplate on the right side and a gold one on the left—that way it's easy to



Equipment Report Westone W60 In-Ear Monitors



Westone also makes custom in-ear monitors at its Colorado factory. *Top:* The UM production room has strict humidity and temperature controls.

Above: Removing the finished enclosure material from the mold.

tell which capsule goes in which ear. Of course the W60's come with a water-resistant orange plastic case that clamps closed and even has a screw-down vent to release moisture inside the case.

I tried all the tips and found that the small STAR and the largest foam ones worked best for my ears. The goal is to achieve a nice occluded (sealed) fit that stays in place yet is still comfortable. There is one additional fit

option that I recommend—Westone can make custom ear tips from impressions that will fit on any Westone universal in-ear. They call this their UM56 tip (\$129 for vinyl and \$149 for silicone, plus the cost of impressions, which is typically \$50 to \$75). The tip is named after the Shure SM-56 microphone because they were first product of Westone's collaboration with Shure, which resulted in Shure's first pro in-ear monitors. After a couple of days using the universal tips, I switched to the UM56 vinyl tips and they became my favorite with the W60s.

Unlike many top-tier in-ears the W60 is quite lightweight and its shape fits nicely into your auricle. I found that once properly seated even a vigorous workout couldn't unseat the UM56 tips from my ears. Another advantage of the UM56 tips is they provide maximum isolation from outside noise. In this respect they were superior to any of the supplied universal tips.

Since the W60 is so sensitive (117dB SPL @ 1mW), driving it to satisfying volume levels with a smartphone, such as my iPhone 5, was easy. But such high sensitivity is a double-edged sword—many headphone amps or accessory headphone connections that can drive more difficult and less sensitive headphones can produce hiss with W60. Even on its lowest gain setting, the Grace m9xx produced some low-level hiss with the W60, as did the headphone-

output jacks on the NuPrime DAC-10H. The Questyle QP-R1, Onkyo DP-X1, Sony NW-ZX100, Sony NW-ZX2, AK Jr, AK240, and Calyx M all interfaced nicely with the W60s.

Sound

While it would be a gross exaggeration to write that all Westone in-ears sound the same, Westone in-ears do have a "house-sound" that is based on Westone's characteristic curve, which is part of the "secret sauce" that makes Westone in-ears unique. And what is "the Westone Sound?" First off, it is very smooth with a wide frequency response. Bass through the W60 is powerful and while it won't vibrate your chest (no headphone will), it does push air with impact but also with definition that keeps the upper bass transients from swamping the lower midrange or low bass.

The W60's midrange is refined, and compared to some headphones might be considered ever so slightly recessed, especially in the upper midrange. I want to stress that this doesn't mean the W60 has a "happy-face curve" or is compromised in the midband, but similar to the Ultimate Ears Reference Remastered custom in-ears, it is more listenable when confronted with peaky musical sources. Listeners whose tastes gravitate toward more aggressively mixed music will find this a boon.

The upper midrange and lower treble frequencies through the W60 were sufficiently forward that the W60 never sounded too dark or hooded even with the warmest-sounding sources. The overall effect is completely "natural" sounding, but not quite neutral throughout this frequency range.

SPECS & PRICING

Drivers: Six balanced armature drivers with three-way crossover

Sensitivity: 117dB SPL @ 1mW

Frequency response: 20Hz–20kHz

Impedance: 25dB

Passive noise attenuation: 25dB

Cable: MFi and EPIC Replaceable

Price: \$999

WESTONE

2235 Executive Circle

Colorado Springs, CO 80906

(800) 525-5071

westone.com

Image width through the W60 was as wide as I've experienced from any pair of in-ears (with one exception). I found it as wide from right to left as many full-sized, closed, over-ear headphones. Image specificity within the soundstage wasn't quite as tight or precise as with some in-ear monitors, however. The Astell&Kern AK-8iE and the Ultimate Ear Reference Remastered both had greater image specificity. Also I found front to back-depth was not as pronounced as I've heard from the two in-ears I just mentioned.

Obviously your choice of player or music source will have a substantial impact on the W60's sound, but even the least expensive players currently on-hand, such as the Astell&Kern AK Jr and Sony NW-ZX100, mated nicely with the W60, having more than enough gain, dynamics, bass extension, and drive to make music.

Equipment Report Westone W60 In-Ear Monitors

Competition

For approximately \$1000 consumers have many choices in in-ear monitors (as well as full-sized headphones). I have three that I've had recent experience with that offer excellent sonic and ergonomic value. The first is the Astell & Kern AK8iE (\$999). This single, full-range, dynamic driver in-ear uses Beyerdynamics' latest Tesla technology to create a very comfortable, lightweight, in-ear that offers a superb dimensional presentation along with impressive low bass response. The W60 produces a wider soundstage, but the AK8iE has more depth. With universal tips both are equally comfortable, but with the W60's UM56 tips the W60 has a slight comfort edge.

Ultimate Ear's Reference Remastered (\$999) is a custom-fit, three-driver in-ear that delivers a slightly smoother sound than its previous Capital Studio's collaboration, The Reference In Ear Monitor. The UE RR delivers a better fit than the W60 even with UM56 tips and also has a more three-dimensional image with greater specificity, but it does not have quite the bass extension or image width of the W60.

Jerry Harvey custom in-ear Laylas are a lot more expensive than the previous two in-ears (\$2725) and have a larger capsule needed to accommodate the twelve drivers. Even though they do weigh more than the W60s and have a bigger profile, the Laylas can be, once fitted well, more comfortable than the W60s. The Laylas are also the only in-ear that created an even larger soundstage than the W60 while still retaining good front to back depth and image specificity. Also the Laylas are the only in-ears

of the three I've mentioned that have even more low bass wallop than the W60s.

Conclusion

Once an in-ear gets to a certain level of sonic and ergonomic quality calling it the "best" in its price range or class becomes a very personal observation rather than a universal claim. Fit, musical tastes, and even the environment where it is most often used can play a big part in your evaluation. Having said this, the W60 in-ears may not be my personal favorite for \$1000, but it certainly performs on a par with my favorites. It has a well controlled, extended, and smooth frequency response with detailed low bass and an extremely wide soundstage. And while I haven't performed a series of drop tests to see if I could knock the Westones out of their characteristic curve, I suspect that if you intend to use your in-ears in hostile environments where they will be subjected to abuse, the W60s may well out-point other in-ears because Westone is one of the few manufacturers that performs drop tests on all their models and build them to withstand abuse.

Yes, I know manufacturers and customers like reviews that are raves, but given the level of the competition in \$1000 in-ear monitors, being "on par" with other manufacturers' best offerings is no mean feat nowadays. Whether you find the W60 to be better or worse than their competition is more about you than the in-ears themselves. But if you're in the market for a pair of universal in-ear monitors, I would advise you to give the W60s a serious listen. They have a lot going for them. **tas**

oppo



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Equipment Report

Ultimate Ears Personal Reference Monitors

As You Like It

Jonathan Valin

As you will discover (if you haven't already), one of the many shocks your flesh is heir to as you grow older is the way your hearing deteriorates. (And before you make that leap into ageism, understand that this deterioration happens to everyone—and it starts early in life.) I, for example, have known for better than two decades that my left ear has a slightly different response to certain midband frequencies than my right one, and (much more recently) that I've begun to lose sensitivity to the highest frequencies, particularly in my left ear. (Though I can still hear out to 12kHz without any boosts, 16kHz and above have become an increasing challenge.) When you combine these vicissitudes with the problems everyone, regardless of age, has hearing very high and very low frequencies at less than thunderous levels (e.g., the Fletcher-Munson curve), assessing the actual value of flat frequency response in a speaker (or any component) becomes a lot more complicated, and dubious, proposition.

Of course, if there were a way to equalize our ears—to make *them* identically flat in response—it might be a different story. Then again would you really want perfectly flat hearing? Aren't the very different ways that our ears work (or don't), together or apart, fundamental to our taste in gear and music? Can the sound of gear and music even be said to exist for each of us apart from the way we're used to hearing them?

All these thoughts went through my mind when I ordered up a pair of Personal Reference Monitors from Ultimate Ears.

These \$1999 in-ears are unique to my experience in two major respects. First, they are custom-made to fit *your* ears—and yours alone. When you order a pair of PRMs you have to visit an audiologist (who belongs to the network of audiologists associated with Ultimate Ears) and have him or her make thermo-plastic molds of your inner and outer ears. Those molds are then sent to Ultimate Ears where they are used to build a set of PRMs that fit you perfectly and perfectly seal against ambient noise.



Equipment Report Ultimate Ears Personal Reference Monitors

Second, you must eq your PRMs for your own hearing or your own taste. You do this by using Ultimate Ears' Tuning EQ box and a "test" pair of PRMs at Ultimate Ears' Southern California facility, at a show, or at another venue where the company is exhibiting. The "test" pair of PRMs is fully functional and equipped with variously sized earpieces, though not yet ideally shaped for you. The Tuning EQ box allows you to dial-in equalization in the bass, midrange, and treble. (What you are actually doing is tuning the four crossovers among the PRM's six balanced-armature drivers to suit your different sensitivity to these frequency bands *in each ear*.) Who said you can't equalize your hearing?

Of course, the big question is *how* to equalize your hearing. Do you want to eq your PRMs to compensate for the inevitable aural vicissitudes I talked about, and that we all perforce live with—to make the sound transmitted by them come closer to equal volume in all frequency bands by correcting for known losses and other differences in your hearing in either ear? Or do you simply want to generically "sweeten" the sound—to make it more appealing at anything short of jet-engine SPLs by boosting the lows and highs (where the ear/brain is least sensitive) and slightly reducing the upper mids (where the ear/brain is most sensitive), rather in the way that Raidho (and others) "voice" their loudspeakers.

Happily, you can do a bit of each of these things with the PRMs, which was the path I chose: I eq'd to compensate for the differences in the way I hear certain frequency bands in either ear by dialing in different adjustments for the left and right channels, and I also eq'd

both channels to slightly boost the bass and top treble to make these bands sound more or less equal in volume to the midband for the SPLs at which I typically listen.

Be forewarned: Though the three pairs of dials on UE's Tuning EQ box seemingly allow for big increases and decreases in level within their various bands, the changes they effect are actually deliberately limited in scope, which means you can dial in the presentation you want with a good deal of subtlety. Nonetheless, don't overdo the dial twiddling, particularly in the bass. Also be sure to listen to a wide variety of music through the "test" in-ears before deciding on your final settings.

When you're done with the audiologist and the Tuning EQ box, the molds and your eq settings are sent to Ultimate Ears in Irvine, California. A couple of weeks later the PRMs will be delivered to your door in a dandy little metal box with your name on it. The PRMs come with a plug-in, user-replaceable, 48"-long braided cable terminated with a 1/8" headphone jack (an optional 60" cable is available for an extra \$30). You also get instructions on how to insert the PRMs into and remove them from your ears. If you're used to those painfully ill-fitting generic earbuds that Apple supplies with its iPhones (or to heavy headphones, for that matter), you won't believe the perfect fit, nearly air-tight seal, and feather weight of these designed-for-you numbers. Ergonomically, this is high fidelity at its most portable and precise. Just plug the PRMs into an iPhone, or a dedicated server/amp/DAC like an Astell&Kern, or a portable high-end amp/DAC like a Chord Hugo (connected via USB-to-Lightning to an iPhone/server), and you can

easily carry your music all over the world.

What does a finished pair of PRMs sound like once eq has been painstakingly dialed-in? Well, rather like a pair of \$220k Raidho D-5s, with closer-to-equal output in either channel (giving spotlighted voices and instruments a dead-center fixity, focus, and solidity), every bit as much inner detail, less emphasis and physical impact in the low bass and midbass (rather more like sealed-box bass than Raidho's ported bass), and, of course, less room sound (including room boom, but also less room-augmented breadth and depth).

Indeed, on something like the "Drinking Song of the Earth" from Mahler's *Das Lied von der Erde* (in the superb 2011 EMI remastering of the Klemperer/Philharmonia/New Philharmonia recording with Fritz Wunderlich and Christa Ludwig), the very first thing that struck me—beyond hearing the entire soundstage inside my head, stretching from the plane of my ears to the back of my skull and from just outside one ear to just outside the other—was the *absence* of the usual sound of my room. What I was hearing instead was the famously glorious ambience of Kingsway Hall in February and November 1964 (on the Philharmonia segments) and of Abbey Road Studio 1 in July 1966 (on the New Philharmonia ones).

Even to an old hand like me, the purity of hearing instruments in the actual acoustic of the hall, rather than that acoustic as "interpreted" by my room, was startling—and revealing. I'm not sure that the always gorgeous Philharmonia and New Philharmonia strings, wind, and brass have ever shone forth more beautifully than they did through the PRMs.

SPECS & PRICING

Input sensitivity: 107dB@1kHz/1mW
Frequency response: 5Hz–22kHz
Noise isolation: -26 decibels of ambient stage noise
Impedance: 31 ohms@1kHz
Internal speaker configuration: 6 balanced armatures and 4 passive crossovers

Input connector: 1/8" headphone jack, compatible with all systems
Price: \$1999

ULTIMATE EARS PRO

3 Jenner Street, Suite 180
 Irvine, CA 92618
 (800) 589-6531
customsales@ultimateears.com

Yes, psychoacoustically, this was an entirely different kind of listening experience—greatly reduced in size and scale from what I'm used to via loudspeakers, with an entirely different "inside your head" rather than "outside your head" perspective. And yet the PRM's presentation was so transparent, so finely detailed, so beautiful in timbre, and in its own way so effortlessly powerful in dynamics that nothing of the performance was lost. In fact, because of the PRM's superior transparency, purity, timbre, and dynamics, much was there to be found. Little details of instrumentation and articulation, such as the touches of orientalism in Wunderlich's delivery, were laid bare; at the same time, the big picture—the staggeringly

Equipment Report



expressive effect of Klemperer's slower tempi and of the Philharmonia/New Philharmonia's superb ensemble and sensitive solo playing, for examples—was also clarified. That this is a great performance has always been acknowledged; that this is, without schmaltz or melodramatics, a greatly heartfelt one, too, has seldom before been made more apparent, at least to this listener. This closer connection to the artistry, the music, and the performance is what a top-flight hi-fi can give you—even one you can slip in your pocket.

I could go through dozens of examples of different kinds of music, all illustrating the same point: The PRM is a superb high-fidelity transducer that, thanks to its perfect fit and unique voicing (designed for and by me—and me alone), pleases my ears more completely and enjoyably than any other in-ear I've tried. There is a reason, folks, why so many performers use these things on stage and in studios. The PRMs let them hear themselves the way they want to be heard.

Do I recommend the Ultimate Ears Personal Reference Monitors? Hell, yes. **tas**

Balanced-Armature Drivers

In 1918 Henry Egerton filed a patent for a balanced-armature (or moving-iron) loudspeaker—a loudspeaker in which the current passing through a solenoid is turned into mechanical energy via an armature (a rod, “balanced” by opposing magnetic forces exactly in the center of the solenoid, that is capable of pivoting up and down in response to fluctuations of current within the solenoid’s magnetic field). These up/down movements are transmitted via a springy drive rod connected at one end to the armature, and at the other to an extremely light metal or foil diaphragm. The soundwaves produced by the diaphragm in response to the vibrations transmitted by the rod are then amplified by a tuned chamber or horn.

Because it greatly increased electrical efficiency, the balanced-armature driver was popular in the early 1920s when amplifiers were very low in power. Though it was soon replaced in loudspeakers by the moving-coil cone driver, invented by Edward Kellogg and Chester Rice in 1925, the balanced-armature transducer never fell completely out of fashion. Throughout the years, it has been used in telephones, intercoms, PA systems, and hearing aids, and has lately found a home in high-end earphones, where its small size, fine-tunability, horn-like transient speed and low inertia, and ultra-high efficiency are considerable plusses. **JV**

W60

“The W60 is a marvel of ergonomic design...The real story here, however, centres on the sound, which offers uncannily natural tonal balance, finely resolved details, and disarming subtlety—all offered up in an almost self-effacing way. The W60’s compelling charms grow on listeners slowly but surely, gradually leaving them spoiled for anything else.”

