the absolute sound
BUYER'S GUIDE TO AUDIO ELECTRONICS

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From the Editor

Welcome to the 2016 Buyer's Guide to Audio Electronics!

We, the editors at *The Absolute Sound* are delighted to bring you this, our latest and greatest guide to audio electronics. Herein you'll find not only **22 of our most recent and important reviews from TAS**, but you can also take in plenty of brand-new content:

- **"On the Horizon,"** featuring the scoop on **19 of the hottest upcoming electronics**—from preamplifiers to all kinds of amplifiers: integrateds, power amps, stereo amps, plus more.

- **"How to Choose Just the Right Amount of Amplifier Power,"** essential advice excerpted from the latest (fifth) edition of Robert Harley's classic *Complete Guide to High-End Audio*.

- A special **"Sneak Preview,"** plus **new reviews of electronics not yet published in TAS.**

- **"Pioneers of High-End Audio,"** three profiles—William Zane Johnson, James Bongiorno, and Nelson Pass—excerpted from *The Absolute Sound's Illustrated History of High-End Audio, Volume Two: Electronics*.

- **"Top Picks,"** where **our reviewers select the best electronics in five categories** across a wide range of prices.

Whether you're new to the high-end scene or a longtime audiophile, we hope you'll find this guide both a fun, informative read and an invaluable resource to help with your next hi-fi purchases.

Happy listening!

Julie Mullins, Editor

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On the Horizon

ON THE HORIZON

Elac Debut Series DA101EQ

This integrated amplifier marks Elac's return to the electronics category. The Debut Series DA101EQ integrated amplifier solves two of the biggest problems with two-channel audio: proper integration and blending of a subwoofer with your main speakers, and room correction. Elac's advanced DSP and innovative smartphone application provide tools to help anyone achieve a true audiophile system at an affordable price. This integrated also features an innovative 100Wpc full-range BASH amplifier that combines the quality of Class AB with energy efficiency approaching Class D. A total of seven inputs including analog, SPDIF, asynchronous USB, and Bluetooth ensure compatibility with most popular sources. Available in June 2016.
Price: $599. elac.us

Auralic Merak

A monoblock power amplifier for the 21st century: Auralic created Merak by merging sophisticated amplifier design philosophy with modern audio technology, all with a compact appearance. The heart of Merak is Auralic's Hybrid Analog Amplify technology. By using it with the Orfeo Class A output module, input isolation transformer, linear power supply, and several other technologies, Auralic brings the essence of analog back to life. Thanks to the new generation of switching technology, Merak achieves 400W of continuous output power while maintaining its efficiency at 90 percent. Benefiting from a linear power supply and a 56,000uF capacitors array, energy storage of Merak is more than 120 Joules; this enables Merak to deliver 16 amps peak current—equal to about 900W power—into large, power-hungry loudspeakers.
Price: $2499 each. auralic.com

Angstrom Audio Lab Stella

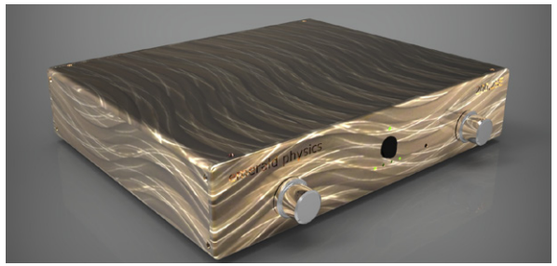
Based in Italy, Angstrom Audio Lab specializes in the artisan production of bespoke amplifiers, such as its new Stella integrated. It's a Class A, dual-mono design rated at 100Wpc into 8 ohms. The Stella features a pair of ECC81 tubes in the preamp stage and EL34s (six per channel) in the output stage in a push-pull, triode configuration. It's equipped with two toroidal output transformers per channel in circlotron operation, in addition to five independent power supplies. Gain adjustment is provided for exacting system optimization, and on the back panel, there are five RCA inputs and an XLR input. Handcrafted in Italy, the wood side panels add a touch of luxury—as do the dashing lighted output meters. In short, the Stella was designed for discerning listeners demanding the highest level in audio amplification.
Price: $16,000. wellpleasedav.com

ON THE HORIZON

BHK Signature

The BHK Signature preamplifier is the culmination of a lifetime of research and design work by legendary designer Bascom King. The preamp is a full-function linestage, featuring five single-ended and balanced inputs, a discrete Class A MOSFET headphone amplifier, all classic through-hole construction, PRP resistors, assignable home-theater bypass, and a fully balanced design. Based on a pair of zero-feedback 12AU7 current-sourced vacuum tubes feeding a Class A MOSFET output stage, the BHK preamp delivers extreme linearity with a rich and open sound. Unique to the preamp's design is its multi-stage stepped attenuator. High-voltage analog switches and gold contact relays are incorporated in a two-stage process of linear attenuation. The first stage uses a classic, single-element, variable-shunt attenuator feeding the vacuum tube input. Finer adjustments are made through varying the actual gain of the vacuum tube—and together, these elements form a sonically-invisible attenuator.

Price: $5999. psaudio.com



Emerald Physics EP200.2SE

The first of many additions to its electronics lineup, Emerald Physics' new EP200.2SE delivers 200Wpc into 8 ohms and 400Wpc into 4 ohms. This same power amplifier also does double-duty as an integrated amp. The newest member of the Emerald Physics family sports an all-aluminum chassis, precision-milled and finished in a luxurious translucent powder-coating. It is remote controlled and has three inputs (including one balanced and two single-ended) along with a remote wand and pre-out/main in loop. Twin 400va transformers power the dual-mono amplifier side, while a separate transformer powers the rest of the circuitry. Clean, powerful, and definitive in design, the EP200.2SE represents a statement product that introduces the next generation of Emerald Physics electronics. Available in late May.

Price: $2995. emeraldphysics.com

Pass Labs Point 8 Series

Pass Labs' Point 8 series of power amplifiers is a new family of music-first audiophile components seven years in the making. The amplifiers refine superb objective measurements with subjective perceptions. They are models of electronic elegance, delivering more power, fewer stages, lower distortion, and less feedback than ever before. They more accurately represent recording venues through a soundstage whose dimensionality does not change no matter the complexity of the source material. In addition, the layering of orchestral instruments by Point 8 amps allows the orchestra to seem present in the listening room, but with more space and air around the instruments, leading to a greater sensation of musical ease and flow. The series consists of five Class A amplifiers and four Class AB amplifiers, four two-channel and five monoblock models. The two-channel amps include the X150.8, the X250.8, the X350.8, and the XA30.8. The mono models include the X600.8, the XA60.8, the XA100.8, the XA160.8, and the XA200.8. Their per-channel power ratings range from 30Wpc for the two-channel XA30.8 to 600W for the single-channel X600.8.

Pricing: $6750 to $42,000/pr. passlabs.com

www.theabsolutesound.com

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ON THE HORIZON

VAC Phi 170 iQ

The VAC Phi 170 iQ is the most affordable amplifier yet to feature VAC's patented iQ Continuous Automatic Bias System, first seen in the cost-no-object Statement Series. The VAC iQ System automatically and continuously holds each output tube's quiescent (idle) current at the precise target amount, resulting in greater detail, better dynamics, lower distortion, and longer tube life. The Phi 170 may be operated as an 85Wpc stereo amplifier, or as a 170W monoblock, capable of delivering full power into 2, 4, or 8 ohms. It is also switchable for single-ended inputs or fully balanced operation (i.e., completely balanced from input to speaker terminals). The direct-coupled input and driver circuits utilize four Tung-Sol 6SN7 twin triodes, while four Gold Lion KT88s provide the power. KT90, KT99, KT120, or KT150 may also be used.
Price: $9900. vac-amps.com

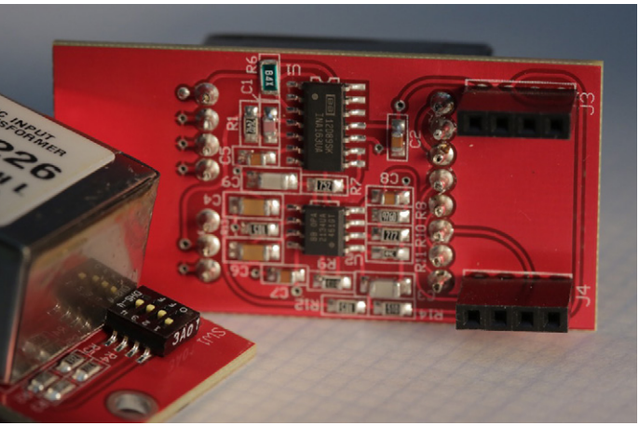
Bryston Cubed Series

Bryston has introduced the Cubed Series of amplifiers which replaces the award-winning Squared Series that made its debut at the 2009 CES. The Cubed Series is a statement design platform ideal for music and theater enthusiasts. The new lineup features the 2.5B³, the 3B³, the 4B³, the 7B³ (pictured), 14B³, and the flagship 28B³. Engineering achievements are at the forefront of the new designs, which feature a patented super-linear, low-noise input buffer jointly developed by Bryston and the late Ph.D. engineer Dr. Ioan Alexandru Salomie. The Cubed Series also has a more robust RF and audio-frequency noise-filtering circuit before the power supplies to prevent unwanted anomalies on the power line from interfering with the audio signal. The new amplifiers also will feature an elegantly redesigned milled-aluminum front panel. Naturally the Cubed Series feature Bryston's legendary 20-year warranty.
Prices range from $3695 to $10,995 (mono). bryston.com