— Hi-Fi+ Magazine

Tech Specs

Sensitivity	117dB SPL @ 1mW
Frequency Response	5 Hz - 40 kHz
Impedance	25 ohms @ 1 kHz
Passive Noise Attenuation	25dB
Driver	Six balanced armature drivers with three-way crossover



Westone
westoneaudio.com

Our Top Picks Headphones

HiFiMan HE400S

\$299

If you're into planar-magnetic cans but thought power requirements and price limitations might put the damper on a purchase, think again. The smart hi-fi men at HiFiMan of Hong Kong have figured out how to deliver the sonic benefits of planar technology in a high-sensitivity (98dB), low-impedance (22 ohms) headphone that isn't power-hungry. Guess what else? This means the HE400S can even be driven by *your smartphone*—a rarity among planar headphones. No amp required. The HE400s delivered a degree of detail and spaciousness that blew JM away when she listened to vinyl via the petite but powerful PS Audio Sprout integrated (elsewhere on this list). The HE400S' performance was quite literally startling in its imaging and staging: JM actually jumped when she heard a voice (on a recording) that sounded as if it were coming from behind her. How's that for presence and realism? What's more, these lightweight, comfy cans are also realistically priced at \$299—among the least expensive planar 'phones on the market. Great sounding, and a great value. hifiman.com (261)

PSB Speakers M4U 2

\$399

The M4U 2 was designed and developed by PSB's illustrious founder Paul Barton and words can scarcely convey what a magnificent first effort it represents. The M4U 2 is arguably one of the cleverest, most well-thought-out, and best-executed headphones on the market—a true "headphone for all seasons." For starters, the M4U 2 exhibits wonderfully extended and neutral tonal balance with a voicing curve that deliberately adds a touch of bass lift designed to precisely emulate the low-frequency "room gain" most speakers enjoy. Next the M4U 2 offers very good, though perhaps not quite class-leading, levels of clarity and dynamic swagger. And to top things off, the M4U 2 is an active noise-cancelling headphone that has three operating modes: a high-sensitivity Passive mode (that actually sounds very good), an Active mode without noise-cancellation (for purists), and an Active Noise Cancellation mode that works very well to suppress background noise. If you only plan on owning one headphone for all possible listening contexts, strongly consider this one. psbspeakers.com (*Playback*, 59)



Oppo PM-3

\$399

The Oppo PM-3 uses the same basic technology as the PM-1 and PM-2 with its sound emanating from a seven-layer planar diaphragm made from double-sided spiraling coils of flat aluminum conductors. Via a double-sided diaphragm, the magnetic field is populated with twice as many conductors as a single-sided diaphragm. This dramatically increases the headphone's sensitivity and ability to withstand higher drive forces. Combined with Oppo's FEM optimized magnet system, which employs high-energy neodymium magnets, the Oppo PM-3 achieves a 102dB sensitivity. It's comfortable, extremely well made, and cleverly designed. Couple it with one of the new generation of portable players such as the Astell& Kern AK Jr, and for under \$900 (\$500 for the AK Jr and \$399 for the PM-3) you have a portable rig that will keep you enthralled for as long as the batteries last. oppodigital.com (256)

Our Top Picks Headphones



Oppo PM-1

\$1099

Oppo's is the only planar-magnetic headphone design that uses a double-sided diaphragm made up of seven layers of material. The diaphragm also has a spiraling pattern of flat conductors etched into both sides. Using both sides increases the headphone's sensitivity, provides better damping, and ensures greater consistency of drive force over the entire surface of the diaphragm. Because the PM-1 has a sensitivity of 102dB/1mW and a nominal impedance of 32 ohms, the power amplifier in any smartphone, tablet, or portable music device can drive it easily without the need for an additional external dedicated headphone amplifier. This differentiates the PM-1 from the vast majority of other premium headphones. Oppo's PM-1 take the prize as the best all-around general-purpose cans SS has ever

used, even though they are not the best performers in any particular category. A great "all-rounder" that will certainly appeal to any audiophile who only wants to own a single great pair of headphones. oppodigital.com (248)

Audeze LCD-X

\$1699

If you're looking for the state of the art in personal listening, look no further than the Audeze LCD-X's. These planar-magnetic 'phones have extraordinarily wide and even frequency response, which extends from below 20Hz to far beyond 20kHz, and even at very loud levels they have very low distortion. Infinity co-founder and hi-fi legend Arnie Nudell, who reviewed the LCD-X for TAS, wrote: "It is my opinion that the LCD-X can compete with all of the very best high-end loudspeakers." That's a startling conclusion coming from the man who designed the Infinity IRS, one of high-end audio's most iconic loudspeakers.

audeze.com (249)



Music Friend In My Pocket

AK70



Astell & Kern www.AstellnKern.com

AK70 with AK T8iE MkII

Our Top Picks In-Ear Monitors



Cardas EM5813 Ear Speaker

\$425

After years in development Cardas' EM5813 Ear Speaker has arrived, and it was worth the wait. The Ear Speaker features vented, polished, copper-plated solid brass earpieces housing a single, high-performance dynamic driver and, as you might expect, uses Cardas Clear Light-type signal cables. The Ear Speaker offers a remarkably big, full-bodied (some might even say "seductive" or "voluptuous") sound that is very high in resolution and that offers superb cohesiveness. Easily one of the best performers in its class, the only drawback here is the fact that EM5813's come with a pretty limited set of ear tips and therefore fit some users better than others. cardas.com (239)



Westone W60

\$999

The Westone W60 is the flagship of the W series of in-ear monitors. It is a six-driver system with three crossovers, comprising two drivers each for the treble, midrange, and bass. As with all Westone designs the driver technology is based on balanced armature. Along with five different sizes of Westone's patented STAR silicone ear tips, you'll find five different sized True-Fit foam ear tips. The W60 is very smooth with a wide frequency response. The midrange is refined, and compared to some headphones might be considered ever so slightly recessed, especially in the upper midrange. It has a well controlled, extended, and smooth frequency response with detailed low bass and an extremely wide soundstage. westone.com (Review premiere on p. 71)



Astell&Kern AKT8iE

\$999

How much can a company grow with only one product category? So, Astell&Kern expanded into earphones. Currently A&K has six universal-fit Jerry Harvey-made in-ears, two in-ears from Final Design, and two earphones from Beyerdynamic, the full-sized over-ear AK T1P and the AKT8iE universal-fit in-ear monitor. The AKT8iEs' most outstanding sonic attribute is undoubtedly their wonderful bass, which will appeal to both EDM fans as well as any classical listener who's into pipe organs. The AKT8iEs go deep, cleanly without bloat, and they do so with dynamic acuity. After their killer bass, the AKT8iEs' second outstanding sonic trait is their cohesive, three-dimensional, and exceedingly specific soundstage. While the AKs do not produce the biggest stage, their dimensional precision is exemplary. Once you obtain an optimal fit, the T8iEs perform on a level that closely approaches the best SS has heard from any headphone technology, including custom in-ears and full-sized reference headphones. astellnkern.com (Review premiere on p. 68)



Ultimate Ears PRM

\$1999

Ultimate Ears \$1999 in-ears are distinctive in two major respects. First, they are specifically made to fit your ears—and yours alone. (When you order a pair of PRMs you have to visit an audiologist and have him or her make thermo-plastic molds of your ear canals and outer ears.) Second, you must eq your PRMs for your own hearing or your own taste. The results of all this customization are amazing. Driven by Chord's fabulous, battery-powered Hugo headphone amp and DAC, which JV raves about elsewhere on this list (as if it needs another rave), the PRM is simply a superb high-fidelity transducer that, thanks to its perfect fit and unique voicing (designed for and by you—and you alone), will please your ears more completely and enjoyably than any other in-ear out there. There is a reason why so many performers use these things on stage and in studios. The PRMs let them hear themselves the way they want to be heard—and let you hear music the way you want to hear it. customsales@ultimateears.com (253)

Equipment Report

Sony NW-ZX2 Digital Media Player

High Performance On The Go

Steven Stone

When Apple discontinued its 160GB iPod Classic portable music players, a funny thing happened: Their prices on eBay doubled overnight. And while many tech-pundits see dedicated portable players as an ergonomic dead end (supplanted by ubiquitous smartphones), crowd-funded sales in excess of \$3 million for Neil Young's Pono player demonstrate that music lovers still have a healthy appetite for dedicated portable media players.

Sony, which created the first "Walkman" portable player, has been involved with portable audio since its inception, but recently has not been as dominant in the market as it was in the early days. That could change with its latest offering, the NW-ZX2. Priced at \$1199, this Android-based player can handle any commercially available music file including DSD128, plus it also plays videos from YouTube, Hulu, and Facebook. The NW-ZX2 has WiFi and Bluetooth support. In short, the new NW-ZX2 does virtually everything an Android-based smartphone can do except make and receive phone calls. And it sounds much better than any smartphone I've heard.

Tech Tour

Instead of an oddly shaped or "look at me, I'm different" case, the Sony NW-ZX2 is conventionally phone-shaped, measuring approximately 2 1/2" by 5" by 1/2". Most of its front panel is a 2" by 3 1/2" touchscreen. The NW-ZX2's enclosure has a matte-black anodized finish with just a hint of texture, making it easier to hold than early iPhones with a mirror finish. The back of the NW-ZX2 is inset with textured genuine leather that further enhances its grip-ability. Ever since my first iPod Touch lasted exactly 30 minutes before it jumped out of my shirt's breast pocket and into the toilet, I've valued players with less slippery surfaces that remain in pockets even when gravity nudges them in other directions. The Sony NW-ZX2 feels secure in my hands (or pockets) due to its shape and thickness. Weight-wise, it achieves a happy medium between being neither too heavy (like the Sony PHA-2 DAC/amp or Colorfly C4 portable player) nor too light and unsubstantial like an iPhone 5. No amount of time in your thigh pocket will bend or otherwise alter the NW-ZX2's case.

Sony has incorporated a number of new technologies into the NW-ZX2. First and foremost is its use of supercapacitors to enhance

power output capabilities. According to a Sony technical paper, a supercapacitor can augment a Class D power amplifier's peak power output by over three times! This makes it possible for the NW-ZX2's headphone amplifier to produce quite a bit more power during dynamic peaks. Also, the supercapacitors increase battery life by relieving the battery of some of the peak-power demands that can reduce its reserves.

The NW-ZX2 employs two crystal clocks. Sony's previous (but not distributed in the U.S.) player, the NW-ZX1, could only do 44.1, 88.2, and 176.4kHz natively, but the ZX2 adds 48, 96, 192kHz native rates, as well as native DSD64 and DSD128.

The NW-ZX2's chassis is constructed of solid aluminum. The interior of the chassis is lined with gold-plated copper to reduce noise and improve isolation between electronic subsections. Other "tweaks" include use of high-purity solder and MELF capacitors in the analog output stage. These high-cost metal-electrode caps are usually only found in custom-tweaked or megabuck components, and are currently the best parts of their kind available. The NW-ZX2 also employs seven Os-Con caps, three in power filtering and four in the analog circuit.



Ergonomics

Anyone who has spent any time with an Android-based phone or tablet (such as the Sony Xperia) will find himself right at home with the NW-ZX2. Upon startup you will be greeted by that swoopy Android graphic and

Equipment Report Sony NW-ZX2 Digital Media Player

unlock screen. Once unlocked with an upward swipe (if you choose not to use the password lock), the NW-ZX2 will display its home screen, including whichever app you had open when you last used the device. The NW-ZX2 comes with "Play" as the primary music app. It looks very much like the music app on Sony's HAP-Z1ES full-sized digital player and includes many of the same features, including SenseMe mood channels, playlists, and multiple view options.

Through Google's "Play Store" you can acquire additional apps. I added Tidal as well as Oppo's HA-1 remote-control app. With the preloaded Google Chrome browser you can do anything that you would do with a web-enabled smartphone, including watching videos, logging into Facebook, or reading e-mail. You can also set up the NW-ZX2 so it can instantly access your Gmail account. The only limitation is that the NW-ZX2 needs access to a WiFi hotspot to enable all this space-age connectivity—it has no other way to directly access Web-based content.

If you use and like the Android operating system, you will be very comfortable with the NW-ZX2. But if you are an Android newbie, there will be a learning curve. My review unit arrived without any instructions (it was only the second one in the U.S.), so I had to fly blind during my initial listening sessions. Except for a minor panic attack when I managed to mute the NW-ZX2's outputs (I un-muted it somehow and haven't had the problem since), I had no operational issues with the NW-ZX2. I've gone back and forth, playing tracks from Tidal, then Sony's Play app, then YouTube vids via Chrome with no hang-ups or inordinately long delays

between selections. Also I could field e-mail and surf the Web while listening to music with no hiccups. After several weeks of use, the NW-ZX2 and its Android OS have proven to be stable and reliable.

The only notable operational issue I experienced with the NW-ZX2 was when I disconnected it from my MacPro desktop computer. If you merely click "disconnect" from the NW-ZX2's screen, instead of first moving the NW-ZX2's icon from your Mac desktop to the trash, you can corrupt the contents of any micro-SD card mounted in the NW-ZX2. This happened to a 32GB card, and it took me almost two hours of copying to repopulate it fully. To avoid this catastrophe, I suggest following Apple's "best practices" and getting in the habit of always moving USB icons to the trash (or virtually "ejecting" them) before disconnecting the physical device itself.

If you use and like the Android operating system, you will be very comfortable with the NW-ZX2.

One particular ergonomic area where the iPod Classic long excelled was "blind" in-pocket use. As much as I love touchscreen-controlled devices, they are virtually impossible to use or navigate by touch alone. The iPod Classic's selector-clickwheel still rules when it comes to on-the-go use. And while the NW-ZX2 does have dedicated navigation buttons on one side, when it's in screen-save mode (with the screen

blacked-out), only the pause and skip-forward and skip-back buttons are active. If you want to adjust the volume you will have to push the unlock/power button or pause button, and then you can adjust the volume by using the up/down buttons located below the power button. With some practice you can probably do this while the NW-ZX2 is still in your pocket and still in its leather case. If you use the shuffle mode and have a wide variety of music with differing "average" volumes, you may find yourself needing to adjust volume "on the fly"; here, the NW-ZX2's push-push scenario for volume adjustment is a less-than-optimal solution. Of course, you could activate the NW-ZX2's automatic volume "leveling," which will adjust all your tracks to have similar max volume levels. But for most listening situations where I could manually adjust my levels, I preferred leaving this auto-volume adjustment feature set to off.

Importing music from my music library from my Mac to the NW-ZX2 was as simple as drag-and-drop. According to the owner's manual, the NW-ZX2 will support up to eight layers of sub-folders, so you won't have to change your folder hierarchy to bring music into the device. The combination of the NW-ZX2's 128GB internal storage and its micro-SD card slot (which will currently support up to a 128GB card) gives the ZX2 a maximum storage capacity of 256GB (but remember some small part of this storage is delegated to the OS). Although not enough storage for an entire mature music library, it is certainly large enough to supply music for several long vacations. And if you insist on bringing your entire music library with you, no matter where you go, the NW-ZX2 supports

any number of additional micro-SD cards, so nothing except your budget prevents you from acquiring a sufficient supply to hold all your music.

Although populating the Sony NW-ZX2 is simple and reliable, it's not exactly a hands-free operation. So it's a nice touch that the NW-ZX2 offers a desktop app called Sony Media Go that's similar to the HAP-1 app for the Sony HAP-Z1ES. Although it's only compatible with Windows-based PCs, it allows users to set up a system that regularly transfers new music to a NW-ZX2 device from their main library and manages these files automatically.

One of the best features of the iPod Classic (and other iPods) was the way it easily integrated with the entire iTunes ecosystem, both on- and off-line. The Sony NW-ZX2 has a leg up on many other manufacturers' current portable players because it also integrates into a larger digital eco-system, except from Google instead of Apple. Is Google's virtual world as slick and well integrated as Apple's iTunes, App store, and iTunes library match? Nope. But Sony's choice of Google's open Android operating system does allow for a potential level of flexibility, device customization, and functionality that can't be matched by any completely Apple-centric portable device.

Battery life ranks as one of the performance parameters that seems less important than sonics when shopping for a portable player, yet it often ends up being one of the principal complaints that new users have with their players. On paper the NW-ZX2 seems to have excellent battery life—60 hours playing MP3 files and 33 hours playing high-resolution files.

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However, in the real world my playing time was quite different. When I first received the player, I found that something was draining the battery even when the NW-ZX2 was in sleep mode—if the player sat for a day, the battery would be nearly dead when I turned the unit on. The only two apps I was using were “Play” and “Tidal,” but for some reason when one was stopped, the other would begin playing. After a couple of days this problem vanished. Why? Neither Sony’s engineers nor I could duplicate it again, so I have to chalk it up to “teething pains,” rather than an acknowledged and repeatable bug.

Sound

Back in the early years of high-performance audio, when Harry Pearson was developing his yin/yang sound paradigm, audio source devices were more harmonically and dynamically colored than they are today. Identifying whether a source device was warmer or cooler than neutral was easier then. Today, finding any current-production portable player that is archetypically “tube-like” or “solid-state-like” is nearly impossible. It’s not that every device sounds the same, but that the sonic differences among top-tier portable players are subtler. More often than not, the overriding sonic factor is how well their analog output stages interface with a pair of headphones rather than the “voicing” that the manufacturer has added to the player’s sound. During the review I used the NW-ZX2 with a wide variety of headphones. Regardless of their type or price, the ‘phones themselves varied from neutrality far more obviously than any of the top-tier portable players I compared with the NW-ZX2.

In my experience the principal reason that a portable music device doesn’t perform up to its full sonic potential is a mismatch between the device’s headphone amplifier and the headphones connected to it. With sensitive in-ear monitors, some portable devices have a continuous hiss or hum because the amplifier isn’t quiet enough or delivers too much gain. Conversely, many portable players lack enough amplifier power to drive low-sensitivity, high-impedance, full-sized headphones to satisfying volume levels. The Sony NW-ZX2 proved to be among the more “headphone-friendly” portable players I’ve tried, in that it supported a wide range of headphone sensitivities.

Given that the NW-ZX2 is a portable device, I think it’s safe to assume that more often than not it will be paired with in-ear monitors, which are generally higher in sensitivity than full-sized, over-ear cans. With my most sensitive in-ears, the 115dB/1mW Westone ES-5 custom monitors, I could hear only the very faintest midband hiss when no music was playing. With any live music track, including my own live classical concert recordings, room noise masked this low-level hiss completely. Switching to the only-slightly-less-sensitive Jerry Harvey Roxanne in-ear monitors I heard nothing but silence, even during the spaces between cuts. Other in-ear monitors I tried, including the Ultimate Ears In-Ear Reference Monitors, Cardas EM5813, and Etymotic 4Ps, were all dead quiet and able to play well above my maximum high-volume comfort zone.

With the far-less-sensitive 90dB/1mW HiFiMan HE560 full-sized earphones, the NW-ZX2 delivered enough power to drive them to

satisfying volume levels on any commercial release I tried. With my own live recordings, which have on average -5dB lower volume levels, I would have preferred a bit higher output levels. Switching to a pair of even-less-efficient cans—the Beyerdynamic DT-990 600-ohm version—resulted in lower-than-ideal maximum volume levels, even on standard commercial releases. If you must use something with extremely low sensitivity and high impedance, you may need to employ an additional external headphone amplifier such as the new Sony PHA-3 (which can drive the DT-990s to well above satisfying levels even with my own lowest-level recordings).

With the U.S.-made Grado RS-1 headphones—longtime audiophile favorites—the NW-ZX2 delivered more than adequate volume with every music file in my library. Although the Grados aren’t that difficult to drive, they do need an amplifier capable of some power to sound their best, especially when it comes to bass control. Through the NW-ZX2, the RS-1’s bass took on a slightly woolly character that lacked some speed and definition compared to the Oppo HA-1 or Woo Audio WA-7 “Fireflies” desktop headphone amplifiers. The RS-1’s upper midrange through the NW-ZX2 was also a trifle more prominent than with either of the two desktop headphone amplifiers.

One of the best full-sized headphone pairings with the NW-ZX2 was the new \$199 group-buy AKG K7XX headphones from MassDrop. In addition, this version of the venerable K-701/702 design had a better fit due to slightly softer earpads, and its neutral sound signature mated nicely with the NW-ZX2. The

SPECS & PRICING

Memory capacity: 128GB

External memory: Micro-SD (card not included)

Key features: High-resolution audio playback, S-Master HX digital amplifier, DSEE HX (Digital Sound Enhancement Engine), ClearAudio+, Clear Bass, equalizer, VPT, one-touch listening via NFC and Bluetooth connectivity

Compatible audio formats: MP3, WMA, FLAC (192kHz/24bit), linear PCM (192kHz/24bit), WAV (192kHz/24bit), AAC-LC, HE-AAC, Apple Lossless (192kHz/24bit), AIFF (192kHz/24bit), DSD (2.8MHz, 5.6MHz)

Battery life: MP3 up to 60 hours

Charging time: Approximately 4.5 hours

Operating platform: Android 4.2

Display: 4-inch FWVGA (854 × 480) TRILUMINOS Display for mobile

Communication mode: WiFi (IEEE 802.11b/g/n/a)

Bluetooth: Bluetooth (A2DP/AVRCP/OPP/HID/SPP)

Accessories: USB cable, leather carrying case, spacer (headphones not included)

Dimensions: 65.1mm x 131.2mm x 18.5mm

Weight: Approximately 235g

Price: \$1199

Sony Electronics Inc.

16530 Via Esprillo
San Diego, CA 92127

Equipment Report Sony NW-ZX2 Digital Media Player

upper frequencies were lively and well defined without sounding grainy or hyper-articulated. The bass response of the K7XX, which is 3dB higher than that of the original K-701 according to AKG, mated well with the NW-ZX2, giving the K-7XX more warmth and musicality than the original version.

The other standout full-sized headphone pairing was the Oppo PM-1 fitted with PM-2 earpads. The PM-1 is among the easiest-to-drive and most universally device-friendly, full-sized, over-ear headphone currently available. As you might guess, the NW-ZX2 had no trouble driving the PM-1s well past most normal-humans' comfort level, and this combination resulted in a sense of dynamic effortlessness that is rare in portable players. Also, the NW-ZX2's built-in five-band eq allows users add a touch more high-frequency emphasis to the PM-1 at 2.5kHz and 6kHz.

I could clearly hear the increased fidelity from the NW-ZX2 compared to my iPhone 5.

Besides the five-band eq, the NW-ZX2 also has some additional "sound-shaping" controls. Although Old School audiophiles largely eschew eq adjustments, headphone enthusiasts often employ "frequency curves" to modify the sound of their cans. You may or may not find the NW-ZX2's additional sonic modifiers of value, depending on your tastes. Under "Sound Adjustment" there is "Surround Sound," which has five options: off, studio, club,

concert hall, and matrix. While I'm sure there are some tracks that will benefit from these DSP modifiers, I used "off" 99.9 percent of the time. The NW-ZX2 also includes something called "Dynamic Normalizer," which reduces the differences between output levels of tracks. While I can see where this could be of value in certain situations, again I left this off for most of my listening.

One sound enhancement I did find valuable was Sony's DSEE HX, which I have previously experienced on the Sony HAP-Z1ES music player. It works on all MP3 and lossy formats to improve high-frequency extension.

Obviously the NW-ZX2 (\$1,199) has some serious competition—principally from Astell&Kern's AK100 II (\$899) and AK120 II (\$1499), Calyx Audio's M player (\$999), as well as Sony's own, more affordable A17 Walkman hi-res player (\$299). Although I did not have the A17, AK100 II or AK120 II on hand, I did have the AK240 (\$2495) and Calyx M. For sonic comparisons I used Tidal and my own high-resolution DSD128 recordings. Headphones for the comparison included both high-sensitivity in-ears, such as the Westone ES-5, Jerry Harvey Roxannes, and Ultimate Ears In-Ear Reference Monitors, as well as lower-sensitivity full-sized headphones, such as the HiFiMan HE560, Audeze LCD-2, Mr. Speakers Alpha Primes, Beyerdynamic DT-990 600-ohm version, and the Oppo PM-1.

With all three players—the Astell&Kern AK240, Calyx Audio M, and Sony NW-ZX2—the headphones had more pronounced colorations and sonic personalities than any of the players. Of the three, the Calyx M delivered the most

drive for difficult headphones, such as the Beyerdynamic DT 990 600-ohm. Also when coupled to the Mr. Speakers Alpha Prime headphones, the Calyx had slightly more low-bass extension, giving electronic dance music a bit more throb. All three delivered hiss-free sonics with most 115dB sensitive in-ears (but the Sony did have a slight hiss with the Westone ES-5).

Listening to the same stream of Justin Townes Earl's latest album *Absent Fathers* from Tidal, I could clearly hear the increased fidelity from the NW-ZX2 compared to my iPhone 5. With my AKG K-7XX headphones the music had a larger soundstage through the NW-ZX2, greater three-dimensionality, and a more natural and organic harmonic balance. The upper midrange was less "splitchy," and lacked the slightly brittle character in the upper midrange that I heard through the iPhone.

Moving up the price ladder, when I compared my own live recordings played through the NW-ZX2 with the Calyx M, the differences were much less pronounced, and with some headphones the differences between these two players' sonic signatures were nil. As I mentioned earlier, the Calyx could and did drive my most difficult-to-drive headphones better than any other portable player I've used, so the Calyx had an edge there. But with less demanding headphones, the sonic differences were so slight that many times in my own A/B tests I could not reliably tell one from the other.

Pitting the Sony NW-ZX2 against the twice-as-expensive Astell&Kern AK240 player was, for me, a sonic dead-heat. Hard as I tried, using the most revealing headphones and in-ear monitors, I could not detect any readily



identifiable sonic differences between the two players when all the sonic shape-changing modifiers in both players were turned off. Once I activated any of the NW-ZX2 or AK240's filters, EQs, or soundfield settings, I could reliably tell which was which.

Equipment Report

As for which is “better” or “the best” portable player...for most users it will probably come down to features, ergonomics, and which player’s operating system is more in tune with a prospective buyer’s own preferences. For some purchasers, Sony’s Android OS may be a bit too busy or feature-laden; for others, the AK240’s two-way streaming may be redundant. Obviously, Sony has an edge price-wise, but Astell&Kern also offers its less expensive (and comparably priced) AK120 II and AK100 II players.

The NW-ZX2 reestablishes Sony as one of the preeminent manufacturers of portable audio playback devices.

I compared the NW-ZX2 with my (now-discontinued) first-generation Astell&Kern AK100. With higher-impedance headphones the NW-ZX2 did a much better job of retaining dynamic drive and bass control. With higher-sensitivity in-ears the sonic differences between the two players were much less pronounced. I still preferred the NW-ZX2 with higher sensitivity in-ears, but its advantages were primarily in soundstaging and dimensionality. (The Sony consistently produced a larger soundstage with greater separation among instruments and a more pronounced sense of three-dimensionality.)

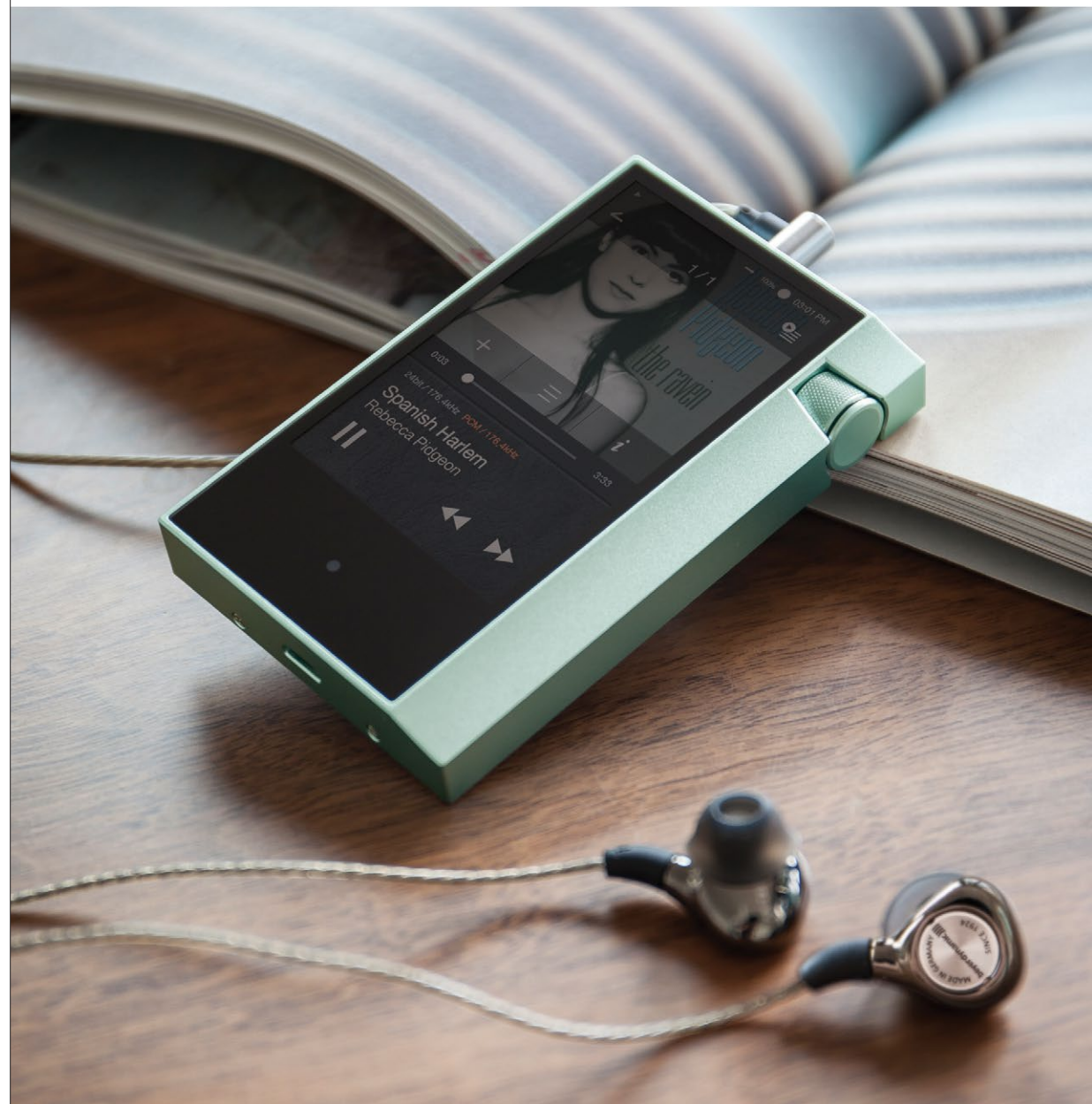
For a final A/B listening test, I compared the Sony NW-ZX2 with the Oppo HA-1 desktop

DAC/headphone amplifier. With similar prices, the two have some overlapping capabilities such as being able to play Tidal streams. When I compared their sound on the Tidal stream of Joshua Radin’s latest album, *Onward and Sideways*, I found the two produced equally excellent sonics, capturing the intimate quality of Radin’s vocals and the gutty edge of his fingerpicked acoustic guitar. Both produced equally large soundstages with similar dimensional characteristics. I could live happily with either.

Wrap-Up

Looking at 2015 CES press coverage, I saw many tech journalists and bloggers writing that the NW-ZX2 was “the return of the Walkman,” which is less than entirely true. Sony has been making portable players continually since its first Walkman cassette player appeared in 1979. What has changed is that the company now offers the A17 Walkman along with the NW-ZX2, Sony’s first cost-no-object digital player designed to challenge premium players from other companies. The NW-ZX2 reestablishes Sony as one of the preeminent manufacturers of portable audio playback devices. And, yes, Sony has succeeded masterfully in achieving its design goals—the NW-ZX2 delivers excellent sound, plays any digital format thrown at it, and looks, feels, and responds like a high-performance product should. If you had any doubts about Sony’s commitment to high-quality audio, the NW-ZX2 should put them to rest. **tas**

Music Friend In My Pocket AK70



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, Pricy." 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 ACG. "The basic operating method is the same as the balanced mode, but ACG uses technology to even more forcefully fix grounding standards...output volume is the same as the regular single-ended operation, however."

Equipment Report Onkyo DP-X1 Portable Music Player

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 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 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



Equipment Report Onkyo DP-X1 Portable Music Player

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-conductor XLR from Moon Audio. With the adapter installed I tried all the headphones in my collection that use balanced connections. These included the HiFiMan HE-560, Sennheiser HD700, Grado RS-1, Audeze LCD-2.2, AudioQuest Nighthawk, and Mr. Speakers 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 Mr. Speakers 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 Mr. Speakers 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**

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/DSD-IFF/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

Astell&Kern AK380 Portable Music Player

The Summit Just Got Higher

Alan Taffel

What began as a single, brilliant, high-end portable music player—one that created the category virtually singlehandedly—has morphed into a broad line of offerings. Astell&Kern wants to make its products accessible to a wide range of consumers, from high-end neophytes to grizzled, uncompromising audiophiles. Recently, the company expanded its already-broad model range in both directions.