Esoteric C-03Xs

Esoteric has released the latest version of its "03" line of preamplifiers, the C-03Xs. This new range represents Esoteric's most affordable preamps but still offers tremendous audio performance—and as with any Esoteric product, is built to an extremely high standard. The latest revisions incorporate some of the technology developed for the acclaimed Grandioso series, such as the 100,000-microFarad EDLC super-capacitor alley in the HCLD power supply; this provides a level of resolution, detail, and spacious imaging that's all but unheard-of in this price range. As with all Esoteric preamps, the C-03Xs employ a fully balanced design and the company's Quad Volume Control System (QRVS). For hybrid audio systems, there is also an AV through-mode.
Price: $11,000. A special-order version with a built-in phono section is also available for $12,500. esoteric-usa.com

ON THE HORIZON



Jeff Rowland HP Phono Card

Jeff Rowland Design Group is announcing its new HP phono card that can be used to upgrade any Capri, Capri S2, or Continuum S2 equipped with the original card. While the original phono card has options for mm, mc, and high-output mc gain and loading (via user-adjustable jumper placement), the HP card is specifically designed and optimized for compatibility with all low- and medium-output moving-coil cartridges. Cartridge loading can be set over a wider range with user-selectable pc board switches—and the card is now conveniently adjustable without removal. An amorphous-core input transformer, which is configured for low gain to preserve high-frequency bandwidth, allows for a balanced phono-cartridge interface to keep the delicate cartridge signal intact. Balanced input circuitry and precision 0.1% thin film resistors throughout provide 64dB of gain with extremely low noise and excellent RIAA equalization accuracy. Available now from your dealer.
Price: $1100. jeffrowlandgroup.com

Constellation Audio Inspiration Integrated 1.0

The Constellation Audio Inspiration Integrated 1.0 is the newest member of the company's entry-tier Inspiration Series, and joins its preamplifier and amplifier line-mates in delivering the performance that is expected from Constellation Audio at a more affordable price. Delivering plenty of power—100Wpc into 8 ohms (and twice that into 4)—a full array of balanced and single-ended inputs and outputs, and an included headphone amp, the Inspiration Integrated 1.0 provides the easiest entrance into the world of Constellation Audio. Like all Constellation Audio products, the Inspiration Integrated 1.0 takes full advantage of shared family technologies. Its design is based on the award-winning Inspiration Preamp 1.0 and Stereo 1.0, combining the preamplifier and half of the stereo amplifier on a single chassis. The custom-designed binding posts are the same binding posts used on the Performance Series Centaur and Reference Series Hercules amplifiers.
Price: $13,500. constellationaudio.com

Zesto Audio Eros

Eros is Zesto Audio's most powerful product to date, and fills out the Zesto line with the beauty and authority of a modern, monoblock tube amp design. Equipped with 150 Watts per block of pure Class A power and driven by a matched sextet (6) set of KT88s and a pair of ECC82s, Eros has plenty of power to drive any loudspeaker. The circuit topology is push-pull and ultra-linear with no negative feedback. Unlike solid state, this tube amp efficiently transfers power by matching the output transformer to the impedance of the loudspeaker using 4 and 8 ohm taps. The power supply is a robust choke-based design incorporating a custom toroid power transformer. Additionally, Eros has auto-bias, so it is safe and easy to use with no adjustments or tweaking. Also there are two parallel options for loudspeaker cables—the five-way binding posts or the SpeakOn connector.
Price: $19,900/pr. zestoaudio.com

ON THE HORIZON

Absolare Passion

One of Absolare's key design goals for the Passion integrated amplifier is that the sonic envelope not be correlated to the sound of solid-state amplification. To achieve this goal, Absolare utilized an advanced hybrid implementation of dual-mono, individually powered solid-state amplification architecture with tube preamplification. Absolare believes that the Passion integrated amplifier has the musical and emotional involvement of a tube amplifier with an inaudible sonic signature. To that end, it delivers 150Wpc into 8 ohms and 200Wpc into 4 ohms while utilizing a 48-step volume control. Housed within the company's signature monoblock chassis, Passion preserves the luxurious Absolare product look and feel. Equipped with four inputs, both RCA and XLR in addition to a remote control.
Price: $24,750. absolare.com

Rotel RA-1592

The RA-1592 integrated amplifier is based on the formidable RA-1570, but with 200Wpc on tap, it sports even greater output from its proven Class AB design. Featuring Rotel's famously rugged power supply with a massive toroidal transformer and slit-foil capacitors, the result is power that won't sag and distort under challenging speaker loads or dynamic signal transients. The preamplifier section addresses both the popularity of today's digital sources and classic analog devices. There's a front-panel USB input for easy connection to Apple smart devices. There's also a rear-panel asynchronous USB input that supports files up to 24-bit/192kHz plus multiple coaxial and optical inputs to provide easy connections for LPCM music sources including high-resolution streaming devices. Finally, Rotel has included Bluetooth aptX, an enhanced version of standard Bluetooth, and for the analog faithful, inputs include phono (mm), aux, and tuner plus a pair of XLR connectors.
Price: $2499. rotel.com

Arcam SR250

The SR250 is Arcam's first two-channel, high-performance AVR designed for enthusiasts who want an amplifier that rivals the best stereo separates, but with the connectivity and flexibility that a networked modern AVR delivers. To further enhance the performance of the new 90Wpc SR250, Arcam has also included the very latest room correcting technology from Dirac Research. With the proprietary Dirac Live, both video and audio stages are designed to embrace both current and upcoming technologies; HDMI2.0a with HDCP2.2 4K "Ultra HD" and 3-D video capability are built in. An internal tuner provides a fully integrated FM/DAB/DAB+ (in appropriate markets) radio solution. Worldwide access to internet radio stations is provided through the network connection, which also interfaces to UPnP audio servers. There's also a USB port to support memory devices.
Price: $3600. soundorg.com

ON THE HORIZON

Cary Audio SI-300.2d

The new SI-300.2d integrated amplifier combines Cary Audio's analog preamplifier and a 300Wpc Class AB power amplifier with a powerful digital section. The digital sections are a chip off Cary's reference products and include top-tier digital circuit topology, D/A conversion process, and a proprietary TruBit upsampling feature. Inputs include four line-level inputs (two balanced XLR, two RCA), Cinema Bypass, XMOS USB, coaxial (2), optical, AES/EBU, and aptX Bluetooth. All SPDIF and Bluetooth digital sources allow for selectable digital upsampling to 768kHz. XMOS USB input enables native 32-bit/384kHz playback and DSD 64, 128, and 256 files. Includes a pre/subwoofer output, coaxial and optical digital outputs, IR hand-held remote, Ethernet and Wi-Fi for controlling the SI-300.2d with free iOS and Android apps.
Price: $5995. caryaudio.com

Cary Audio AiOS All-in-One System

The new AiOS All-in-One System is the first product under Cary Audio's lifestyle series, designed for a new age of music listening and enjoyment—one where simplicity, compactness, and aesthetics take precedence...one where music sources come together from the internet, computers, mobile phones and tablets, USB sticks, hard disc drives, SD cards, or from other digital and analog connected sources. Lifestyle series means the AiOS is designed to fit into your lifestyle both for listening preferences and visual appeal. What's more, AiOS has its own apps for Android and iOS for easy control whether you're relaxing comfortably or roaming about leisurely. The switchable color illumination and optional matching-color side panels for AiOS makes for an exceptionally flexible and handsome music system.
Price: $2995. caryaudio.com

Emotiva BasX Series

Both entry-level and aspiring audiophiles can take heart in the new and affordable BasX line of audio components from Emotiva. BasX includes an array of two-channel amps, powerful multizone amplifiers, and versatile stereo preamp/tuners, engineered to work together and outfitted with the most intuitive operation in audio. Featured throughout the line are robust toroidal power supplies and muscular Class AB output stages. For example, the BasX A-100 (pictured) is a small, powerful 50Wpc integrated amplifier in a half-rack-width package that's ideal for anchoring a small stereo system. It includes automatic turn-on, front-panel volume control, and a high-powered headphone output. The PT-100 preamp/tuner ($299) sports a high-quality FM tuner, and both digital and analog inputs to connect to all audio sources. It includes a precision mm/mc phono preamp, a USB input that supports digital audio up to 24/96k, and an optional Bluetooth module input. Need power? The IA-100 tuner/amplifier includes all of the features of the PT-100, but adds a stereo amplifier that delivers 50Wpc into 8 ohms.
Prices: A-100, $199; PT-100, $299; IA-100, $399. emotiva.com

Audio by Van Alstine Transcendence 10RB and DVA850

RB stands for Real Basic, a transparent and engaging new pure tube preamplifier designed to be affordable and make real improvements to any budget system. With four sets of inputs, two sets of outputs, plus an outstanding headphone buffer section, the 10RB uses two 6DJ8/E88CC or 6N1P tubes. A remote-motor-driven analog volume control and AVA's acclaimed Vision adjustable phono section are available as options.