At the entry level is the new AK Jr, which brings A&K just barely into the under-\$500 range. On the other end of the spectrum, the AK380 takes its place as the brand's new flagship. The previous top dog, the AK240, remains in the lineup. The latter player raised eyebrows with its then unheard-of \$2499 price tag. But Astell&Kern wasn't cowed and/or the AK240 met with strong market success, because the new AK380 goes for a whopping \$3499. Pony up \$3999 if you'd like yours in copper.

That's a whole lot of money for a portable player, but the more deeply you look at the AK380, the more its price seems justified. I'll get to that shortly, but first let's have a look at what the AK240 and AK380 have in common. Both have large touchscreens (the AK380's is

slightly larger) encased in aircraft-grade Duralumin bodies clad in custom-fitted leather. Both are oversized compared to, say, an iPod Nano or a Sony Walkman, but both feel substantial and swanky in the hand. Inputs and outputs are identical: There are ports for micro-USB, standard headphones, and balanced headphones. Feature-wise, both units feature dual DACs for better channel separation, native DSD with no interim PCM conversion, MQS support, streaming over WiFi or (heaven forbid!) Bluetooth, a 20-band parametric equalizer, and 256GB of internal memory that's expandable by 128GB via a microSD chip.

Clearly the AK240 was already a richly featured device. Seems as if there wouldn't be much to add, doesn't it? But the AK380 goes the AK240 quite a bit further. Most immediately obvious is the new touchscreen. Aside from a bump in size from 3.31 to 4 inches, the new player trades an AMOLED display for WVGA. The difference is instantly apparent. The new flagship's screen is brighter, sharper, and more colorful. Meanwhile, in terms of connectivity, the AK380 adds aptX Bluetooth. Trust me, if you're going to use Bluetooth, aptX is the way to go.

But the most significant changes for the AK380

are deep inside. First and foremost is the switch from dual Cirrus Logic CS4398 chips to dual AKM AK4490's. Aside from any sonic benefits, which are evaluated below, the shift enables the AK380 to support resolutions all the way up to 384/32 (the AK240 topped out at 192/24) and DSD256 (versus the AK240's DSD128). Most users won't need the AK380's extra resolution now, but it's if and when broadly available source material evolves to that level.

The AK380 goes yet another step further by pairing the new chipset with a high-precision VCXO (Voltage-Controlled Crystal Oscillator) clock. The clock module has a jitter rating of just 200 femtoseconds (a femtosecond is a quadrillionth of a second, or 10^{-15}), which in turn reduces the AK380's overall jitter to just 30 picoseconds—roughly half that of the AK240. And just to make sure the new chip/clock combo can devote all its resources to sonics, peripheral functions like the parametric eq are offloaded to a new dedicated DSP chip.

If you're getting the impression the AK380 is a very serious piece of equipment, you're right. And bristling as it does with so much advanced technology, it would seem a shame to use the AK380 solely to play music through a set of cans.



Astell&Kern certainly thinks so. Which brings us to what I consider one of the AK380's most significant features: extensibility. Unlike nearly all others of its genre, the AK380 is not necessarily a standalone device. Rather, it can serve as the center of an entire ecosystem. If you need to drive low-sensitivity headphones, slap a module called AMP (\$699) right onto the back of the unit. AMP has its own battery pack, so it doesn't shorten playing time, and seamlessly integrates with the AK380 both physically and functionally. No interconnect necessary, no dueling volume controls. Astell&Kern also offers the AK CD Ripper (\$349). Although it's a physically separate unit, the AK CD Ripper, like AMP, is plug-and-play.

Equipment Report Astell&Kern AK380 Portable Music Player

Now comes my favorite of these functionality extenders: the AK Cradle (\$349). When nestled into the aluminum-bodied Cradle, the AK380 suddenly becomes not a portable player but a high-end streamer/DAC front end for a high-end audio system. You know, the kind that is installed in a listening room and doesn't move. What the Cradle adds that self-contained portable players necessarily lack is a set of high-grade, balanced XLR outputs. The Cradle also powers the AK380, which means that if you run it in conjunction with the AK Connect app for your smartphone or tablet, you can leave the cradled player untouched and use it just as you would any other digital front end. The CD Ripper can also be directly linked to the Cradle, completing the scheme.

Needless to say, all the attention A&K has lavished on the AK380's build-quality, features, technology, parts, and extended functionality would be pretty much moot, especially at its elevated price, if the unit didn't sound the part. Admittedly, I was skeptical on this point. I thought the original AK100 was a landmark in both design and sonics. In my review of that unit, I compared it with a fifth-gen iPod Classic—the best of its breed—and there was simply no contest. I didn't see a lot of room for improvement—until I heard the AK120. The subsequent Mark II versions of these models sounded even better, much to my surprise. Then came the AK240, and I finally felt I'd reached the summit in personal player sound. Honestly, I had zero complaints.

But the AK380 has once again bushwhacked me. It stretches the boundaries of what's sonically possible from a personal player in a way I never imaged possible. For instance, with the

AK380, instruments exist in a field of air, as they do on a well dialed-in dedicated system, and in real life. These air pillows are missing on the AK240. But the air around instruments is merely one example of the AK380's greater transparency. The ability to draw more detail from the bits also manifests itself as richer timbre—for instance on brass and string bass—that makes instruments more lifelike. Previously hidden details, such as the decay of reverb, become easy to hear.

The AK380 is also "faster"—that is, notes start and stop more quickly—than the AK240. This gives it the ability to trace rhythms more accurately. Consequently, beats are tighter and more infectious through the new flagship. This is true not only with rock but with material like chamber music, which relies on less overt sources of rhythm. Through the AK380, you can definitely tap your feet to a chamber quartet or octet (try the Dvořák *Serenades* on Praga), and you can more easily pick up on rhythmic variations such as syncopation.

With each succeeding generation of AK players, Astell&Kern has managed to lower the noise floor. This has the obvious benefit of a more relaxed listening experience, but there is another, equally important advantage. With a lower noise floor, instruments not only stand out from the background, they stand out more clearly *from each other*. Even compared to the already quiet AK240, the AK380 is better at allowing each instrument to be heard more distinctly. Once more, it's not necessary to enlist complex music to hear the difference. Even on something as uncomplicated as a jazz trio, the AK380 better conveys what each player is up to,

as well as the sound of his specific instrument.

The final distinction wrought by the AK380 is superior spatiality. The new flagship exhibits tight (but never edgy) imaging and an extremely wide soundstage. I suspect this is due to better channel separation. Whatever the cause, material such as the HDtracks 192/24 version of Led Zeppelin's "Whole Lotta Love" becomes mind-expanding.

Since the AK380 can also serve as a music streamer (in either portable or cradled mode), I wanted to test the quality of its sound in that regard. It's been my unfortunate experience that many otherwise excellent digital source components fall down when asked to stream. This is especially true for wireless streaming, which is the only type the AK380 supports. One encouraging sign, though, was that the AK380 supports DLNA (Digital Living Network Alliance), a rigorous protocol for exchanging media files between servers (such as a NAS drive) and clients (in this case the AK380).

So I proceeded to compare the sound of the AK380 when streaming over WiFi versus playing directly from its internal memory. What I found was that the difference is nearly impossible to hear—a welcome and astonishing result. If I listen *hard*, I can detect a slight veiling of voices when in streaming mode. Norah Jones, who is always recorded in such a way that her voice comes across intimately, sounds subtly less "there" when streaming. But that's about it. As it turns out, the AK380 sounds great regardless of how it's accessing music.

With the AK380, Astell&Kern has created a flagship that transcends the genre of audiophile-quality portable players. Never, to my

SPECS & PRICING

Display: Four-inch WVGA touchscreen
Supported audio formats: WAV, FLAC, WMA, MP3, OGG, APE, AAC, ALAC, AIFF, DFF, DSF
Maximum input rate: 384/32, DSD256
Battery: 3400mAh 3.7V Li-Polymer
Outputs: Phones (3.5mm), optical (3.5mm), balanced (2.5mm, 4-pole)
Memory capacity: 256GB plus 128GB microSD
Wireless: 802.11 b/g/n (2.4GHz), Bluetooth V4.0 (A2DP, AVRCP, aptX)
Supported OS: Windows XP, 7, 8, and 10; MAC OSX 10.7 and up
Dimensions: 3.14" x 4.42" x .70"
Weight: 8.11 oz.
Price: \$3499

ASTELL&KERN

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astellnkern.com

knowledge, has such a device incorporated features and parts comparable to those found in the best high-end components. And never, in my experience, has a portable device delivered sound so uncannily similar to that of the best high-end systems. But the AK380 goes beyond delivering superb sound. Thanks to a set of clever peripherals, this player can serve as the digital front end in any audio system. Combine all that with generous storage, a large, bright display and next-generation resolution, and the AK380 becomes the portable player to beat. **tas**

Our Top Picks Portable Players



Astell&Kern AK Jr \$299

The AK Jr is only 4.5" by 2" and 3/8". It will slip easily into almost any pocket you choose, except for the change pocket of your jeans. 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. Configured around a single Wolfson WM8740 DAC, it supports up to 192/24 PCM as well as DSD64 via conversion to PCM. The beauty of the AK Jr is that it can work with a wide variety of headphones without needing additional gear. 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 its size and its price. astellnkern.com (Review forthcoming)



Astell&Kern AK100 II and AK120 II \$699, \$1499

These portable players are best thought of as iPods on steroids. With their finely-brushed black aluminum cases and intuitive controls, they give up nothing to Apple in industrial engineering. But iPods max out at a tepid 48/16 resolution, whereas the AKs go to 192/24. The AK120 will even play DSD files! Sonically, these players simply stomp modern-day iPods and iPhones, which sound dull and dreary by comparison. Even on moderate-resolution material, the AKs deliver high-end qualities like timbral richness, airiness, detail, and pace. And once you have held hi-res in your hands, you will never settle for less. The AK120 boasts dual Wolfson DACs and twice the memory capacity (a precious resource when storing hi-res material) of the AK100. The flagship also has marginally more air, a smidge less grain, and stronger bass. Both players constitute wild successes, bringing true high-end sensibility and performance to portable music. astellnkern.com (236, 239)



Onkyo DP-X1 \$799

One of the latest manufacturers to toss its portable player's hat into the ring is Onkyo. Its DP-X1 offers a unique set of features and capabilities at a highly competitive price. The DP-X1 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 (except perhaps the Pioneer XDP-100R, if he were absolutely sure he would never, ever, need a balanced output). Reviewer SS 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. Recommended? Is that even a question? Onkyo has hit a home run that deserves two trips around the bases. onkyousa.com (Review premiere on p. 84)

Our Top Picks Portable Players



Sony NW-ZX2
\$1199

Sony, which created the first “Walkman” portable player, has been involved with portable audio since its inception, but lately has not been the dominant player it was in the early days. This could change with the NW-ZX2. This Android-based player can reproduce any commercially available music file including 128x DSD; plus, it also plays videos from YouTube, Hulu, and Facebook. It also comes with WiFi and Bluetooth support. The NW-ZX2 reestablishes Sony as one of the preeminent manufacturers of portable audio playback devices. And, yes, Sony has succeeded masterfully in achieving its design goals—the NW-ZX2 delivers excellent sound and looks, and it feels and responds like a high-performance product should. If you had any doubts about Sony’s commitment to high-quality audio, the NW-ZX2 will put them to rest. sony.com (252)



Astell&Kern AK240
\$1999

Hard to believe, but the Astell&Kern AK240 improves upon the already brilliant performance of its highly regarded predecessors. Like them, it brings true high-end performance to portable music. Finally, audiophiles can enjoy music at the sonic level they’re used to at home—without being anywhere near a reference system. Unlike iPods or iPhones, the AK240 can play high-res and even native DSD files, which can either be local or streamed across a network. That’s a distinct sonic advantage. Even with lower-res material the AK240 delivers resolution, timbral nuance, dynamic inflection, ease, and authority unheard of in other portable players. Compared to the AK100 and AK120, the AK240 boasts a significantly quieter background, greater purity, and even greater resolution. astellkern.com (248)



Astell&Kern AK380
\$3499

The AK380 is an expensive personal player, but the closer you look the more its price seems justified. A large, bright WVGA touchscreen is encased in an aircraft-grade Duralumin body clad in custom-fitted leather. There are dual AKM AK4490 DACs that deliver superior channel separation, native DSD with no interim PCM conversion, and resolution up to 384/32. Other features include MQS support, streaming over WiFi or Bluetooth aptX, a 20-band parametric equalizer, and 256GB of internal memory (expandable by 128GB via microSD chip). Yet this player is not necessarily a standalone device. When nestled into an AK Cradle (\$349), which provides power and balanced XLR output jacks, the AK380 transforms into a high-end streamer/DAC front end worthy of any high-end system. Sonically, the AK380 stretches the boundaries of what’s possible from a personal player. Through the AK380, instruments exist in a field of air, and their rich timbres are exceedingly lifelike. The AK380 is also “fast”; its ability to trace rhythms accurately results in tight, infectious beats. Happily, all this is true regardless of how the unit is accessing music, including streaming. With the AK380, Astell&Kern has created a flagship that transcends the genre of audiophile-quality portable players. astellkern.com (263)



Equipment Report

Aurender Flow DAC/Headphone Amp

Desktop Delight

Steven Stone

When I first laid eyes on the Aurender Flow, I didn't get it. Taken from its form-fitting leather case it looked like another portable player, albeit big and sorta on the heavy side. It also looked 90s-ish with a big ol' center knob, a wiggly curve to its chassis resembling a logo for a hydro-spa, and one lone single-ended headphone output. Paging Forrest Gump: We got your portable player, right here. But I was completely wrong.

First, let me make one thing perfectly clear, the Aurender Flow is not a portable player. It is, in fact, a DAC and headphone amplifier capable of being used as a preamplifier and external drive (if a drive is installed in it), that makes it ideally suited for nearfield high-performance desktop use. That large knob I mocked earlier... well, its size and feel make it one of the most accommodating volume knobs I've ever had the occasion to fondle while hunting for that ideal SPL.

Tech Tour

With its footprint measuring only 5½" by 3½" by 1", Aurender packs a lot of technology into the Flow's one-pound chassis. The DAC uses an XMOS USB interface and Sabre ESS9018K2M

chips, and has its own internal 4450mAh battery power supply. The Flow can handle any digital data stream up to 384/32 PCM and 128x DSD via USB and 192/24 PCM via its TosLink input. Although the Flow has only a single-ended ¼" 'phone-jack output, it can be configured in several ways. It can be variable output in 0.5dB increments up to 2 volts or you can configure the Flow for fixed output at either 2 or 5 volts. No, that was not a typo—5 volts. Output impedance is only 0.06 ohms.

The first time I saw the Flow I was confused by its m-SATA drive capability. You can add a drive to the Flow, and most people would assume it is for storing music to be played on it. They would be correct, but unlike a portable player where you could access the drive on the go, the Flow's drive can only be used when it is connected to a computer. But using an Apple camera connection cable, one can also access the contents of an iPad or iPhone.

In function, this is similar to the Auralic 2000 DAC/headphone stand that I reviewed in Issue 246. It, too, had provisions for tethering a drive that could only be accessed while the Auralic was connected to a computer. The difference is that the Flow holds the drive internally while

the Auralic uses external drives.

The Flow is the first USB DAC I've seen that is USB 3.0-compatible. If your computer only supports USB 2.0, no worries, the Flow has provisions within its menu for several different "host modes" optimized for various computer systems. The options include USB2, USB3, Mac, IOS, and Android.

The Flow also has user-selectable digital filters. For PCM it has, by default, a PCM1 filter (which is a slow roll-off, in-band filter), and a PCM2 (which is a minimum-phase PCM filter). DSD users have the option of moving the DSD cut-off filter from the default, DSD at 47.7kHz, to 50, 60, or even 70kHz. There are three charging options: CHG+ is constant charging mode; CHG- turns off the charger; and CHGA- configures the Flow for automatic charging whenever music is not playing.

Setup and Ergonomics

Unless you intend always to use the Flow as a fixed-output device, its ideal location should



be somewhere within arm's reach. Heck, even if you never intend to use its volume control, the Flow is much easier to operate when it's close to you, so you can see its display. Yes, the Flow has a display in the circular area inside its

volume knob. Given the small area of this display, it is remarkably complete. Not only can you see the current volume level but also the USB mode, the current format being played, the battery condition, the output mode, and even whether a headphone is connected.

The Flow can be placed so it lays flat on its back (there are four small rubber bumpers to protect its rear surface), or you can lay it on its side so the control buttons are all located on the top. The only controls in addition to the large circular volume knob are along one side of the Flow. They consist of a power on/off, menu, move up, move down, and play buttons. The menu button has two modes, one for commonly changed settings and another push-and-hold mode for the settings that you will only need to alter occasionally.

Equipment Report Aurender Flow DAC/Headphone Amp

Upon initial installation you are supposed to designate which kind of computer or smartphone the Flow will be connected to via the push-and-hold menu button. But if you're the kind of person who doesn't read the owner's manual cover-to-cover and assumes that if you're using a Mac, the Flow will be plug-and-play, the Flow *will* work, although I found performance to be better if you do set it up optimally for the device it is going to be tethered to. On a Mac, once designated, I found that the play, pause, move forward, and move backward buttons will operate iTunes as well as Aurdirvana+, Pure Vinyl, Pure Music, and Amarra Symphony. Keyboard and mouse controls also remained fully operable with all these apps.

The review sample of the Flow came with a 250GB mSATA drive mounted in it (it is sold *sans* drive, which is easily user-installable). My MacPro recognized the drive immediately and mounted it on the desktop. As with any mounted desktop drive, if you remove the drive without first unmounting (or ejecting) it, you will get an error message, and if you turn off or disconnect the Flow you get that same error message. This error warning gets old. Because a 250GB drive was too small for my entire music library (the Flow holds up to a 1TB mSATA drive) and I didn't need another set of back-ups, I turned the drive off via Flow's menu—after ascertaining that it could be written to and read from successfully.

Manufacturers of battery-powered devices will always face the dilemma of figuring out how and when they should be recharged. The Flow gives you the three options that I noted earlier. For optimal sound, I recommend turning off the recharging completely. When used as a preamp I

could hear some low-level noise generated by the Flow's charging circuits even in the "charge only when not playing" mode. When attached to an analog preamplifier the noise levels were the lowest in fixed-output mode with charging turned off.

I used the Flow with a wide variety of earphones from highly sensitive in-ear monitors to my least efficient full-sized headphones, and I was pleasantly surprised that they all worked well. Even with the most sensitive Westone ES-5 there was only the very faintest bit of low-level hiss. At the other end of the efficiency spectrum, the Flow had more than enough power to drive Beyerdynamic DT-990 600-ohm version well past *loud*. The Flow is the first headphone amplifier I've experienced that didn't need multiple gain settings to successfully accommodate a full range of headphone options.

One feature I've never given much thought to (but will in the future) is how a headphone amplifier interfaces with a new headphone. When you unplug and then plug in a new headphone, an amplifier can handle the new headphone in several ways: The amplifier can merely reproduce the previous volume settings. Or it can mute the output until the volume level is adjusted by hand, at which point the previous volume level manifests itself. Or it can mute the output and then reset the volume to maximum attenuation. After being blasted by more than my fair share of headphones, I much prefer the last method. Especially with the Flow's 0.5dB volume increments, matching levels when comparing two headphones—even allowing for the opportunity to linger over that wicked-cool volume knob—was rapid and repeatable, and I never had to worry about lowering the volume before installing a

different pair of cans. A further nice ergonomic touch is that the Flow's display has an outer ring that shows you the volume level—when you remove a pair of earphones, you can watch the that volume ring drop, reassuringly, back to -90dB.

Sound

In the short time it's been around, Aurender has already garnered a reputation for making excellent-sounding gear. The Flow should enhance its already sterling character. I used a wide variety of headphones with it and couldn't find a mismatch. Unlike some headphone amplifiers that favor a particular set of headphones or type of 'phone, the Flow was very much an equal opportunity amplifier; everything I threw at it worked fine and sounded good. Also, the Flow allowed each headphone to produce its own unique sound signature. Grado RS1s still presented a different soundstage and imaging characteristics than Mr. Speaker's Alpha Dogs.

Flow users have several PCM digital filter options that I mentioned earlier. Listening to Sia's "Chandelier" off Tidal, I liked the PCM2 filter better than the PCM1 default. PCM2 produced better decipherability of her phrase "can't feel anything" and more precise imaging on the background singers located hard left and hard right. Also in this mode, the intentionally added distortion bed was a hair less aggressive. In the past I've found that many PCM filters are more software than hardware dependent, and this was true with the Flow. Some music will benefit more from one PCM filter setting than another, so it's not a question of which filter is overall the "best," but rather, which one suits the music better. Too bad the Flow can't remember and

SPECS & PRICING

Sample rates: Up to 192kHz via SPDIF; up to 384kHz, DSD128x via USB

Compatible bit depths: 16–24 (SPDIF), 16–32 (USB)

Internal storage: Up to 1TB total via mSATA bus

Output impedance: 0.06 ohm

Output power (0.1 percent THD): 43mW/600 ohms, 87mW/300 ohms, 384mW/56 ohms, 570mW/32 ohms

THD+N: -114dB

THD (1kHz, 5.1V RMS output): 0.0002 percent

Dynamic range: 122dB

Damping factor: >130

Power supply: 4450mAh Li-ion rechargeable battery

Dimensions: 3.1" x 5.4" x 1.1"

Weight: 1 lb.

Price: \$1295 without mSATA drive

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employ whichever filter setting you find is preferable for a particular track, but as of now you still must change the filter settings manually via the menu.

I also used the Flow as a DAC/preamp by feeding its output to the analog input of the NuForce DAC-10H. Although it required using

Equipment Report Aurender Flow DAC/Headphone Amp

a ¼" headphone-to-female RCA adapter and then a 1 meter length of interconnect (I recommend something flexible such as the Kimber KCAG for this task), the setup worked nicely. I found the Flow's noise levels were lowest when I used the 2V fixed-output mode coupled with no battery charging. I used the NuForce ST-10 power amplifier tethered to a pair of Audience 1+1 speakers in my desktop system for these listening sessions. I also had a Velodyne DD10+ subwoofer tethered to the DAC-10H. I was impressed by how close the sound quality of the Flow was to the NuForce DAC-10H. Once levels were matched—which was pretty easy with the DAC-10H's numbered volume settings—the DAC-10H had a slightly wider soundstage, but the Flow's soundstage was deeper. The DAC-10H also had better low-level detail due to its somewhat quieter base noise level, but the Flow matched the DAC-10H's dynamics and pace.

I also compared the Flow with the Oppo HA-1, once more using the Oppo's analog inputs so I could compare the two in a matched-level A/B test. Again it was a close call with the Flow having better dimensionality and upper-mid-range energy and the HA-1 having more relaxed transient response. The Flow produced a more three-dimensional soundstage, but the HA-1 produced better lateral delineation and separation between instruments in the soundstage.

Neither the Oppo HA-1 nor the NuForce DAC-10H could successfully handle as wide a range of different headphones as the Flow. Even with its different gain ranges, the NuForce DAC-10H could not go from high sensitivity to low with the same equanimity as the Flow. With the DAC-

10H, you have to hunt and peck for the best combination of gain and volume; with the Flow, you merely turn the volume knob to the right point. And while both the Oppo HA-1 and the NuForce DAC-10H offer far more flexibility in input and output options, if your primary use will be with headphones and not as a preamplifier for a speaker-based system, the Flow's feature set and sound make it a better option than the other two.

Summary

I've heard there are some audiophiles who like an uncluttered desk. For someone who wants great sound, smooth ergonomics, and a compact footprint, the Aurender Flow offers an elegant solution for headphone and nearfield listening. Put a large mSATA hard drive in it and you have a clever rig for a traveling audiophile. Although the Flow will work in portable applications, in my view its one-pound weight and form factor make it more suitable for desktop service. Also, The Flow could easily find a place with music professionals, carrying it from studio to studio to ensure monitoring consistency.

Never before have audiophiles had so many fine options for DAC/preamps in the \$1000 to \$1500 range. I've mentioned several with which I'm familiar during this review. But the Flow's physical dimensions and its ability to drive everything I could throw at it headphone-wise make it special. Yes, my first impression of the Flow was wrong, but after giving it a chance to strut its stuff, I have to admit that it has become my current go-to headphone listening rig. If headphone listening from a computer source is your thing, you need to hear the Flow because it was made for you. **tas**



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Equipment Report

David Berning microZOTL2.0 Personal Amplifier

A Masterpiece in Miniature

Dick Olsher

During my visit to Washington, D.C., in 1998, David Berning invited me to drop by his house in nearby Potomac, Maryland. At some point during that evening he pulled out a prototype, which he described as a low-power and low-cost ZOTL amplifier. David was eager to offer his impedance-conversion technology in a highly affordable product. When he finished describing the device, I suggested that it would make for a perfect headphone amplifier. Sure enough, when it was released in 2000 as a “personal amplifier,” it included a headphone input. When I reviewed the microZOTL some 15 years ago I concluded that its greatest potential was as a headphone driver for both low- and high-impedance designs. My opinion then was that it ran circles around headphone amps costing thousands of dollars. Sadly, the microZOTL was discontinued in 2007. It remained up to Mark Schneider of Linear Tube Audio and his distribution website, urbanhifi.com, to re-issue the microZOTL under license from Berning as the microZOTL2.0 reviewed here.

The microZOTL2.0's internal circuitry is identical to that of the original, but there are some significant differences. The power supply is now outboard which reduces noise. Functionality has

been enhanced in the form of preamp outputs, a second line-level input, and a selector switch that toggles between the two inputs. Premium tubes (Russian Tung-Sol reissue 6SN7 and 12AT7) are now standard instead of the Chinese tubes of the original. In general, parts-quality has been enhanced and the unit includes an Alps volume pot and silver-coated and Teflon-insulated copper wiring. And there's no question that the microZOTL2.0 improves on the cosmetics of the original.

Go ahead and peek through the plexiglass top plate at the main circuit board and marvel at the circuit complexity. The microZOTL2.0 is configured as a Class A push-pull power amplifier. What is most unusual here is that the power tubes for each channel are the twin sections of a 6SN7. As far as the front end, one section of the 12AT7 input tube is used as a voltage amplifier while the second section is connected as a cathodyne phase-splitter. The output of each 6SN7 half is superimposed over a 250kHz RF carrier and transformed through an RF-converter transformer to obtain the high-current and low-impedance domain required by a loudspeaker. The advantage gained is that, unlike a conventional audio transformer that must op-

erate over a wide bandwidth, the RF-converter transformer operates at a single frequency and can therefore achieve an extremely high turns-ratio without adversely impacting the power bandwidth. According to Berning, the microZOTL2.0's effective turns-ratio is an enormous 168-to-1, making it possible to use a triode (normally only seen in amplifier input or driver stages) in the output stage. The resultant output impedance is 2 ohms with zero global feedback. Of course, the carrier frequency is filtered to the tune of 50dB before reaching the output terminals. Power delivery is a nominal 1W into a 4-ohm load.

My first instinct when surveying the microZOTL2.0's enhanced functionality was to use it as a basic line preamp. It didn't take me long to hook up a DAC to Input 1 and a phono stage to input 2. I asked David Berning about the expected voltage gain when driving a power amp, typically a 50k-ohm input impedance. He thought the microZOTL2.0 would offer a bit more than the specified 12.4dB gain into a 14-ohm load. That's more than enough for any digital source and should suffice for a moving-magnet phono stage with a gain of 45dB or more. David did caution that the power amp should be turned

on last and turned off first in order to avoid a low-frequency thump. Then there is the 2-ohm output impedance. That's significantly lower source impedance than that of any preamp on the market, even those incorporating a cathode-follower output buffer. The payoff is the ability to drive long cable runs with no worries. It's not just about output impedance but also about being able to sink current into the cable, and that the microZOTL2.0 does very well by virtue of being a miniature power amplifier.

At the 2015 RMAF I was surprised to find out that Mojo Audio's Benjamin Zwickel instincts were aligned with mine. He was using the microZOTL2.0 to drive David Berning's latest power amp, designed for Linear Tube Audio, the ZOTL40, which features a 40Wpc, EL34-based, push-pull output stage. In my setup, the microZOTL2.0 was coupled with the VTL Manley Reference 100/200 monoblocks and the Analysis Audio Omega planar loudspeakers. In this context I could only marvel at its explosive dynamics. The range from soft to loud was negotiated with a world-class startle factor that exceeded the performance of the Audible Illusions L3A line preamp, and if memory serves me right, actually equaled the performance of the much-more-ex-



Equipment Report David Berning microZOTL2.0 Personal Amplifier

pensive Pass Labs XP-30 preamp in this regard. That made the microZOTL2.0's presentation visceral and involving, impossible to ignore. And as it turned out, it was far from being a one-trick pony. Bass response was spectacularly solid, extended, and pitch-perfect. And there was no denying that soundstage transparency bettered that of any tube preamp I've auditioned under \$5k. The microZOTL2.0 was able to dig into a mix and resolve a complex passage with great precision. And that was a function of its excellent control over transient attack and decay. Its tube character was evident in its ability to do justice to spatial depth and width perspectives. That has been a weak point of solid-state designs and one of the reasons I've stuck with tube preamps for the past several decades. I suggest that you give the microZOTL2.0 a serious listen. It unzips the soundstage, allowing its boundaries to surge and expand with conviction. The upper midrange is smooth and free from tube brightness. However, the treble range sounds a bit electronic in character, lacking the textural purity of the midrange. My first thought was to categorize this as an artifact of the carrier frequency, especially since in more recent ZOTL designs Berning has deemed it important to raise it from 250 to 500kHz. But since I did not experience this problem during my headphone listening sessions, I'm inclined to think that the culprit is the VTL amp, which may be sensitive to the residual carrier frequency.

For someone who doesn't listen much to headphones, I happen to have a fair number of them on hand. My favorite in the circumaural category are the Sennheiser HD 600 cans, mainly because of their excellent tonal balance and smooth

presentation. The microZOTL2.0 pushed the HD 600 to a performance level I had not previously experienced. Prior to the microZOTL2.0 I had used the HD 600 extensively with the Antique Sound Lab MG-Head OTL 32 DT headphone amplifier. This is an all-tube OTL design, which uses a pair of triode-connected 6BQ5/EL84 pentodes per channel in the output stage. The sonic result could best be characterized as being overly tube-like: a nice fat lower midrange combined with a noticeable loss of transient speed. In other words, the HD 600 was easy to listen to but lacking in clarity and detail resolution—simply put, its presentation was “decaffeinated.” In this context, there was no way anyone would mistake these cans for a high-resolution device, let alone reach a sonic orgasm. Adding the microZOTL2.0 to the chain transformed the HD 600—almost as if it had received a shot of caffeine. The HD 600 sounded faster and much higher in resolution. For example, I was now able to clearly distinguish between different upsampling settings on the Eximus DP1 DAC.

Sonically, the best headphones in my collection are the Stax SR-X Mk2, which I use with the SRD7 Pro interface. These decades-old cans run circles around the HD 600. I keep them around for the same reason I hang on to my Quad 57 ESLs—a gorgeous midrange, absolutely to die for. Good electrostatic speaker designs seem destined to become classics for the simple reason that they leave little room for improvement. With the SRD7 connected to the microZOTL2.0's speaker terminals, the Stax projected incredibly suave mids saturated with microdynamic subtlety. And there was nothing wrong with the treble range, which was reproduced with excep-

tional extension and air, and without any electronic artifacts. Together, these components forged a natural and synergetic partnership.

Most of you are probably familiar with Chesky's binaural demo album titled *Dr. Chesky's Sensational, Fantastic, and Simply Amazing Binaural Sound Show*. It contains a lot of good music as well as some neat test tracks. I agree with Chesky that binaural (aka dummy head) recording, far from being a gimmick, is an important technique for capturing the sensation of being there, in essence providing a live concert perspective. The right and left channel ID tracks have David Chesky initially standing some 30 feet from the mike in a reverberant cathedral acoustic. He talks as he walks closer and closer and ends up whispering in your ear. That's a pretty impressive demo of the imaging capability of a good binaural recording. Getting a feel for the acoustic space of the recording was effortless with the microZOTL2.0 in the chain.

The microZOTL2.0 is one of the few headphone amplifiers that can truly deliver an emotionally charged listening experience. Since the microZOTL2.0 is sold direct to the public, without the usual dealer markup, it represents an uncommonly good deal. But it's more than simply a question of money. Here, for the first time, via ZOTL technology, it is possible to experience the magic of a 6SN7 “power” tube. This may sound like a TV commercial, but the new and improved microZOTL outshines the original. That should not come as a surprise given the use of enhanced passive parts and better tubes. To my mind, the microZOTL2.0 is the pinnacle of desirability when it comes to headphone amplifiers. **tas**

SPECS & PRICING

Frequency response (full power): 10Hz–20kHz +0/-1dB (4-ohm load); 5Hz–50kHz +0/-1dB (14-ohm load)

Power output: 1W into 4 ohms (1% THD); 0.5W into 14 ohms (1% THD)

Sensitivity: 0.6V RMS

Output impedance: 2 ohms (0.5A/60Hz)

Input impedance: 50k ohms

Hum and noise: 90dB below full output (20Hz–20kHz)

Voltage gain: 10.3dB (4-ohm load); 12.4dB (14-ohm load)

Dimensions: 9.5" x 4.75" x 7.875"

Net weight: 5.35 lbs.