Also new is the DVA850 ultra-high-power hybrid tube monoblock power amplifier that AVA calls the delicate brute. With the power to run most any audio system, its musicality, bass dynamics, and transient response are as good as you are going to find at a rational price. The DVA850 has both RCA and XLR inputs (switchable) to accommodate any source, along with dual sets of speaker binding posts to allow easy bi-wiring. Equipped with two 12AT7/ECC81 tubes. A peerless value considering the cost per watt, all 850-plus of them.
Prices: 10RB, $899 base price; DVA850, $3699/each. avahifi.com

SNEAK PREVIEW

Audio Research Reference 250 SE

Don Saltzman

The introduction of a new Reference-line tube amplifier from venerable manufacturer Audio Research Corporation is always a big deal. Incorporating significant upgrades from its Reference 250 predecessor, the Reference 250 SE mono amplifier features Tung-Sol's latest high-current output tube, the KT150. The 250 SE also features a sleek(er) new look and internal enhancements including new active and passive parts and a 50 percent larger power supply than the Ref 250. And the new power meter not only looks cool, but it also enables easy biasing of the output tubes.

Sonically, the Reference 250 SE is the epitome of its maker's "High Definition" tagline. First, the lack of background noise is startling, especially for a large tube amplifier. The amp is so quiet that it sometimes comes as a shock to hear an unexpected instrument "pop out" of seemingly nowhere. Based on what's captured in the recording, the soundstage can be vast, with the space around each instrument breathing life into the performance.

Most impressive is what these amplifiers can do with the Magneplanar 20.7s. Like a black hole in grille cloth, this relatively inefficient loudspeaker can inhale an aspiring power amplifier with nary a trace left behind. But, with the right amplifiers, these speakers sing like few others. With the 250 SEs they sing with a full chorus. Each watt has been to the gym, and the nominal 250-watt rating feels conservative—a pleasant surprise for someone who previously was convinced that only more powerful amplifiers (tube or solid state) could do justice to the 20.7s.

When this brawn is combined with saturated tonal colors, huge dynamic swings, delicacy, lifelike textures, and solid-state-like low-bass extension and control (but with the bloom and air of tubes as found in the Reference 250 line), the new Reference 250 SE is a class leader in higher-power tube amplifiers. DS, full review forthcoming.

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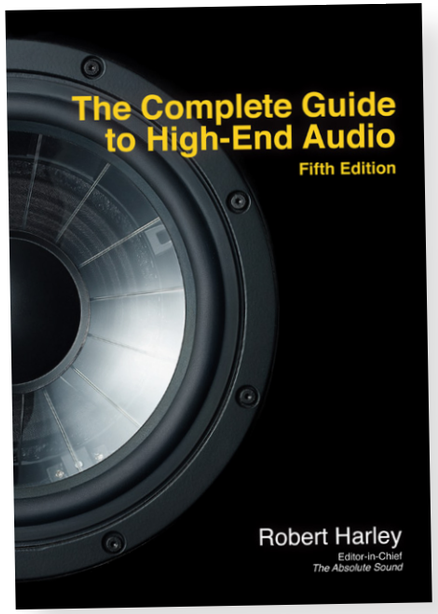
How to Choose Just the Right Amount of Amplifier Power

Excerpted and adapted from *The Complete Guide to High-End Audio (*fifth edition). Copyright © 1994–2015 by Robert Harley. hifibooks.com. To order call (800) 841-4741.



How Much Power Do You Need?

The first question to answer when shopping for a power amplifier or integrated amplifier is how much output power you need. Power output, measured in watts into a specified loudspeaker impedance, varies from about 20 Watts per channel (Wpc) in a very small integrated amplifier to about 1000Wpc. Most high-end power amplifiers put out between 80 and 250Wpc.

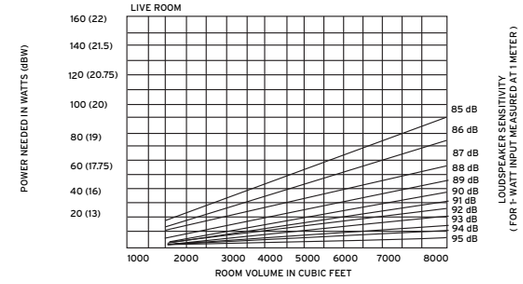
Choosing an appropriate amplifier power-output range for your loudspeakers, listening tastes, room, and budget is essential to getting the best sound for your money. If the amplifier is under-powered for your needs, you'll never hear the system at its full potential. The sound will be constricted, fatiguing, lack dynamics, and the music will have a sense of strain on climaxes. Conversely, if you spend too much of your budget on a bigger amplifier than you need, you may be shortchanging other components. Choosing just the right amplifier power is of paramount importance.

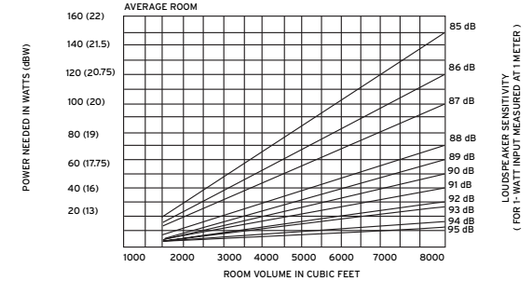
The amount of power needed varies greatly according to loudspeaker sensitivity, loudspeaker impedance, room size, room acoustics, and how loudly you like to play music. Loudspeaker sensitivity is by far the biggest determining factor in choosing an appropriate power output. Loudspeaker sensitivity specifies how high a sound-pressure level (SPL) the loudspeaker will produce when driven by a certain power input. A typical sensitivity specification will read "88dB SPL, 1W/1m." This means that the loudspeaker will produce an SPL of 88 decibels (dB) with one watt of input power when measured at a distance of one meter. Although 88dB is a moderate listening volume, a closer look at how power relates to listening level reveals that we need much more than one watt for music playback.

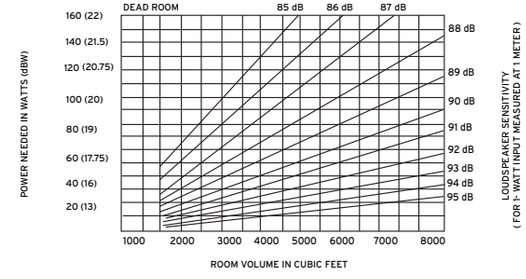
Each 3dB increase in sound-pressure level requires a doubling of amplifier output power. Thus, our loudspeaker with a sensitivity of 88dB at 1W would produce 91dB with 2W, 94dB with 4W, 97dB with 8W, and so on. For this loudspeaker to produce musical peaks of 109dB, we would need an amplifier with 128W of output power.

Now, say we had a loudspeaker rated at 91dB at 1W/1m—only 3dB more sensitive than the first loudspeaker. We can quickly see that we would need only half the amplifier power (64W) to produce the same volume of 109dB SPL. A loudspeaker with a sensitivity of 94dB would need just 32W to produce the same volume. The higher-sensitivity speaker simply converts more of the amplifier's power into sound.

This relationship between amplifier power output and loudspeaker sensitivity was inadvertently illustrated in an unusual demonstration more than 60 years ago. In 1948, loudspeaker pioneer Paul







How to Choose Just the Right Amount of Amplifier Power

Klipsch conducted a demonstration of live vs. reproduced sound with a symphony orchestra and his Klipschorn loudspeakers. His amplifier power: 5W. The Klipschorns are so sensitive (an astounding 105dB SPL, 1W/1m) that they will produce very high volumes with very little amplifier power. Klipsch was attempting to show that his loudspeakers could closely mimic the tonal quality and loudness of a full symphony orchestra.

The other end of the speaker-sensitivity spectrum was illustrated by a demonstration I attended of an exotic new loudspeaker. During the demo, the music was so quiet that I could barely hear it. I looked at the power amplifiers—300Wpc monsters with large power meters—and was astonished to see that the power meters were nearly constantly pegged at full power. This unusual speaker converted only a minuscule amount of the amplifier's output power into sound.

The importance of loudspeaker sensitivity is also demonstrated by today's 3Wpc single-ended triode amplifiers, which can produce moderately loud listening levels through high-sensitivity speakers. These examples of huge variations in sound-pressure level and amplifier power illustrate how loudspeaker sensitivity greatly affects how big an amplifier you need. Even a small difference in loudspeaker sensitivity—2dB, say—changes your amplifier power requirements.

Why Amplifier Output Current Matters

Some amplifiers barely increase their output power when driving 4 ohms; others can double it. This means that not all "100Wpc" amplifiers are created equal. One "100Wpc" amplifier might put out 150W into 2 ohms, while another might deliver 400Wpc into 2 ohms. This ability to drive low-impedance loads (specifically, to deliver lots of current) has a large influence on an amplifier's sound and subjective power capability. Loudspeakers have dips in their impedances at certain frequencies, which puts greater current-delivery demands on the power amplifier.

This difference has real-world consequences. The ability to increase output power into low impedances indicates how much current the amplifier can deliver to the loudspeaker. It is current flow through the loudspeakers' voice coils (in dynamic loudspeakers) that creates the electromagnetic force that causes the cones and domes to move, and thus produce sound. If current flow through the voice coil is constrained, so is the music.