Price: \$1100

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Associated Equipment

Analysis Audio Omega loudspeaker; VTL Manley reference series 100/200 monoblock amplifier; AVA Vision phonostage; Kuzma Stabi Reference, Technics SL-10, Revox B795, and Sony PS-X600 turntables; MacBook Pro laptop running Amarra V3.03 software, April Music Eximus DP1 DAC; ModWright modified Sony XA-5400ES SACD player; FMS Nexus-2, WireWorld, and Kimber KCAG interconnects; Kimber KCAG speaker cable; Monarchy Audio AC-Regenerator; Sound Application power line conditioners

Equipment Report

Dragon Inspire IHA-1 Headphone Amplifier

Simply Gorgeous!

Steven Stone

Headphone amplifiers come in all sizes and at all prices, from inexpensive project-box designs such as the \$129 JPS Labs O2 all the way up to state-of-the-art amplifiers such as the \$3995 Audeze "The King." Right near the middle of this range you'll find the \$1599 Dragon Inspire IHA-1 headphone amplifier, which is sold exclusively by Moon Audio. Created by Dennis Had, the founder of Cary Audio, who has been designing tube-based electronics for over fifty years, the IHA-1 began as a retirement hobby project. Mr. Had sold Cary Audio seven years ago and had planned to do a lot of relaxing and sailing, but after a year the lure of sailing was eclipsed by the siren song of Had's studio space, where he began working on new single-ended tube designs. Eventually he turned his attention to headphone amplifiers, and the Inspire IHA-1 was born. While its price—especially for what is essentially a hand-built, made-to-order component—places the IHA-1 in the "affordable" category, its performance with the right headphones puts it firmly into the category of something you might buy if price was of no consequence.

Tech Tour

The Dragon Inspire IHA-1 is a single-ended vacuum tube design that has its inputs directly coupled to the grids of two 6SN7 dual-triode tubes with only a selector switch and volume control between the inputs and the tubes. The IHA-1 has only three tubes total in its circuit, two 6SN7 dual triodes and one 5Y3GT rectifier. The IHA-1 can also be configured with different dual-triode tubes, such as a 6BL7 or 6BX7 (with the 6BX7 you lose some output power) and different rectifier tubes, including a 5Y3, 5U4, or a 274B. Because the 6SN7 tube is a dual triode, it allows the IHA-1 to have two gain stages, powered by each section of the 6SN7. While the IHA-1 is not a true dual-mono design because the right and left channels share the same power supply, the two channels remain separated throughout their signal path.

A set of special hand-wound, custom, air-gapped output transformers are also directly coupled to the IHA-1's outputs. Because the IHA-1 is a direct-coupled design throughout without any coupling caps or output attenuation resistors in the signal path, it is more sensitive



to EMF and EMI-generated hum and noise. "Purity at its best" comes at a price, which means you must pay attention to the IHA-1's physical placement if you wish to hear it *sans* hum and extraneous noise.

The IHA-1 is also a zero-feedback design. According to the Moon Audio site, "THD is close to ultimate vacuum tube perfection considering zero feedback. The second and all remaining harmonic contents at the 1.125 watt output level into 32 ohms are over 65dB down." But by eliminating feedback, the IHA-1 design also lacks the noise filtering that feedback can deliver; hence, the IHA-1 will be more sensitive to external noise either through the AC line or from other electronic devices.

The volume control for the IHA-1 is a 100k dual stepped attenuator made by a Danish firm, DACT. While this dual attenuator insures that both channels will track together accurately, it also eliminates the option of any channel balance adjustments. This is the sort of trade-off that was made to optimize the IHA-1's sonic performance.

Readers may wonder how a single-ended tube amplifier that only supports single-ended inputs can supply a balanced headphone output. The "secret" to the IHA-1's balanced output operation is that the secondary windings from the IHA-1's custom air-core transformers are tapped to get the necessary inverted signal for balanced headphone operation.

Equipment Report Dragon Inspire IHA-1 Headphone Amplifier

Physical Setup and Ergonomics

The chassis of the IHA-1 measures 8 inches by 2½ inches (without tubes) by 10 inches, and is finished with a copper powder coat with a dual-process clear coat. The front panel has a volume knob on the left-hand side flanked by a three-way selector (Channel 1, Mute, and Channel 2) to its right. The right half of the IHA-1's front panel has output connections for single-end ¼" stereo and four-pin XLR balanced headphones and a two-way toggle on/off switch. The back panel of the IHA-1 has two pairs of RCA inputs and one switched RCA output as well as the AC power connection.

The Inspire IHA-1 can be used both as a headphone amplifier and as a two-input analog preamplifier. The line-level output is an additional \$100 upcharge over the \$1599 base price, but it is an upgrade that vastly increases the IHA-1's utility. I used both capacities during the review. For part of the review, the IHA-1 was attached to the analog output from a Grace m9xx DAC/pre, which was connected to my MacPro desktop. For some of my critical listening I used several high-performance portable players, including the Astell&Kern AK240, Calyx M, AR M2, Sony NW-ZX2, and Questyle QP1R. Because it has two selectable inputs you could easily set the IHA-1 up to handle both your computer and your portable devices as sources.

I also used a variety of headphones and in-ear monitors with the IHA-1. Since the IHA-1 has both single-ended ¼" and balanced headphone connections I also had the opportunity to compare the single-ended and balanced outputs on several headphones that have interchangeable cables, including the AudioQuest Nightfly,

Sennheiser HD700, and Audeze LCD-2.

My review sample came with two Sylvania 6NS7 dual triodes and one RCA 5U4 rectifier tube. These are the tubes that Moon Audio's Drew Baird prefers, and they come at an extra cost of \$200 (but you still receive the two stock 6SN7 Electro Harmonix and Sovtek 5Y3GT as well). I did not try "tube rolling" (changing out tubes), but obviously being able to use a variety of tubes is part of the appeal of the IHA-1.

Sound

The phrase, "the music emerged from an inky black background" has become an audiophile cliché, but after a minute of warm-up (during which you will hear some hum from the right channel), the IHA-1 is as silent, with as quiet a base noise level, as any solid-state headphone amplifier I've used. A silent background is even more important in headphone listening than in a room-based system where some small amount of hum and noise can be forgiven because it's inaudible by the time you move far enough away from the loudspeakers to listen. With headphones you can't rely on distance to reduce a system's intrinsic noise level.

When I received the first sample IHA-1, it had a hum that would not go away regardless of placement or AC wiring scheme. I returned it for a second sample. The second sample was hum-free as long as it was properly placed and connected (it was especially sensitive to noise generated by some AC power conditioners such as the EquiCore 150 balanced power conditioner, which I've found is best reserved exclusively for digital devices). With the PS Audio Quartet, the IHA-1 was absolutely silent when used as a

line-level preamplifier or headphone amp, even with the volume control turned up all the way to full output, which is how I sometimes used it with the Grace M9xx, where I relied on the Grace's volume control with its finer delineations to attenuate levels.

Sonic purity comes at a price, but the IHA-1's cost is far less than you would expect to pay for a hand-built, point-to-point-wired, U.S.A.-made component.

Some headphone amplifiers are designed to be general-purpose devices, with multiple gain and impedance adjustments, while others are made to work best with certain headphones that fall within a more limited specification set. The IHA-1 is definitely one of the latter. Dennis Had told me that the two headphones he used when designing the IHA-1 were the Grado PS-1000 and Audeze LCD-3. My experience is that the IHA-1 is better suited for medium- and low-sensitivity headphones than anything with sensitivity greater than 90dB. With higher-sensitivity in-ear monitors, the IHA-1 has a noticeable hiss that obscures low-level details. Some of the headphones that were too noisy for my tastes included the Oppo PM-3, Audeze EL-8, and virtually every in-ear monitor in my collection.

Once you eliminate all the higher-sensitivity headphones that don't mate well with the IHA-1, you're still left with a plethora of 'phones that do. Among those that worked successfully with the IHA-1 were the Sennheiser HD-600, Senn-

heiser HD-700, Audeze LCD-2, Beyerdynamic DT-990 600-ohm version, HiFiMan HE560, Beyerdynamic DT-880 250-ohm, AKG K-7xx, AKG K-553, Grado RS-1, AudioQuest Nighthawks, Mr. Speakers Alpha Primes, and Audio Technica ATH-A900x.

Once it is mated with a headphone for which it is suited, the IHA-1's midrange liquidity and innate harmonic beauty will roll over you like a fifty-foot wave. The IHA-1's midrange is lush without sounding thick, fast without losing lower-midrange body, and immensely musical. But like all single-ended designs, this midrange purity comes at a price—less control and definition at the frequency extremes. While I found the IHA-1's treble response exhibited no noticeable sonic failings, its bass response was fluffier and less incisive than more conventional tube and solid-state headphone amps I'm familiar with. I call this "marshmallow bass." Headphones with large suspended planar drivers had the most noticeable issues from the IHA-1's lack of low bass damping, but on other headphones, such as the AKG K-7xx, the differences in low-bass presentation were reduced.

The three-dimensionality of the IHA-1's soundstage, especially when the unit was coupled to a spatially incisive headphone such as the HiFiMan HE560 or the Grado RS-1, was something akin to wandering around in a huge hall that just happened to be inside and around your head. And while even the "lowly" O2 headphone amplifier can deliver precise lateral imaging and a decently sized soundstage, the IHA-1 takes that lateral image specificity and adds another dimension—depth—and then explodes the soundstage outward, leaving plenty

Equipment Report Dragon Inspire IHA-1 Headphone Amplifier

of room for the spaces between the notes as well as among the instruments themselves.

With most solid-state headphone amplifiers the balanced output has double the voltage swing of the single-ended output because it is using two amps (one in positive polarity and one with inverted polarity). The IHA-1 does not double the voltage swing because it uses the same amp, creating the balanced signal with its transformer-coupled output. By the very nature of the output transformer, a balanced signal appears at the secondary output winding so there

is no need for a phase inverter or second amp section.

Given that the balanced output does not offer additional voltage, I found that using a balanced cable instead of a single-ended one from the same manufacturer (Wireworld) resulted in no audible differences between the two connections with all three headphones I used for this test—the AudioQuest Nightfly, Sennheiser HD700, and Audeze LCD-2.

When I used the IHA-1 as a preamplifier, I was most impressed with its soundstaging and imaging characteristics. When compared to the Grace m9xx's preamplifier section, the IHA-1 produced a slightly larger stage overall with remarkably specific three-dimensional imaging on phase-coherent recordings. I was also captivated by the IHA-1's lack of background noise or low-level hum. Finally, the IHA-1's bass was not as soft and fluffy when used as a preamplifier. Although the IHA-1's midbass was slightly less taut than that of the Grace m9xx, on some selections I preferred the IHA-1's softer yet fuller bass response.

The perennial question in the tubes-versus-solid-state amplification debate is whether tubes are subtractive, removing some amusical energy that solid-state passes on to your ears, or if tubes merely have fewer additive distortions than comparable solid-state devices. Depending on the particular tube and solid-state circuits involved, the answer could be either or both. But when used in an optimal setup, with a high-performance headphone, the IHA-1 makes a strong sonic argument for a single-ended tube design as a lower-distortion (when not stressed) and less sonically pernicious technology.

Competition

There aren't a lot of single-ended tube headphone amplifiers currently in the market, but one that does compete with the IHA-1 is the Woo Audio WA7 Fireflies with tube power supply (\$1398). The Woo can handle a wider range of headphones than the IHA-1 (it can be used with sensitive in-ears without adding noise). It also has a decent USB 2.0 input to handle digital feeds up to 192/24. The downsides of the Woo compared to the IHA-1 are that the Woo does not offer a balanced XLR connection and it can't function as a preamplifier. I did not have a WA7 in my possession during the IHA-1 review to make any direct sonic comparisons.

Although it's solid-state, the NuPrime DAC-10H has a similar price (\$1795) and feature set. Both units can handle single-ended and balanced headphones and both can also serve as preamplifiers. The DAC-10H does have greater flexibility than the IHA-1 with more inputs (including analog line-level) and outputs as well as a very good DAC capable of 384/32 PCM and DSD128. The DAC-10H can also handle a wider range of headphones successfully. Sonically, the DAC-10H offers a clean, clear, more matter-of-fact solid-state view of the musical event as compared to the IHA-1's tube-centric three-dimensional panorama.

Summary

As I said at the beginning of this review, nowadays audiophiles have a multitude of options when it comes to headphone amplifiers, from USB-stick-sized units for \$100 to multi-functional full-sized components with six-figure price tags. Even within the limited range of \$1500 to \$2000 you will find almost every type

SPECS & PRICING

Input impedance: 100k purely resistive
Frequency response: 12Hz to 32kHz +/- 0dB

Power output into 40 ohms: 1.7W at less than 1% THD (primarily 2nd harmonic)

Amplifier gain: 18dB

Noise floor: -87dB

Headphone outputs: 1/4" single-ended and 4-pin XLR

Output tubes: Two 6SN7 dual triodes

Rectification: One 5Y3

Dimensions: 10" x 6" (with tubes installed) x 8"

Weight: 12 lbs.

Price: \$1595 base price (NOS tubes, \$100; switched line-level output, \$100)

MOON AUDIO

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Equipment Report

Moon by Simaudio Neo 230HAD Headphone Amplifier/DSD DAC/Preamp

Don't Call it Entry-Level

Steven Stone

Most "computer audiophiles" begin their audio journey innocently enough—usually with a better set of earphones, which then require some kind of outboard digital-to-analog (DAC) with a headphone amplifier to drive them to satisfying levels. After a little while they are hooked. Often the next step is a more substantial DAC/headphone amplifier, one that can not only drive headphones but also act as a preamplifier for a room-based system.

This particular upgrade path has not gone unnoticed by Simaudio. Unlike many manufacturers, Simaudio's first headphone-centric offering was the \$4300 reference 430HA headphone amplifier, rather than an "entry-level" component. The new \$1500 Moon Neo 230HAD remedies this oversight with a compact yet full-featured DAC/pre/headphone amp that is aimed directly at the computer audiophile who is ready to take his first big step into high-performance audio.

Tech Tour

According to the good folks at Simaudio, the Neo 230HAD borrows quite a bit of technology from

the company's "big boy" Neo 430HA (reviewed by Robert Harley in Issue 253). The Neo 230HAD uses the same type of transductance analog amplifier, but it has a single-ended circuit with bipolar devices rather than fully balanced differential outputs. The DAC chip used in the Neo 230HAD is the ESS9018 K2M, but a DAC is far more than the chip used. The Neo 230HAD employs one large 10VA toroidal transformer in its power supply along with eight DC voltage stages—four for each channel to ensure proper regulation.

The Neo230 HAD has two pairs of single-ended RCA outputs. One pair is fixed-level while the other is variable, controlled by the front panel volume knob. The front panel has one ¼" stereo headphone output that can generate 200mW into a 300-ohm load and 1W into a 50-ohm load. Accepted formats and bit rates include PCM up to 384/32 and DSD up to DSD256 via the USB inputs. SPDIF accepts up to 192/24 PCM, but not DSD, while the TosLink can handle up to 192/24 PCM.

Ergonomics and Setup

The Neo 230HAD's chassis is 7 inches wide by 3 inches high by 11 inches deep, which is what

used to be referred to as a "half-size" width when rack-mount-sized components ruled the earth. The front panel is curved, which gives the Neo 230HAD less of a boxy look. It is populated by a large volume knob on the right side, a small blue LED above the on/off button in the center, and an input button, two rows of blue LEDs, a ¼" headphone output, and a 3.5mm stereo input on the left side. These rows of LEDs designate the source input as well as the bit-rate of the current program material.

The back panel of the Neo 230HAD has one TosLink, one USB, and two SPDIF inputs, as well as one pair of RCA analog inputs. The rear panel also has two pairs of RCA single-ended analog outputs—one fixed and one variable—and a standard IEC AC connection.

Setup was simple and straightforward. I attached a USB input from my 2015 MacPro desktop and for the initial installation I ran the fixed-level outputs into the input of the Tortuga Audio LDRV3.V2 passive preamplifier. I also used the Neo 230HAD connected directly to a power amplifier via its variable outputs.

Unlike some DACs which offer you several dif-

ferent digital filter options, usually fast, slow, and minimum phase, the Neo 230HAD has no filter adjustments. Its controls are minimalist to the point that instead of giving users the option of having either fixed or variable output on both single-ended outputs, Simaudio chooses to permanently designate one fixed and one variable. Thus, no switch is needed. While I would prefer to see the option of fixed or variable, this solution certainly works. But if you require two variable (one for your power amplifier and one for your subwoofer) or two fixed outputs (one for your preamp and one for your Stax or balanced headphone amplifier), you will need to use signal splitters for those connections.

The Neo 230HAD comes with the Moon CRM-2 full-function remote control, which also works with several other Moon components. The functions that work include input selection, volume control, and power on/off. As for the rest, such as balance and mute, don't hold your



Equipment Report Moon by Simaudio Neo 230HAD Headphone Amplifier/DSD DAC/Preamp

breath waiting for something to happen after you press the remote's buttons.

Very occasionally, when going from PCM material to DSD files, there would be a very short period of noise before the Neo 230HAD locked on the DSD signal. This only occurred for me while using Audirvana+, but I would recommend the "best practices" of not leaving your volume control up when switching between PCM to DSD files.

Performance

Although the Neo 230HAD includes several different devices whose functions are relatively independent—DAC, preamp, and headphone amplifier—most of the time they will be used together, such as when you listen through headphones. And while it's possible to bypass the volume control by using the Neo 230HAD's fixed-level outputs and routing them to a preamplifier or external headphone amplifier (which I did during the review), the whole point of the Neo 230HAD is that it can be used as a one-box component that simultaneously serves as a digital hub, preamplifier, and headphone amplifier for all but the most complex multi-input systems.

When used as a preamplifier the Neo 230HAD was dead silent. The Neo 230HAD also had oodles of gain—at normal, moderately loud listening levels I barely got up to 9 o'clock on a rotary dial that starts at 7 o'clock! Splitting the unbalanced signal into two unbalanced signals so I could run both my main amplifier and subwoofer did not seem to reduce the signal levels one iota.

Through a system that is so transparent that I could clearly hear the NuPrime ST10 power amplifier warm up after being turned off for

a day, the soundstage started flat with almost no depth, and gradually, over the next 30 minutes, deepened and expanded to its normal dimensions. I could also hear how little the Neo 230HAD altered the sound, especially on material I was familiar with. A recent guilty pleasure, the cut via Tidal "Dracula" from Bea Miller's *Not an Apology*, has some very deep bass pulses combined with some very rude percussion crashes that can sound either very cool or sorta cruddy depending on your system's high-level dynamic resolution and low bass capabilities. On my nearfield system it can rock, and with the Neo 230HAD in the signal chain, it did.

I connected a wide variety of earphones to the Neo 230HAD's headphone output and I was impressed by how many the Neo 230HAD drove well. With hypersensitive low-impedance in-ears such as the Westone ES5, I could hear a very slight amount of white-noise hiss even when the volume control was turned all the way down, but at normal listening levels this hiss level remained low. With any "regular-sensitivity earphone (between 85 and 95dB)" the Neo 230HAD generated a silent background.

With my most difficult-to-drive headphones, which are currently the Beyerdynamic DT-990, 600-ohm version, the Neo 230HAD had lots of gain left in reserve. The volume control barely cracked 10 o'clock. The Neo 230HAD also proved to be a good pairing with difficult-to-match headphones such as my newly acquired Sennheiser HD 700.

Summary

A scant few years ago you would have been hard-pressed to find a high-performance en-

try-level DAC/pre/headphone amplifier from an industry-leading audio manufacturer for around \$1500. Nowadays, audiophiles have a lot of options, including three that I have had extensive experience with—the NuPrime DAC-10H (\$1795), the Oppo HA-1 (\$1199), and the Moon Neo 230HAD (\$1500).

Although the Moon Neo 230HAD has fewer adjustments and lacks balanced headphone outputs, its sonics, especially when used as a preamplifier, placed it above the Oppo. The Neo 230HAD was closer to the level of neutrality I've become accustomed to hearing from the Tortuga Audio LDRV3.V2 passive preamplifier. (In comparison, the Oppo HA-1 was slightly warmer harmonics with a more pronounced midbass.) The Neo 230HAD also has a slightly more coherent soundstage with easier to locate depth cues—there was better isolation around each instrument and each voice had less of what, for lack of a better term, I'll call a "noise halo," slightly blurring the edges of each instrument in a mix.

The NuPrime DAC-10H offers quite a bit more flexibility (balanced headphone and analog outputs as well as different gain and filter settings), but sonically I found the Neo 230HAD and DAC-10H to be a sonic dead heat, with both producing hard-to-fault sound. While I would rate the DAC-10H as a somewhat better value because of its features, for many nearfield and desktop systems that added flexibility may be overkill, at which point the Neo 230HAD would be a more cost-effective choice.

Usually at this point in a review of an "entry-level" component reviewers dredge up the phrase "gives you a taste of the high end." The

SPECS & PRICING

- Headphone impedance:** 20–600 ohms
- Output power:** 100mW into @ 600 ohms, 200mW into 300 ohms, 1W into 50 ohms:
- Inputs:** One pair unbalanced on RCA jacks, one 1/8" mini-jack
- Input impedance:** 22k ohms
- Single-ended headphone output:** Stereo TRS
- Single-ended preamp outputs (RCA):** Two pairs (fixed and variable)
- Frequency response:** 20Hz–20kHz +/- 0.1dB
- Output impedance:** 1.25 ohms
- Weight:** 6.2 lbs.
- Dimensions:** 7" x 3" x 11"
- Price:** \$1500

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Moon by Simaudio Neo 230HAD gives you far more than a taste—it will fatten you right up. If you don't require a balanced headphone output, the Neo 230HAD may be all the DAC/preamp/headphone amplifier you ever need. **tas**



Our Top Picks Headphone Amplifiers/DACs



Berning microZOTL2.0

\$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.

urbanhifi.com (260)



Moon by Simaudio 230HAD

\$1500

Although the Moon/Simaudio Neo 230HAD includes several different devices whose functions are relatively independent—DAC, preamp, and headphone amplifier—most of the time they will be used together, as when you listen through headphones. The whole point of the Neo 230HAD is that it can be a one-box component that serves simultaneously as a digital hub, preamplifier, and headphone amplifier. If you don't require a balanced headphone or line-level output, the Neo 230HAD may be all the DAC/preamp/headphone amplifier you ever need.

simaudio.com (260)



Auralic Taurus MkII

\$1899

The Taurus MkII is a powerful, highly capable, and fully balanced headphone amplifier/preamp that offers most of the performance of an ultra premium-priced headphone amp at a much more manageable price. With an analog output module patterned after the sonic characteristics of the legendary Neve 8078 recording console, Taurus delivers richly detailed sound, with extremely expressive and explosive dynamics, that also conveys an unmistakably Neve-like touch of natural, organic warmth. **auralic.com** (239)



Dragon Inspire IHA-1

\$1595

Headphone amplifiers come in all sizes and at all prices, from inexpensive project-box designs such as the \$129 JPS Labs O2 all the way up to state-of-the-art amplifiers such as the \$3995 Audeze "The King." Right near the middle of this range you'll find the \$1599 Dragon Inspire IHA-1 headphone amplifier, which was created by Dennis Had, the founder of Cary Audio, who has been designing tube-based electronics for over fifty years, and is sold exclusively by Moon Audio. Even within the limited range of \$1500 to \$2000 you will find almost every type of headphone amplifier, but none offer quite the same combination of sound and features as the Inspire IHA-1. If you're in the market for a single-ended, directly coupled, all-tube headphone amplifier with the ability to function as a low-noise line-level preamplifier, you should seriously consider the Inspire IHA-1 as an option. And while sonic purity comes at a price, in the IHA-1's case that price is far less than you would expect for a hand-built, point-to-point-wired, U.S.A.-made component. **moon-audio.com** (264)

DESKTOP SYSTEMS & BLUETOOTH SPEAKERS

DESKTOP SYSTEMS & BLUETOOTH SPEAKERS

AUDIOENGINE HD6 • KEF MUO • RIVA TURBO X • B&W T7

TOP PICKS: [DESKTOP AND BLUETOOTH](#)

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Equipment Report

Audioengine HD6

Crossover Vehicle

Neil Gader

For any audio company, making the leap from the desktop to the listening room is not the simple, slam-dunk proposition it might appear to be. The goals are often at odds with each other and require different skill and feature sets. The desktop experience is more intimate and personal, while the listening room is more inclusive and often shared. Audioengine, however, is not just a loudspeaker company. With an innate grasp of the market, its strength as a desktop and personal listening specialist involves a panoply of products from powered speakers, to DACs, to wireless systems, to accessories, and cables. The new HD6 loudspeaker is arguably the most versatile piece of gear Audioengine has come up with yet. Powered, DAC-equipped, and Bluetooth-enabled, the two-way HD6 is comfortable on a desk or shelf, or flanking a flat panel, or set out in the room on a pair of stands. The HD6 is a crossover product like few others.

The \$749-per-pair HD6 is more than an attractive loudspeaker. Much more. It's a complete audio system that only needs a source as humble as a smartphone to it get up and running. Separate components and wires? Thanks to the HD6's built in Bluetooth you won't need 'em. Or

perhaps you'd like to hook up an old-fashioned source component like a CD player or even something *really* ancient like a turntable via a phonostage. No worries—there's also a pair of analog inputs. No muss, no fuss.

There are a lot of features built into the HD6, but its ultimate success hinges on the loudspeaker's quality. The HD6 is a two-way compact, roughly a foot tall. The bass-reflex enclosure has a rear-mounted, horizontally slotted port. Each HD6 employs a ferrofluid-cooled silk-dome tweeter with a neodymium magnet. The woofer is a 5.5" Kevlar/woven-glass/aramid composite with a rubber surround. It's housed in a cast aluminum frame for rigidity and increased heat dispersion. The cabinets are available in several finishes, including walnut and cherry veneers as well as satin-black paint. Also included are detachable grilles with hidden neodymium magnets.

The right speaker accommodates the brains of the operation—amplifiers, DAC, and Bluetooth, as well as a set of analog inputs and an optical digital input. You'll know the right channel immediately by its front panel power light and volume control (an all-analog design). The left speaker connects to the internal amplifier



in the right channel via an included banana-terminated speaker umbilical. The amplifiers in the HD6 are Class AB analog monoblock designs with an output of 50Wpc RMS, but capable of 75W peaks. The circuit boards for the power and preamp sections are vertically mounted for mechanical shock protection. Audioengine also touts the use of gapless-core toroidal transformers, which have a more tightly radiated magnetic field. Translation: lower noise. AE points out that its toroidals are lighter than standard, lower-cost "EI" transformers and also generate less heat.

Keep in mind that the HD6 is not a fully active loudspeaker system. The internal crossover is passive in contrast to professional "active" monitors that insert an electronic crossover in front of each discrete amp per transducer—sending only the audio signal required for that specific driver. The HD6 is more like a conventional amplifier/loudspeaker rig, only with *all* the electronic bits and bobs squeezed into a single speaker. Given the tight internal confines, the HD6 sports an oversize aluminum heatsink on the rear panel of the master speaker to address any potential thermal issues. An amazing piece

Equipment Report **Audioengine HD6**

of packaging sleight-of-hand, if you ask me.

The HD6's Bluetooth features aptX coding—an advanced audio codec that's also backwards-compatible with almost any BT device. How extended is its range? Answer: In the real world it all depends on the home, but I found its performance suitable to any medium to large room depending on the home's construction and floor plan. Both the BT receiver and optical input utilize the AKM AK4396A DAC, widely known for its low-noise and fidelity. The optical input configures the AK4396A as a bit-perfect 24-bit DAC, and can accommodate sample rates up to 192kHz.

Instant Gratification

Setup is devilishly easy, even for someone like me, who invariably cringes at the prospect of "pairing" devices (it's a childhood issue, like eating lima beans). But the AE team couldn't have made the task any simpler. With my smart device at the ready, an iPad, I only had to power on the right/master speaker and press the "pair" button. Within seconds I'd identified the HD6 within the Settings/Bluetooth submenu of my iPad's System window and selected "Audioengine HD6." I was literally streaming my Oldies playlist in seconds with very good musical results. Bluetooth response was stable with only a few dropouts over the course of the evaluation. When all was said and done, however, I spent most of my listening sessions running the elite Esoteric K-03X SACD player and a Blu-ray player through the analog and optical inputs. The HD6 was positioned on heavy stands, a good two feet or so from back and sidewalls.

I listened to the HD6 in the manner that I

imagined many listeners would—a combination of music and movies. It's well suited to both of these genres but sonically tipped in favor of a cinema balance. By that I mean it makes voices intelligible without getting edgy, and has the weight and dynamics to lend credibility to an action/adventure soundtrack. It also creates a strong center image, crucial to the cinema experience in the absence of a true center channel. It did a marvelous job contributing to the immersive atmosphere of the harrowing mountain climbing documentary *Meru*. The sensational soundscape of arctic winds buffeting the climbers at twenty thousand feet sent more than a few chills up my spine and added greatly to the thrillingly vertiginous cinematography.

In tonal balance, the HD6 offers a forgiving, ear-coddling midrange—a warmer, slightly darker balance that was effective at conveying big sound from a small box. Bass response was largely very good, if a little overly enthusiastic in the upper midbass. This added oomph in the 80–150Hz range is not uncommon among mini-monitors. Like a loudspeaker equipped with a much larger woofer, the HD6 creates an illusion of bottom-octave extension. Although not perfectly flat in frequency response, its bass has been tailored pleasingly, with commendable control and usable extension into the 50–60Hz range—certainly enough to provide excitement while listening to large-scale music, a feature I noted immediately during the final moments of Vaughan-Williams' *Antartica* [Naxos] when the orchestra, playing at full tilt, is suddenly interrupted by pipe organ, emerging like a leviathan from the musical depths. That's a lot of information, and the HD6 traversed this

SPECS & PRICING

Type: Self-powered wireless loudspeaker
Inputs: TosLink optical, Bluetooth aptX, 3.5mm stereo analog, left and right RCA analog

Codecs supported: aptX, AAC, SBC
Amplifier type: Analog dual-class A/B monolithic

Drivers: 5.5" Kevlar woofer, 1" silk-dome tweeter

Frequency response: 50Hz–22kHz +/- 1.5dB

Dimensions: 7.25" x 11.75" x 10"

Weight: Right speaker (powered) 17.5 lbs.; left speaker, 12.5 lbs.

Price: \$749

AUDIOENGINE USA

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territory with confidence and clarity. Indeed, it's a game little speaker, with very good mid-range dynamics. Don't expect it to reproduce the full impact of timpani mallets upon the big drumhead or the complex canvas of cavernous hall reverberations from a pipe organ. Yet, as I discovered, it didn't shy away from these challenges, either.

The HD6 exhibits a conservative signature in the treble range. As I listened to Norah Jones' "Come Away With Me" [Blue Note], I noted that her vocal sibilance was more subdued, and the intensity of brushed cymbals was moderated somewhat. Likewise, during Copland's *Fanfare* [Reference Recordings], the lusty brass ensemble

was a little less immediate than I've noted in the past, but presented with a fair amount of air—overall a little rolled-off but musically convincing, nonetheless. As I listened to the Beatles' "Hey Jude" on the HD6 I detected a small subtraction of presence and snap in Paul and John's harmonies and a general ceiling over the soundstage. I then reverted to my own, much pricier ATC SCM20-2SL two-way monitors for comparison. The height component of the crisply struck tambourine returned to the mix, as did the vocal transparency of Paul and John's vocals [*Past Masters*, Apple].

Yes, these are the sorts of trade-offs that small loudspeakers confront all the time, but I rate the HD6 sonics far preferable over the long haul than the hyper-detailed and bass-starved mini-monitors that were once the rage years ago, when such "lil' screamers" were taking the world by storm. Mini-monitors are about making hard choices in tonality and dynamic output. I like and admire the direction AE has taken the HD6.