"Each 3dB increase in sound-pressure level requires a doubling of amplifier output power."

An analog is helpful to understanding this concept. Think of a power amplifier driving a loudspeaker as a water faucet and a hose; the water pressure is voltage, the flow of water through the hose is electrical current, and squeezing the hose forms a resistance (impedance) to the flow. In this analogy, the loudspeaker's impedance is the resistance in the hose that impedes the flow of water. The lower the loudspeaker's impedance, the less the resistance to current flow from the amplifier, and the harder the amplifier must work to deliver current to the loudspeaker. If the impedance is halved (say, from 8 ohms to 4 ohms), the amplifier is asked to deliver double the current to the loudspeaker (all other factors being equal).

PREVIOUS PAGE NEXT PAGE

"In the end, everything is subjective, but in my humble opinion there is no better brand out there for innovative design, military spec like build quality and outstanding sound performance. In this case, if you also consider the astonishing value realized when compared to the best, we have something very very special."

Robert S. Youman

INT-60 Review
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How to Choose Just the Right Amount of Amplifier Power

If the amplifier isn't up to the job, the musical result is strain or even distortion on musical peaks, weak bass, loss of dynamics, hardening of timbre, and a collapsing soundstage. In short, we can hear the amplifier give up as it runs out of power. Conversely, amplifiers that can continue increasing their output power as the impedance drops generally have very deep, extended, and powerful bass, virtually unlimited dynamics, a sense of ease and grace during musical peaks, and the ability to maintain correct timbre and soundstaging, even during loud passages. If you have relatively high-impedance loudspeakers with no severe impedance dips, you're much less likely to encounter sonic problems, even with modest power amplifiers; the loudspeaker simply demands less current from the power amplifier.

Amplifiers with high current capability (indicated by their ability to increase output power into low impedances) are often large and expensive. Their current capability comes from massive power transformers, huge power supplies, and lots of output transistors—all expensive items.

Keep in mind, however, that not all systems require large power amplifiers. If you have sensitive loudspeakers with a fairly high impedance, the loudspeaker's current demands are vastly lower. Consequently, smaller amplifiers work just fine. Single-ended triode amplifiers with as little as 3Wpc and very limited ability to deliver current can sound highly musical when driving a load-appropriate loudspeaker.

What to Look for When Comparing Power Ratings

When comparing amplifier power ratings, make sure the specified power is continuous or RMS rather than peak. Some manufacturers will claim a power output of 200W, for example, but not specify whether that power output is available only during transient musical events such as drum beats, or if the amplifier can deliver that power continuously into a load. RMS stands for "Root Mean Square," a mathematical calculation expressing the effective, or average, power output. Very few amplifiers are, however, specified by peak power.

Another way manufacturers exaggerate power ratings is by not specifying the power bandwidth. This term describes the frequency range over which a power amplifier can deliver its power. A power amplifier delivering 200W at 1kHz is far less powerful than one that can deliver 200W over the full audio bandwidth of 20Hz–20kHz. You'll often see mass-market audio/video receivers with power-output ratings specified only at 1kHz, or from 50Hz to 20kHz. Further, stereo power amplifiers can deliver more power with only one channel driven—look for the words "both channels driven." The maximum power output should also be specified at a certain distortion level.

You can see the potential for misleading power-amplifier output claims. The abuses were so bad at one time that the Federal Trade Commission (FTC) stepped in to regulate power claims—the only example of an audio specification being regulated by a governmental body. The FTC mandate for power ratings requires that the power rating be continuous (not peak), that the load impedance and bandwidth be specified, and that the Total Harmonic Distortion (THD) be given at full power and measured over the audio bandwidth. You may see a power specification that reads "50Wpc continuous (or RMS) power

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How to Choose Just the Right Amount of Amplifier Power

into 8 ohms, both channels driven, 20Hz–20kHz, with less than 0.1% THD." A power specification including all these conditions is called an "FTC power rating." Some manufacturers no longer adhere to the FTC-mandated power ratings, figuring that the issue has blown over and is no longer enforced. You see fudged power ratings on mass-market audio/video receivers that must now power five or seven loudspeakers rather than two, and in single-ended triode amplifiers that cannot meet the stringent FTC power-output specification requirements.

> "The higher-sensitivity speaker simply converts more of the amplifier's power into sound."

If you're amplifier-shopping for low-impedance loudspeakers, look at the power-output specifications into 4 ohms. Make sure you see the words "continuous" or "average" in the power rating. See if the bandwidth and distortion are specified. These figures don't tell us what we need to know about the amplifier's musical qualities, but nevertheless indicate good technical performance.

Why Amplifier Power Isn't Everything

We've seen how loudspeaker sensitivity greatly affects how much amplifier power you need, and how power amplifiers with the same 8 ohm power rating can differ radically in their abilities to drive loudspeakers. Now let's look at some other factors influencing how much amplifier power you need.

The first is room size. The bigger the room, the more amplifier power you'll need. A rough guide suggests that quadrupling the room volume requires a doubling of amplifier power to achieve the same sound-pressure level. How acoustically reflective or absorptive your listening room is will also affect the best size of amplifier for your system. If we put the same-sensitivity loudspeakers in two rooms of the same size, one room acoustically dead (absorptive) and the other acoustically live (reflective), we would need roughly double the amplifier power to achieve the same sound-pressure level in the dead room as in the live room.

Finally, how loudly you listen to music greatly affects how much amplifier power you need. Chamber music played softly requires much less amplifier power than rock or orchestral music played loudly. The relationships between loudspeaker sensitivity, room size, room acoustics, and amplifier power are shown in the illustration on page 11.

We can see that a low-sensitivity loudspeaker, driven by orchestral music in the large, acoustically dead room of someone who likes high playback levels, may require hundreds of times the amplifier power needed by someone listening to chamber music at moderate listening levels through high-sensitivity loudspeakers in a small, live room. A 20Wpc amplifier may satisfy the second listener; the first listener may need 750Wpc.

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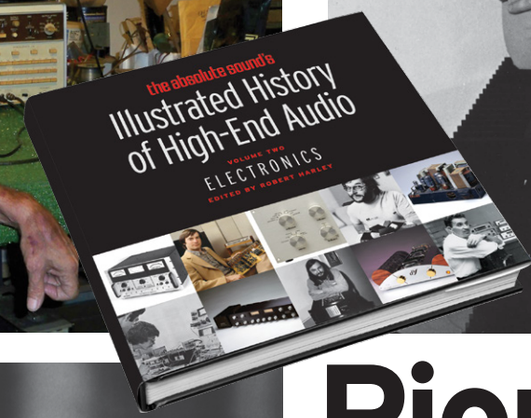
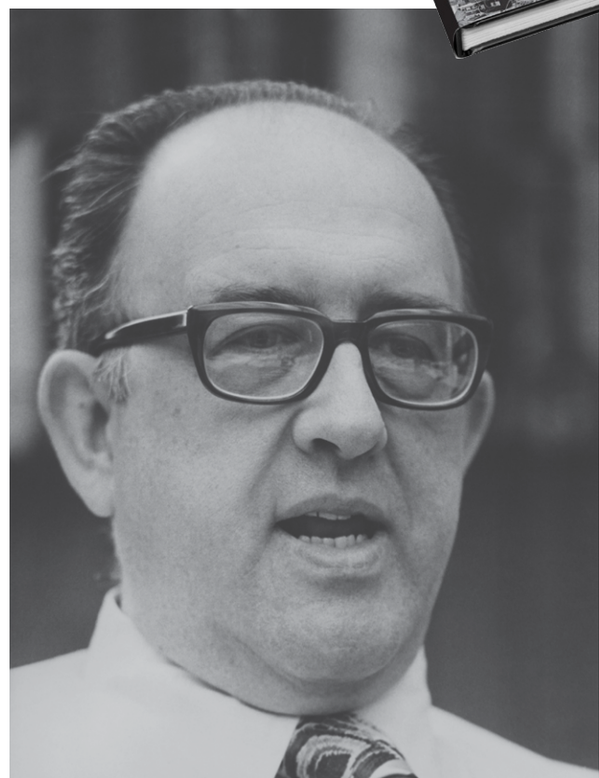




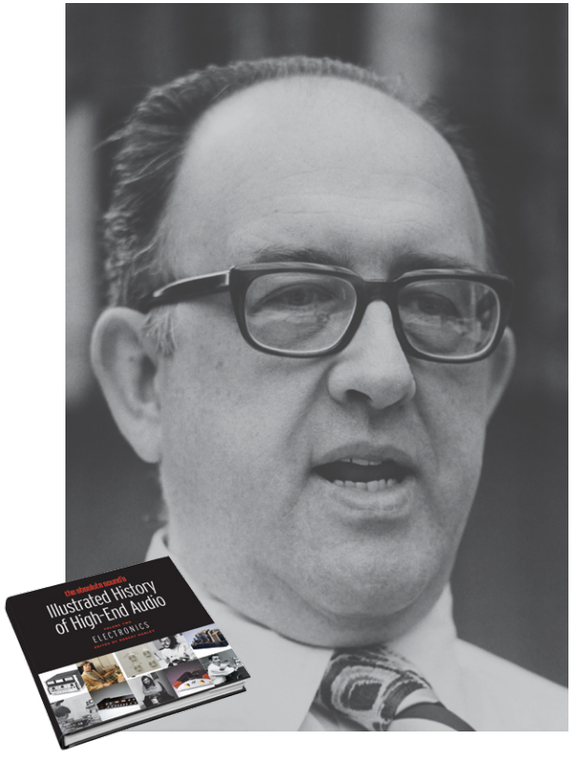
Pioneers of High-End Audio

In keeping with this issue's focus on electronics, we celebrate three of the industry's greatest electronics designers and companies in short excerpts from *The Absolute Sound's Illustrated History of High-End Audio, Volume Two: Electronics*.

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

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

PIONEERS OF HIGH-END AUDIO WILLIAM ZANE JOHNSON



William Zane Johnson and the Audio Research Corporation

Jonathan Valin

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

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

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

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

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

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

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

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

Then came the fateful day when a couple of those grad students dragged me and my wife

PIONEERS OF HIGH-END AUDIO WILLIAM ZANE JOHNSON

to a specialty hi-fi "store" (actually a flat in a brownstone apartment building) on the Near North Side run by a colorful character named Basil Gouletas. Basil was rather like the Hugh Hefner of hi-fi salesmen: I don't remember ever seeing him in anything but pajamas and a bathrobe. At the far end of his flat, Basil had a grand piano almost entirely shielded off by a pair of tall decorative screens; at the listening end he sat ensconced in a La-Z-Boy recliner with a turntable well within arm's reach.

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

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

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

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

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PIONEERS OF HIGH-END AUDIO JAMES BONGIORNO

James Bongiorno Great American Sound, Sumo, Ampzilla 2000

Robert Harley

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

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

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

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

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

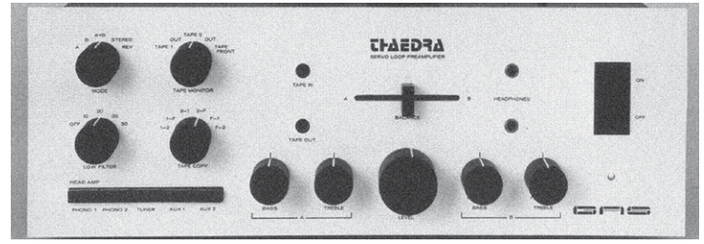
To call Jim Bongiorno a colorful character is not only a monumental understatement, but both figuratively and literally true; the accompanying photo reflects his daily dress. Audacious and flamboyant in the extreme, any encounter with Bongiorno was bound to be a memorable experience. He had a penchant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

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

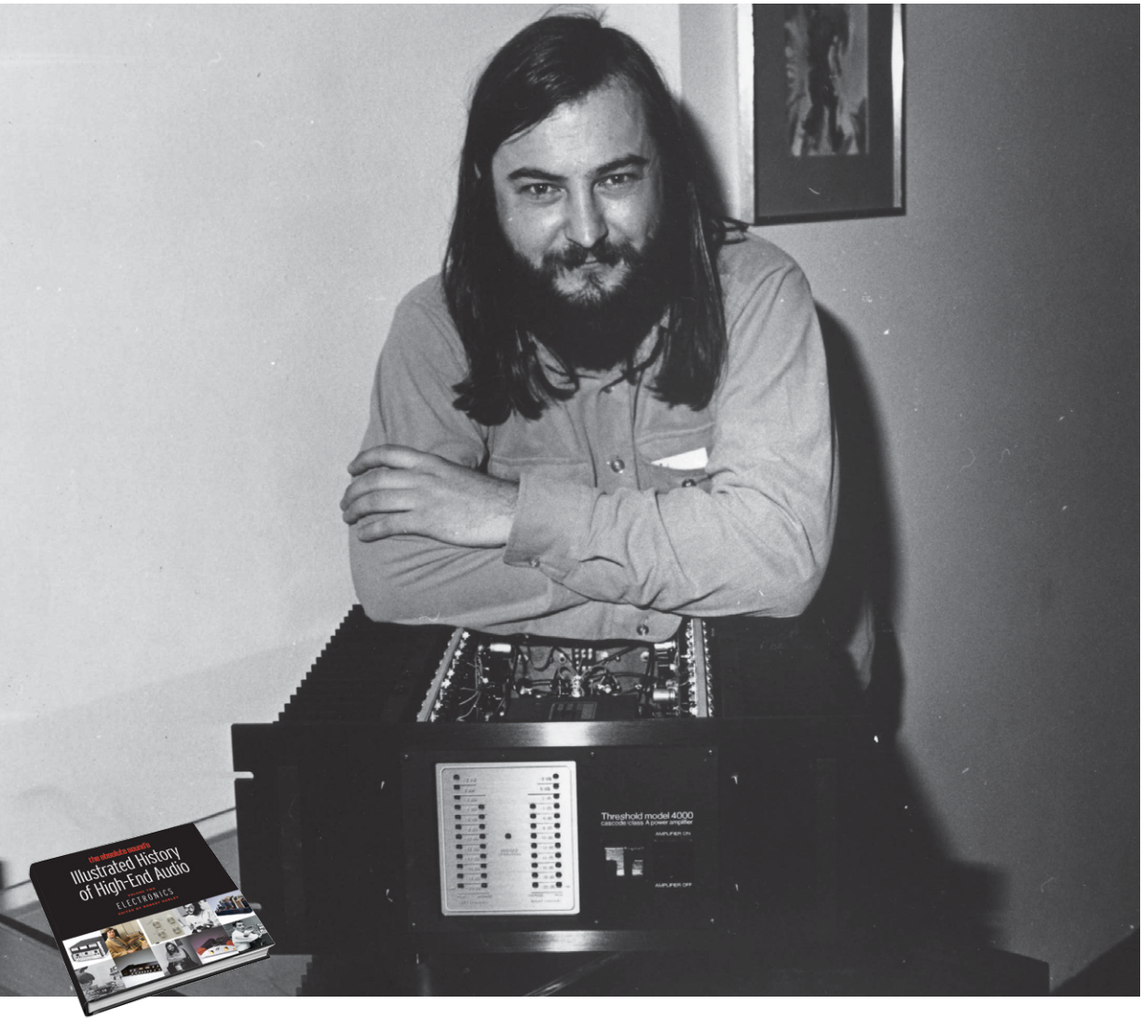
PIONEERS OF HIGH-END AUDIO JAMES BONGIORNO

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

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



PIONEERS OF HIGH-END AUDIO NELSON PASS



Nelson Pass
Threshold, Pass Labs, First Watt

Greg Weaver

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

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

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

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

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

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

By the early 1990s, Pass felt the urge to leave bipolar devices behind and explore the benefits of FETs, which offered output curves much like those of tubes, and sounded more musically natural. Over the next two and a half

PIONEERS OF HIGH-END AUDIO NELSON PASS

decades, his work at Pass Labs led to progressively simpler circuits and increasingly superior sounding amplifiers.

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

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

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

Integrated Amplifiers

PS Audio Sprout

Little Big Man

Julie Mullins

Call it love at first sight. Simply put, I adored this little integrated amp from PS Audio straight out of the box. From its wonderfully compact size—slightly larger than a chunky paperback bestseller—to the look and feel of its smooth wood-paneled top and its (dare I say it?) *convenience*, it's a winner. Whether you're into digital or analog, you'll discover big sound in a neat little package.

However, don't let the Sprout's petite design and relative simplicity of operation fool you. This miniature comes as close to a full-function integrated as you currently can get. The amplifier section delivers 50Wpc into 4 ohms and 32Wpc into 8—not a burly powerhouse but more than sufficient for desktop or apartment-sized listening. The Sprout's digital section features a fully asynchronous, precision sigma/delta Wolfson DAC that supports sample rates up to 192/24 over USB. And unlike many other integrateds with built-in digital, the Sprout also comes with a moving-magnet phonostage. When you add that the Sprout can also function as an analog preamp (with discrete, buffered, line-level outputs to power a sub or a second amplifier and pair of speakers), a headphone amplifier (for low-output-impedance cans), and a wireless Bluetooth music player, it's tougher to imagine what this Little Big Man *can't* do than what it can. What's more, it's designed to be user-friendly. And indeed, it is.

The Sprout's clean, rather streamlined appearance cuts to the chase. As befits a name like Sprout, its diminutive scale not only gives it cool "table-top" appeal (I'd call it downright—dare I say it?— cute), but also spatial economy, as there simply isn't room on its chassis for excess bells and whistles.

The front panel features a pair of silver aluminum rotary knobs that strike the perfect balance between vintage classicism and straightforward ergonomics. One is a stepped volume control, and the other is a rotary selector for switching among vinyl, analog, digital, or Bluetooth sources. No touchscreens here. Scott McGowan's design objectives called for a more tactile "human" experience. Although I appreciated its minimalism and hands-on style, I must admit I did hanker for a remote at times. (That said, before I got this job, I had for many years been using a circa 1981 Advent receiver—and God knows that lacked a remote. So not having one didn't seem all that strange.) The only other feature on the front, just below the Sprout name, is a ¼" headphone jack.

Call me biased, but I'd rate the Sprout's partner-acceptance factor quite high. I'm of the opinion that hi-fi components, especially at the higher-end of the spectrum, should not only sound amazing, but also *look* good. The Sprout's aesthetics, at once retro and modern, are to my eye entirely appealing.