Is the HD6 for you? First, you might consider how you plan to listen to music—now and in the future. A smart device-*only* system of today might very well handcuff you down the road. However, the HD6 is intelligently designed to grow with your changing tastes and listening habits. I can tell you from personal experience with my nieces and nephews—millennials all—that the HD6 is quite what the audio doctor ordered in their regard. A genuine performer, it's attractive, flexible, and user-friendly. Indeed, it's hard to imagine a "tweener" rig that does more for less than the HD6. Truly the little *audio* engine that could. **tas**

Equipment Report

KEF Muo Wireless Desktop Loudspeaker System

Honey, I Shrank 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 Muo's

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

Yes, the tiny two-way Muo is elegant looking, cute even, but don't let its stylishness belie some serious proprietary technologies inside that have been "trickled down" from the Muon. (If you shine a light and look through the grille

holes on the front panel you can actually see the drivers.) Let's start with the unique Uni-Q "point-source" driver array, a miniaturized version of the Muon's. There are two identical 50mm/2-inch full-range Uni-Q drivers, each with a decoupled central dome tweeter and midrange, in addition to one auxiliary long-throw radiator in between for better bass extension. When two drivers are placed closely together in a small enclosure, stereo imaging becomes difficult to extend beyond a limited sweet spot close to and directly in front of the speaker. High-frequency interference can distort and color the sound outside this area. In the Muo, only one Uni-Q driver handles the full frequency range, while the other driver plays only low and midrange frequencies. This configuration enables a "gentle" crossover for wider overlap and better sonic dispersion. Indeed, the Muo not only sounds like a larger speaker than it is, but its sound can fill a small-to-midsized room quite capably. In addition, either one (or a pair) is handy for desktop use, offers portability for travel, and paired most easily with my iPhone. (On practical note, I'd suggest that a slipcover case might be a worthy addition for a future model to help protect against marks and small surface scratches on the aluminum.) You can stream via

Bluetooth 4.0 aptX from your computer or mobile device, or listen via an auxiliary input (DAC, NAS, etc.); plus there's a micro-USB input, which can be used for charging and firmware updates.

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



Equipment Report KEF Muo Wireless Desktop Loudspeaker System

scribe 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 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 syncing.

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 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.

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), OS X 10.10.5. (The KEF folks 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—related to my hardware. I found I needed to reboot the laptops once or twice for the Bluetooth to “find” the Muo. In stereo mode, the 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. I’d recommend El Capitan or Yosemite, which both seemed to work fine.

Sonically Speaking

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

I mostly listened to Tidal streaming (hi-res version in Chrome) and tracks from my library rang-

ing 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 hires 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 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.

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

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

Riva Turbo X Wireless Music System

High End in Miniature

Robert Harley

One of the highlights of THE Show Newport wasn't a six-figure mega-system, but rather the show's most modest hi-fi—the Riva Turbo X. Smaller than a loaf of bread, the Turbo X is a portable, self-contained audio system with Bluetooth streaming.

But why get excited about a wireless speaker system when this category has become synonymous with commodity-grade audio? Because the Riva Turbo X is as far from a commodity product as you can get; it embodies thoughtful design combined with a high-end aesthetic. The Riva makes good sound accessible to the masses, serving as an ambassador carrying the message that better sound equals more musical enjoyment. It also makes a great bedroom, kitchen, office, garage, or vacation system for audiophiles.

The Riva Turbo X was created by a group of people who are passionate about music (see sidebar). They envisioned a product that communicated the musical experience in an affordable and accessible product. The Riva Turbo X is all that and more. In fact, the Turbo X is a high-end system in miniature, masquerading as a lifestyle product. It's also reasonably priced

(\$299), portable, and can run on its internal rechargeable battery for up to 26 hours.

Operating the Turbo X is straightforward. A row of touch-sensitive capacitive "buttons" (actually depressions in the top panel) turn on the power, select the source, set up Bluetooth pairing, and adjust the volume. The depressions allow the unit to be operated by hand, and the capacitive aspect makes the top water-resistant. In a nice detail, the buttons illuminate when you bring your fingers near the unit. You can also control the Turbo X via a free app. It's possible to disable the Riva's top-panel buttons so that the unit is controlled only by the app—a nice feature if you have small children. Inputs include wireless Bluetooth streaming, a USB input (with an "A" type connector, which works with the USB cable supplied with an iPad or iPhone), and a stereo Aux input. A mini-USB jack is provided for software updates. The Aux input is great for connecting to a portable player such as an Astell&Kern (which is how I did most of my listening). There's even a mode for increasing the analog input gain, a feature useful when connecting a lower-output source such as an inexpensive turntable that has an integral phonostage. The Turbo X can also func-

tion as a soundbar for multichannel audio (it has a dedicated "Surround" mode), and even as a smartphone speaker. Finally, you can charge your phone or tablet from the Turbo X's high-capacity internal battery.

A top-panel button marked "T" engages "turbo" mode, which allows the system to play louder, but at the expense of battery life. This mode engages, in DSP, compression of frequencies below 160Hz so that the drivers aren't overloaded by excessive excursion. Without this compression (non-Turbo mode), the Turbo X will produce an SPL of 92dB at 1 meter. With Turbo mode engaged this figure is increased to 99dB. Other than this "smart" reduction in dynamic range below 160Hz to protect the drivers when in Turbo mode, the Riva employs no other compression or equalization. My only complaint about operation is that the gimmicky "swoosh" sound when you engage the "turbo" can't be turned off. I was also confused by the charging system, specifically the rear-panel "Battery" button. It must be in a certain position for the Turbo X to charge, but I could never tell if it was in charging mode or not.

The build-quality and execution are outstanding. The Turbo X has the look and feel of

a product that has been refined through many iterations—not the first product from a new company. I particularly liked the rugged Cordura travel case (\$29.99), which has a separate zippered pouch for the power supply.

The Turbo X employs three active full-range transducers, one front firing and one each firing to the left and right sides. Two passive radiators on the front and two on the rear round-out the driver complement. Three speakers may seem like an odd number, but the Turbo X is designed around one of the company's core technologies, called Trillium, for which they were just granted a patent. Trillium uses digital signal processing to create a third channel from the incoming left and right channels, with the goal of creating a soundstage larger than is possible from conventional stereo.

All the drivers and electronics were designed in-house. The transducers are 60mm units with dual neodymium magnets, 25mm voice coils, and a frequency response of 60Hz–16kHz. The passive radiators have full frames, bobbins, spiders, and surrounds so that their motion remains piston-like. Many inexpensive passive radiators are simply diaphragms covering a hole. The drivers face in opposite directions (left and



Equipment Report Riva Turbo X Wireless Music System



right active speakers, front and rear passive radiators) to cancel vibration. The enclosure is braced as well so that most of the energy generated by the transducers is launched into the room as sound rather than as enclosure vibration. Each of the three active drivers is powered by a 15W Class D amplifier from Texas Instruments.

So what caught my ear at the Newport show demo? For starters, this tiny system effortlessly filled the hotel room with full-bodied sound. There's a cognitive disconnect when you look at the tiny Turbo X and hear truly deep and well-defined bass along with wide dynamic expression and a huge soundstage; it seems to defy the laws of physics. Not only that, but the Turbo X had a smooth and natural balance that seemingly conveyed lots of musical detail. It

sounded like a quality separates system, not a \$299 wireless speaker.

Exploring the Turbo X at home, I became even more enamored of this diminutive audio system. Not only does the Turbo X offer surprising bass extension and dynamics for its size, it has an extremely resolving and nuanced sound that beautifully communicates musical expression. The tonal balance is just right, with a clean and subtle treble. The top end lacks the hard sizzle (and rapid listening fatigue) of other compact portable systems. Despite its subtlety, the treble was surprisingly refined and resolved. Cymbals sounded like metal shimmering, not aerosol spray cans. The midrange was truly exceptional, with very low levels of coloration. Vocals seemed to "get out of" the Riva's tiny enclosure, existing in space. This midrange clarity is no doubt due in part to the full-range nature of the drivers; there's no crossover or discontinuity between disparate drivers. I listen to a lot of music on my desktop through a single full-range driver system (the amazing Audience 1+1 V2+) and I greatly appreciate the virtues of a full-range crossover-less transducer. The Turbo X has a coherence and openness in the midrange that you really have to hear to believe.

I noticed a significant difference in the bass response depending on where the Turbo X was located. When out in the open on a table, the bass was adequate. But with a wall behind it, such as on my desk, the boundary reinforcement really helps the Turbo X achieve its full bottom-end potential. Riva recommends placement near a wall or corner. On my desk, even a hard-rocking album like Jeff Beck's *Performing This Week . . . Live at Ronnie Scott's*, with Vin-

nie Colaiuta's cannon-like kick drum and Tal Wilkenfeld's center-of-the-earth bass guitar, didn't faze the Turbo X. Usually, turning up a portable speaker system results in mushy bass, clipping, enclosure vibration, and other signs of distress. Not the Turbo X—it reproduces bass and dynamics better than some small bookshelf speakers. Commendably, the bass was clean and articulate, with good pitch definition. I could hear individual notes, not just the fuzzy mush that is typical of small wireless speaker systems.

Another amazing thing about the Turbo X is

SPECS & PRICING

- Frequency response:** 60Hz–16kHz
- Maximum SPL:** 92dB at 1m (conventional mode); 99dB at 1m (Turbo mode)
- Inputs:** Bluetooth, USB audio, line-in (stereo mini-jack), USB data
- Audio codecs supported:** SBC, AAC, aptX
- Battery life:** 6+ hours at maximum volume; 26+ hours at 75dB
- Drivers:** Three active, four passive radiators
- Dimensions:** 9.1" x 3.5" x 4.1"
- Weight:** 3.5 lbs.
- Price:** \$299

RIVA AUDIO

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Fountain Valley, CA 92708
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rivaaudio.com



Equipment Report Riva Turbo X Wireless Music System

that its tonal balance doesn't change much when you are off-axis from the unit's front. You can walk around the room and hear essentially the same balance no matter where you are. There's a bit more treble sparkle and openness if the Turbo X is positioned near ear level, but I suspect that the system was voiced so that you don't need to be on-axis.

The Riva Turbo X is fun to use, rewarding to listen to, and makes a great second system for audiophiles. But more importantly the Turbo X is a glimpse into the high end for the mass-market listener. It brings audiophile values to a product that fits the way in which many non-audiophiles listen to music. **tas**

The Backstory

Riva is the brand name of products developed by Audio Design Experts (ADX), a company formed by a group of engineers who had developed audio technologies for other companies. One of the products they had designed became the world's best-selling soundbar. The engineers were working for driver manufacturer Aurasound when they left to team up with Rikki Farr, who took the role of company Chairman. Farr has long experience in audio as a concert promoter (he put on the Isle of Wight festival in 1970), owner of one of the world's largest touring sound companies, nightclub proprietor, and creator of consumer audio products.

The Turbo X was designed primarily by ADX's President and Chief Engineer, Don North. North is a longtime audiophile, music lover, and vinyl enthusiast. North spent most of his career as a transducer designer, and developed drivers that ended up in products such as the McIntosh XRT speaker system, the 12" woofers in the Legacy Focus, and in products for Boston Acoustics. He's also the author of the acclaimed Stratus 2A3 directly heated triode headphone amplifier.

Farr, North, and the design team set out to create products that brought a high-end aesthetic to a mass-market category. They evaluated the existing wireless speaker systems and found them to be lacking. Specifically, these designs processed the signal with bass and treble boost along with dynamic range compression. The compression gave the listener a greater sense of loudness, but at the expense of natural dynamics—and concomitant reduction in musical expression. Designers of commodity-grade systems also compress dynamics so that the drivers' design parameters can be relaxed, thus making the drivers less costly to build. Another limitation of products in this category is enclosure vibration, which gives the bass a "plastic-y" fuzzy character rather than real pitch definition.

They developed the prototype of the Turbo X and partnered with one of the largest electronics manufacturers in Taiwan, Wistron, who came aboard as an investor. Wistron builds products for companies such as Sony, Apple, and Lenovo, which explains the Turbo X's outstanding execution.

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links in your system and upgrade where it will do the most good; how to set up and tweak your system for maximum performance from equipment you already own; how to read equipment reviews; and most of all, how to become a more perceptive and appreciative listener. This book makes hi-fi more fun!

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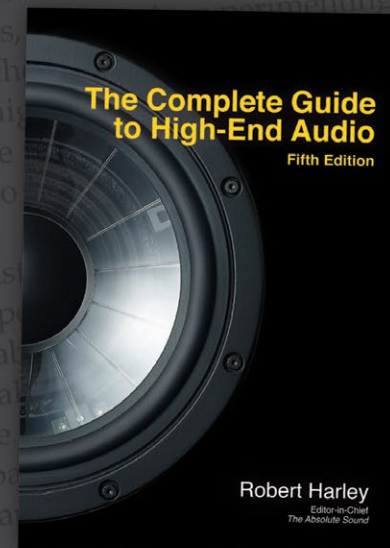
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Equipment Report

Bowers & Wilkins T7 Wireless Portable Speaker

Grab & Go

Neil Gader

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

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

SPECS & PRICING

Input: One analog via 3.5mm mini-plug

Dimensions: 4.5" x 8.25" x 2.13"

Weight: 2 lbs.

Price: \$349

B&W GROUP NORTH AMERICA

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North Reading, MA 01864
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bowers-wilkins.com

meant to reduce vibration and distortion. This is likely the reason why, even at louder levels, the T7 not only doesn't fall apart sonically but also doesn't fall to pieces physically.

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

Setup is a breeze. Simply choose which laptop or smart device to pair with the T7, and that

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

Keep in mind that as a BT device the T7 doesn't have the same throw distances as portables operating on a wireless network. As a result, it requires fairly close proximity to the server. On the other hand, wireless networks, particularly those shared by other members of the family, have their own share of aggravating dropouts and are often difficult to configure. Bluetooth setup is pretty much dummy-proof, or as I like to say—*my style*.

The T7's sound is poised and full-bodied with a fluid, rhythmic feel that truly surpassed my expectations. Spoken word from podcasts is articulate, with a warmer hue rather than an overly sibilant edge. I spent a lot of time playing back FLAC files courtesy of Tidal (tidalhifi.com/us). The sound was as engaging as the wireless

reception was reliable. Through the T7, my pop and rock playlists maintained a forward balance and a level of presence that framed vocals up front and center, with surprisingly clear backing images. Eric Clapton's "Change the World" had a robust snare sound, good resolution of the backup singers, and a level of tightly defined low-end energy unexpected in a product so diminutive. In addition, Clapton's acoustic guitar solo had genuine transient snap and focus. The T7's real trick, however, is its dynamic performance—the very thing that so often is the first to get tossed from the micro-speaker bus. In this case, the T7 reproduces dynamic gradations with relative sensitivity, on both the micro- and macro-level.

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



Our Top Picks Desktop & Bluetooth



Riva Turbo X

\$299

Nominally, Riva's Turbo is just another Bluetooth speaker system. But look (or better yet, listen) a little closer and you'll discover that the Riva Turbo is high-end audio in miniature. Weighing just three pounds and about two-thirds the size of a loaf of bread, the Turbo throws a huge yet defined soundstage, offers wide dynamics, and delivers shockingly deep bass extension for its size. It will run for up to 26 hours from its integral battery. It's perfect for a bedroom system, garage, or travel—and comes with a very nice travel case. rivaaudio.com (261)



B&W T7

\$349

The B&W guys clearly know the musical terrain in this wireless/streaming radio mini segment. The T7 sounds poised and full-bodied with a fluid, rhythmic feel that will truly surpass expectations. Keep in mind that as a Bluetooth device the T7 requires fairly close proximity to the server. NG thinks it should also be said that the T7 proves that portable, wireless speakers can be consistent with high-end values. That, and suitable for take-out too. bowers-wilkins.com (252)



KEF Muo

\$350/each

This wonderfully portable little wireless loudspeaker delivers 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. Available in six different finishes, it may look cute and colorful on the outside, but it's serious on the inside: The Muo boasts a miniature version of KEF's Uni-Q "point-source" driver arrays—a decoupled central tweeter dome, midbass, plus a long-throw radiator in the middle for better bass extension. How they packed this remarkably clean- and clear-sounding configuration into this sleek 3.1" x 8.3" x 2.3" form is a wonder—and a testament to its clever design. kefdirect.com (265)



Audioengine HD6

\$749

Perhaps the most versatile piece of gear the clever team at Audioengine has come up with yet. Powered, DAC-equipped, and Bluetooth-enabled, the two-way HD6 is comfortable on a desk or shelf, or flanking a flat panel, or set out in the room on a pair of stands. It's basically a complete audio system that only needs a source as humble as a smartphone to get up and running. Sonically it conveys a conservative, forgiving signature in the treble range, and an ear-coddling midrange with a warmer, slightly darker voice that was effective at conveying big sound from a small box. Bass response was largely very good, if a little overly enthusiastic in the upper midbass but with commendable control and usable extension into 50–60Hz range. A genuine performer, it's hard to imagine a loudspeaker that does more for less. A crossover product like few others. audioengineusa.com (262)