Okay, enough about its appearance. How does it function and play? The Sprout produces a much bigger sound than both its name and its dimensions suggest. If you closed your eyes, you'd probably think you were listening to a considerably larger amp, so full-bodied is the presentation.

I thought it would be fun to try out the Sprout across the extremes of loudspeakers, from basic no-fi to *über*-high end. I was in such a hurry to hear the thing, I'll admit I went with Bluetooth first. And as an experiment, I deliberately didn't even use close-to-reference-quality speakers—just, uh, vintage Infinity bookshelves from about the time of the Advent receiver, connected with zipcord. In short, a near-worst case scenario.

The initial tracks were from an old Red Book CD rip of Calexico's *The Black Light*, played back via my iPhone 6's native music app and, in spite of all the roadblocks I'd thrown in the Sprout's way, I was astonished by the detail and richness of the presentation. I enjoyed several more tracks that first day (and over the following weeks) and was repeatedly (and pleasantly) surprised by how robust, dimensional, and easy on the ears most music came through—even before break-in, even with low-res files.

Naturally I needed to move on to higher-quality speakers before more sensible evaluation could take place. So, after allowing for more casual listening via Bluetooth, Red Book CD, and some hi-res tracks during a few weeks of break-in, I hooked up the Sprout to a pair of $28k Raidho D-1s—the magnificent

EQUIPMENT REVIEW - PS Audio Sprout

two-ways that serve as my current references (coupled with a pair of JL Audio e110s). As I'd just gotten my little GEM Dandy PolyTable set up and installed a Shelter 201 cartridge (the illustrious Japanese maker of moving-coils' first foray into moving-magnet territory), I began by spinning some vinyl—and quickly realized I needed to turn the little volume knob nearly ✣ of the way up to achieve reasonable SPLs.

A listen to the first side of Rickie Lee Jones' *The Magazine* delivered easy, laid-back listening fit for a lazy Sunday afternoon. Although this easygoing pace suggested some occasional want of transient speed and slam (this is a hard-hitting album), almost all instruments sounded sweet and natural, from pretty piano and strings, to delicate triangle tings that made me sit up and take notice. And Rickie indeed sounded like Rickie.

Next I put on Leonard Cohen's latest release, *Popular Songs*. The opening track "Slow" had an appropriately languid feel overall, but delivered decent bass and kick-drum separation with good soundstage depth. Violin was sweet and mellow. The Hammond B3 seemed slightly recessed compared to what I've heard on some reference systems. Vocals presentation was forward and powerful, but there was just a slight dulling of the sensual voices of the backup singers, which tended to sound more lilting and a touch more present on reference systems (and indeed in person, as I had the pleasure of seeing Lennie and the band on his most recent tour—much to the chagrin of JV, who's never heard his idol live.) Yet Cohen's gravelly voice still drew me in, and the easygoing and generally natural midrange kept me listening. It's worth mentioning that many of these qualities—midrange focus and timbral naturalness, albeit with a somewhat narrower soundstage—tend to be characteristically associated with many moving-magnet cartridges.

Next, I gave the HiFiMan HE400S planar headphones a try—and this experience stole the show, particularly with vinyl! The Brian Eno/David Byrne left-of-center, experimental 1980 collaboration *My Life in the Bush of Ghosts* (remastered version from Nonesuch), chock-full of driving polyrhythms and layers of quirky (and early) sampling, became a thrillingly surreal experience. I was struck by the degree of detail and image specificity of instruments, samples, and effects, which came to my ears seemingly from all corners of the room (or the recording space). So much was happening, and with so much energy, I almost literally didn't know where to turn. Every instrument seemed to hold its own place in space. The chugging guitars took on an urgency that surprised me; funky wah-wah effects were at once heavy yet quick-footed, with throwaway twangs that rang out in long, satisfying decays. "Help Me Somebody" displayed impressive speed, punch, and snap—a sort of counterpoint to Sprout's generally more easygoing demeanor with tougher-to-drive loudspeakers.

To hear some vocal- and piano-centric melodies, I put on Tori Amos' remastered *Under the Pink*. The reggae-tinged rhythms on "Past the Mission" felt just right, and Trent Reznor's backing vocals emerged with great impact, and Tori's breathy, impassioned voice sounded, well, just like Tori. Via the HE400S headphones, I heard transient and ambient information I hadn't heard before, such as the long decays from Amos' Bösendorfer piano in addition to occasional, subtle echoes within the recording space. Full of spirited energy, she and her piano also delivered a thrilling, lilting experience on "Cornflake Girl." The more I turned up the volume, the more exciting the song's buildup became. At higher volumes, between the record's tracks I could hear subtle background hiss, but so what?

There's another piano pop tune I feel compelled to mention: The English Beat's "I Confess" from the *Special Beat Service* MoFi LP, a recording that has at times sounded a touch bright and brittle on certain systems. Not so here. In a tight, clean presentation, the vocals and piano were staged front and center, with impressive detail and naturalness on the mandolin, trumpet, and sax. So realistic were the vocals, that at one point during my headphone listening, a layered-in voice that came from out of nowhere (or from a distant place in the left channel) startled me—and actually made me jump. For a split-second I thought someone had appeared in my room almost behind me. How's that for true-to-life impact?

Speaking of impact, Khachaturian's *Masquerade Suite* on Analogue Productions' spectacular RCA Living Stereo reissue was an aural marvel, with thrilling climaxes, cymbals, and warm energy, particularly on strings, that made me want to get up and waltz around the room (which as a dancer, I might have done, had I not been tethered to the Sprout by the cans' cord). Such fun, easy, and pleasurable headphone listening made it hard for me to return to putting the Sprout's other talents to the test.

Next, I figured I'd *really* put the Sprout through its paces. After all, the original Kickstarter page contains a video of Scott McGowan—PS Audio founder Paul McGowan's son and the force behind the Sprout's development—demo'ing the little amp with a pair of huge Infinity speakers to show its ability to power almost any transducer, even gigantic ones. Call me crazy, but this inspired me to shoot for the moon. So I toted the Sprout—which, weighing just shy of three pounds, wasn't tough—to JV's house and convinced him to pair it with

SPECS & PRICING

Type: Integrated amplifier with built-in mm phonostage, USB and SPDIF DAC, Bluetooth receiver, and headphone amp
Amplifier power output: 32Wpc into 8 ohms, 50Wpc into 4 ohms
Headphone power output: 1W into 16 ohms, 200mW into 300 ohms
DAC: Asynchonous
Inputs (digital): SPDIF (RCA coax), USB Type "B," Bluetooth (antenna)
Inputs (analog): Phono (RCA) 3.5mm stereo
Outputs (analog): 3.5mm stereo
Dimensions: 6" x 1.75" x 8"
Weight: 2.9 lbs.
Price: $499

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Boulder, CO 80301
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his beloved, limited-edition Magico M Project loudspeakers. As you might imagine, this took a bit of persuasion. To my amazement, he said yes. And, as you might expect, this pairing was a bit of David and Goliath.

In another astonishing turn of events, JV let me play some hi-res digital tracks. Perhaps the only notable downside to the Sprout's tiny footprint is that the space between the inputs and outputs is, by dint of its tiny dimensions, limited. It was a tight fit (and almost a deal-breaker for JV) to attach his spade-lug Crystal Absolute Dream speaker cables.

We started with a toughie: The low-end-laden Holly Cole tune "Jersey Girl" at 96/24 displayed some respectable articulation, though the bass extremes lost some control and became a bit muzzy in the deeper reaches. Vocals took on a slightly heavier, darker color, but soundstaging was fairly well defined and deeper than expected. Resolution was good on certain instruments, but the presentation could have used some more ambience, dynamic nuances, and fullness. However, with an integrated, it's hard to say what factors could be contributing: the built-in DAC? Or something else? But let's be honest here. We're talking about an unrealistic pairing, a just-for-kicks experiment. So these listening notes should be taken with a grain of salt.

Joni Mitchell's "Free Man In Paris" from a 96/24 rip of the *Court and Spark* LP on Nautilus fared the best of the several tracks we tried, a tune where the Sprout's upper midrange focus served the song well. Here, the bass was lighter weight, but plenty of detail shone through, including crisp cymbal taps and

piano chords. This absurd Magico pairing was a tall order for the Sprout. But the fact that the diminutive 50Wpc integrated drove these big guns and got the job done respectably well was something in itself.

Little overachiever that it is, the Sprout is hard to find fault with—especially at its incredible price and given all that it can do. The Sprout does have some deep bass, but its low end can go slightly soft around the edges or, when pushed to extreme volumes (rarely), even verge on a thump. The upper midrange and treble, particularly the brilliance range, can be slightly hooded with a subtle dulling of transients at times. On the physical front, I've mentioned the lack of remote control—although I can appreciate the "hands-on" design rationale behind not having one. Scott's quote on the company's website says it all: "We spend a great deal of time interacting with our machines, but those that bring music into our home are personal and I did not want to lose touch with that. I wanted to touch, to feel, to interact with Sprout."

One other minor quibble: There's a tiny toggle on/off switch on the back of the amp at the top, but no power indicator light. When I couldn't remember whether the thing was off or on, I'd put my hand on it to see if it was warm. PS Audio deserves kudos for its winning compact design that maximizes inputs and outputs for an absolute minimum of space. But this can make certain connections a bit tricky is all.

Conclusion

On the sonic side, I'd describe PS Audio's Sprout as polite yet pleasing—impossible not to enjoy. Throughout the listening period overall, a definite midrange focus emerged across rock, pop, and blues selections, both acoustic and electric. Perhaps this isn't surprising, considering that these genres may be the music of choice for the new generation of audiophiles in the market for a Sprout. Vocals were another strong suit, and the Sprout offers a respectable sense of realism on them (and on most instruments). Timbral balance registered as fairly neutral, and imaging typically offered more detail than expected, particularly for a component at such a reasonable price. And as my listening examples illustrate, the Sprout is an absolutely stellar headphone amp. In fact, that struck me as one of its best assets.

Hats off to the Boulder, Colorado, firm—longtime makers of outstanding amplifiers (and other components) that any music lover who appreciates quality sound is bound to love, especially the new generation of listeners (who may not even call themselves audiophiles) for whom the Sprout was primarily designed. Don't want to mess with overly complex menus, book-length user manuals, and a bewildering plethora of computerized controls? The Sprout offers plenty of quality without complication. Just connect the little guy and use the knobs on the front. For simplicity, versatility, portability, and affordability, it's tough to beat. You get a helluva lot for your money. Termed "an amplifier for the modern home," it looks the part. It's hard to imagine a more fun, cool component. There's a lot to love here, and, one presumes, a lot of love went into it. tas

Cambridge CXA80

Well Played

Neil Gader

In a newspaper article published a few months ago, a survey of Millennials had automakers worrying. Apparently car ownership was not nearly as important to this group as it was to previous generations. However, what was *crucial* in a new car purchase were issues of technology and connectivity. Expensive luxury cruisers? Not so much. A gas-conserving hybrid with top-notch Bluetooth/GPS interface, wireless surfing, and something akin to Apple's CarPlay? Now you're talking. Courting the youth vote in the high end also continues to be a tricky proposition, and like the automobile, excellent connectivity might just be the answer.

The new CX Series from Cambridge could be just the right ticket to engage this new generation. Offering components designed to partner with each other and to appeal to both audio and home-theater fans, the CX Series has a fresh look with a brushed finish and a nice "floating effect" created by the upturned corners of the chassis bottom plate. There are six models in the series including a pair of integrated amps, the A60 and the A80, the CXN network music player, the CXC dedicated CD player, plus a pair of multichannel AVRs in 120W and 200W versions.

The CXA80 at $899 is the top rung of the aggressively priced CX line. Besides featuring a major power bump over the CXA60, it's also equipped with a DAC, today's equivalent of the once-ubiquitous phonostage. Its Class AB amplifier outputs a healthy 80Wpc into 8 ohms (120Wpc into 4). Its toroidal transformer is a low-flux design with separate dual-mono windings—the tranny's prodigious size is proudly on display through the vented top plate of the chassis. The A80's internal circuitry has been designed from the ground up and includes a high-specification 24-bit/192kHz WM8740 DAC from Wolfson, and a bundle of digital inputs to manage the potpourri of today's digital sources. Thus, the unit features two optical inputs, a SPDIF input, plus asynchronous USB for a PC or Mac. An optional BT100 Bluetooth dongle is available for aptX streaming direct from smartphones or tablets, allowing access to music from Spotify, YouTube, and various other sources. Standby power consumption is a miserly 0.5W.

The front panel offers a host of controls including treble, bass, and balance. In addition, there is a headphone jack and a portable-player input. On the back panel are a trio of analog RCA inputs, a subwoofer out, and dual sets of speaker terminals. A balanced XLR input is also offered exclusively on the CXA80.

Ergonomically I found a couple of misfires. The front-panel buttons are small and hard to read, although repeated use will likely ameliorate this criticism somewhat. My larger grievance is reserved for the lack of a lighted alphanumeric front-panel display to specify volume level and input selection. Also the volume knob does not have a small positioning light or audible click to indicate changes. I was so surprised at these omissions that I considered the possibility that I'd overlooked something in the manual. But no, the user is left to fend for himself, using a best-guess estimate when navigating loudness levels. A real head-scratcher.

Fortunately, the strength of the A80's sonics made these minor annoyances fade into the background (at least most of the time). The

SPECS & PRICING

Power output: 80Wpc into 8 ohms (120Wpc into 4 ohms)
Inputs: Analog, one balanced XLR, four RCA; digital, one SPDIF, two TosLink, USB
Outputs: 3.5mm headphone, preamp, subwoofer
Dimensions: 16.9" x 4.5" x 13.4"
Weight: 19.1 lbs.
Price: $899

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A80 springs out of the blocks with a richly textured, almost exuberant midrange that persuasively propels a beat-driven groove such as the crunchy snare and dancing bass line that introduce Michael Jackson's "Billie Jean." And then there's the vamping piano and kickdrum opening of Steely Dan's "Time Out Of Mind"—a heavy rhythmic engine that drives this song forward. The A80 retrieves the low-level details of this precision-engineered track with finesse, especially the backing harmonies featuring the white-soul vocals of former Doobies heartthrob Michael McDonald. His voice, which often breaks into a breathy falsetto, is well captured by the A80, with a notable amount of air and space enlivening the mix.

And this amp has some real guts. It doesn't shrink from a big operatic track like Dire Straits' "Telegraph Road." This fourteen-minute cut has a wide dynamic envelope that intensifies into a meter-pinning crescendo before it begins a slow fade many minutes later. Any amp worth its salt needs to be able to hang on to the bite of the lengthy Knopfler guitar solo, the piano fills, and the runaway-train drum fills; otherwise the song loses its scope and scale. I've rarely heard an amp in this price range match the CXA80 in this regard.

At the other end of the dynamic range, Norah Jones' cover of "The Nearness of You" is reproduced with nice sensual intimacy on her close-miked vocal, and authentic weight and rich timbre on the piano accompaniment. Tonally, the A80 is firmly midrange-centric, but on a vocal like this one I found that there's a slightly artificial coolness and whiteness that hardens the edges of vocal transients. It's a narrow-band coloration, to be sure, and its relative presence will likely depend on the rest of your system.

Singling out the DAC for a moment, I found its performance lively, with swift, clean transients, stable imaging, and surefooted bass. It was very good in general (and excellent in this segment), but some fine resolution was lost. For example, it didn't fully exploit the dynamic gradations and the tactile and harmonic complexities that are revealed in the 24-bit/96kHz version of Fleetwood Mac's "Dreams," and soundstage depth was slightly truncated during "Gold Dust Woman." Certain elusive musical elements, both intimate and tactile, such as the skin reverberation of a drum, fingertips on a Steinway keyboard, or a short breath escaping a singer's parted lips are a bit obscured.

When it comes to representing three-dimensional acoustic space, volume, and hall boundaries, nothing can match a great orchestral track. Most often I call on the brilliant recordings of Keith Johnson on the Reference Recordings label, which are nothing if not revealing of the exact balance of the music, the musicianship, and the acoustic space. No matter how many times you listen to one of his recordings, you never lose sight of how much liveliness and immediacy fill every moment. As I listened to the Rutter *Requiem*, and the array of the vast Turtle Creek Chorale, there was no denying the expanse of the huge, vaulted space, and the weighty voice of the pipe organ. Although the bottom octave of the pipe organ was less than fully realized in pitch and grip, the A80 did more than a commendable job delivering most fundamentals. Certainly if the A80 had a Soulution badge across its prow, I would have expected a more fully realized expression of dimension and ambient space, but given that the A80's price is missing a couple of zeros compared with that marque, I think I'll tip my hat instead.

So, well played, Cambridge. Except for one particular grievance, the CXA80 was a delight to have in my system. It's pleasingly styled, forward thinking, and sonically appealing. And priced in a sweet spot for audiophile first-timers. I haven't done any polling myself, but I would have to believe that the youth market would be nicely served by this highly connectable and competitive integrated amplifier and DAC. Recommended with enthusiasm. tas

NuPrime IDA-8

Smart Design at Work

Julie Mullins

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

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

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

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

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

SPECS & PRICING

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

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

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EQUIPMENT REVIEW - NuPrime IDA-8

FPGA processing with ultra-low jitter and distortion.

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

Smart Design, Inside and Out

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

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

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

Setup and Sound

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

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

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

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

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

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

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

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

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

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Audio Research GSi75

Classic Marque, Modern Sound

Jacob Heilbrunn

The phrase "Swiss Army Knife of audio products" gets bandied about a lot in the high end, but the Audio Research GSi75 truly is it. ARC modestly describes the tube-based GSi75 in its user manual as an integrated amplifier. Well, yes. But talking about burying the lead, as they say in journalism.

After popping the GSi75 out of its box, I quickly discovered that there is a lot more to it than 75 watts per channel. The GSi75 has a wealth of controls and options packed into its relatively modest-sized chassis. It contains both a DAC and phonostage. Each is of high quality. The DAC provides you with upsampling options, or you can just stick with the native sampling rate of 44.1kHz. I found I liked sticking with the basic sampling rate best. Will it sound different at other rates? Yes. But better? I'm not so sure.

Then there is the nifty phonostage section. It offers the option to alter the input impedance on the fly with five different loads—100, 200, 500, 1k, and 47k ohms. If you like to fiddle with—or to put it more politely, tailor—the sound, then you can play with this unit to your heart's content. It's also important to note that this unit, somewhat to my surprise, is single-ended. No big deal. Some designers will tell you they continue to prefer single-ended, while others swear by balanced. Most ARC gear these days seems to fall into the latter camp. ARC also offers the option to employ the SE3 input of the GSi75 as a standard volume-controlled input or as a "unity gain" input. This permits the user to combine the GSi75 with a multichannel surround-sound processor.

But these aspects are, of course, only part of the story. The other half is that all the gee-whiz features of the ARC are allied to a bunch of KT150 output tubes coupled with the Russian high-transconductance 6H30 tube on the input. Audio Research likes to drive its gear hard, and the 6H30 allows it to do that. The KT150 is a tube that's come on strong in the past few years, displacing the venerable KT88 and the not-so-venerable 6550. The advantage of the KT150 is simple: It can take a lot higher plate voltage and you can get more watts out of it. Fewer tubes equals simpler circuitry, always a good thing in the high end. ARC supplies a plastic tool to adjust bias to 65mA via volume pots on the side of the amplifier. Negative feedback is pre-set at a judicious 4dB.

So what does the GSi75 actually sound like? Not what I expected. My memories, admittedly from years ago, of the ARC Ref II Mk. 1 were of a very full-bodied and bloomy sound. I know that ARC has moved somewhat toward a more neutral presentation and that it's sometimes accused of having a whitish sound. Still, I wasn't prepared for the crystalline clarity, coupled with pretty much zero tube rush, that emanated from the GSi75. This is one of—maybe *the*—quietest piece of tube gear that I've heard in recent years. Maybe it's a function of no interconnect from preamp to amplifier, but something dandy

SPECS & PRICING

Output power: 75Wpc
Tubes complement: Two matched-pair KT150 (power output), two 6H30 (driver)
Frequency response: 1.0Hz to 70kHz.
Input sensitivity: 0.55V RMS single-ended for rated output
Input impedance: 52.5k ohms single-ended
Inputs: SE1, SE2, SE3, phono, SPDIF digital (coax RCA and TosLink), USB
Maximum input: 10V RMS (any input)
Output polarity: Non-inverting (any input)
Output taps: 8 ohms, 4 ohms
Damping factor: Approximately 4
Overall negative feedback: 4dB
Price: $16,000

AUDIO RESEARCH CORPORATION
3900 Annapolis Lane North
Plymouth, MN 55447-5447
USA
(763) 577-9700

ASSOCIATED EQUIPMENT
Continuum Caliburn with SAT and Cobra tonearms; Lyra Atlas and Miyajima Mono Zero cartridges; dCS Vivaldi CD/SACD playback system; Ypsilon preamp, phonostage, and SET 100 Ultimate monoblock amplifiers; Transparent Opus, Audience, and Nordost Odin 2 cabling; Wilson XLF loudspeakers and Hammer of Thor subwoofers

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EQUIPMENT REVIEW - Audio Research GSi75

is going on with the GSi75. If you're one of those people who turns up his nose at integrated units, then the purity of the ARC might help change your mind.

Unlike the Jadis DA88S that I reviewed for TAS last year, the ARC doesn't command your attention with whiplash dynamics or tremendous bloom. Instead, it stages more of a disappearing act. It's always firmly in control and may have a little less perceived power than the blissful Jadis. But I wager that it's more neutral. Top to bottom it sounded of a piece, with nothing in the frequency spectrum protruding.

Initially, I was somewhat stumped by the sound of GSi75, which I found a little antiseptic. After an hour of warm-up, which I have come to think is especially essential for the GSi75, it relaxed and conveyed with precision one of my recent CD acquisitions, Bach's violin concertos played by Alina Ibragimova on the Hyperion label. For whatever reason, I've often found that recordings of the orchestra on Bach's violin concertos can sound turgid, recessed, or confused. While the Hyperion recording is not perfect in these regards, there can be no doubting that Ibragimova plays with real verve and originality, qualities that came through beautifully with the GSi75. I was especially struck by the unit's ability, on cut after cut, to unravel with impressive fidelity the sinuous and intricate orchestral lines. Not once did I have the impression that it was treading into steely sonic territory, sacrificing tonal richness for accuracy.

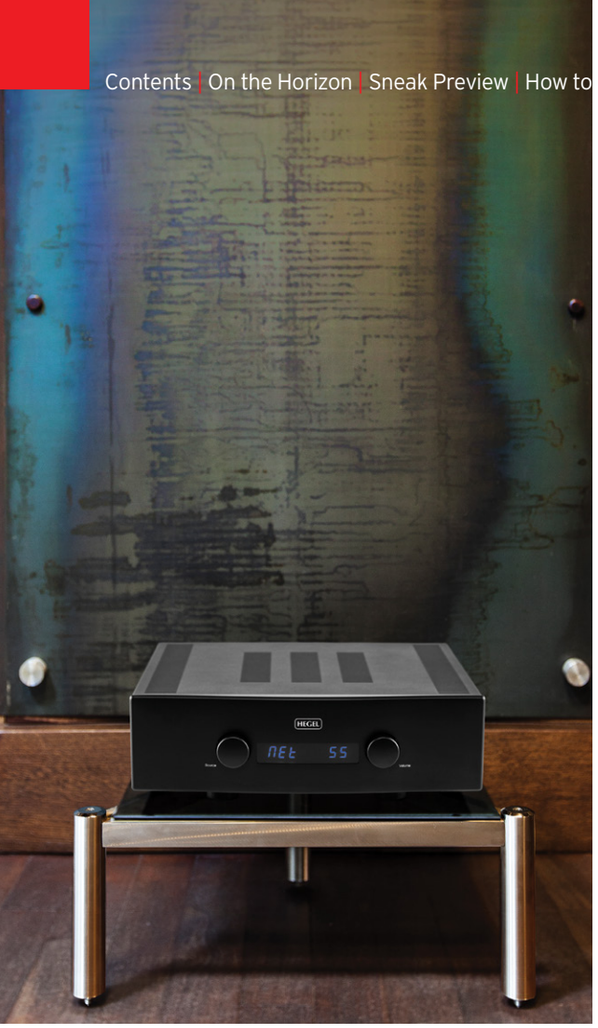
Something similar can be said about the GSi75's rendition of another of my favorite CDs. On a recent Harmonia Mundi recording, the marvelously talented cellist Jean-Paul Queyras, whom I listened to when he used to play at my grandmother's home in Freiburg, Germany, when we were both teenagers, performs Haydn's cello concertos with the Freiburg Baroque orchestra. This ensemble has won renown for dedicating itself to baroque performance practice, but adding a good deal of verve to the proceedings. Put bluntly, Queyras' performance is, to borrow from Donald Trump, high energy. Once again, the GSi75 conveyed with great gusto the hair-raising presentation. At one point, Queyras, in the heat of the moment, whacks his cello with his bow—a non-musical event, to be sure, but I have to tell you that I was shocked by how much of the hall space the ARC captured. You could really hear that whack resounding in the recording venue. This was, in its own way, a tribute to the ability of the GSi75's tubes to open up the soundstage so that very small details are never lost or obscured. Instead, the imaging of the GSi75 is spot-on. Queyras' cello was in perfect proportion to the orchestra, and I could hear all the way into the back of the hall.

As enjoyable as digital was, I remain first and foremost a vinyl aficionado, partly because it sounds so darned good, partly because it reminds me of my childhood spinning black gold. It's comforting to know that not everything from the good old days has gone by the wayside; indeed, vinyl is making a comeback. So onto the Continuum Caliburn I plopped that wonderful disc, The Persuasions' *We Came to Play*, as soulful an album as ever was recorded. Admittedly, this album may not be for everyone; my buddy and fellow reviewer Anthony Cordesman sat in stony silence when I played it a few weeks ago. Nevertheless, this gem, which A.J. Conti of Basis brought to my attention several years ago at his factory in New Hampshire, is one of my reference discs. On the cut "Gypsy Woman," I reveled in the superb imaging, the pellucidity of the voices, and above all, the ability of the GSi75 to faithfully reproduce Jimmy Hayes' bass. The intonation was about as good it gets, and the GSi75 communicated the emotional excitement of the lyrics as they reach an impassioned crescendo. There was no blurring, no smearing, no overlapping of voices with the GSi75.

Another album that I've been deploying with some regularity is Shelby Lynne's *Just a Little Lovin'*—the 45rpm version, I should add, recently released by Chad Kassem's Acoustic Sounds. The sound is pretty much impeccable—tremendous presence. What more is there to ask for? The GSi75 locked onto the ensemble and never let go. Cymbals came across with just the right amount of metallic sheen and the guitar accompaniment was perfectly delineated. No, it wasn't the kind of jet-black background you get with solid-state gear. But the flipside is that you get that glorious 3-D imaging that only tubes seem able to provide.

No, the sound was not as big and voluptuous and powerful as with my reference Ypsilon gear. But that shouldn't come as a surprise either. The GSi75 isn't meant to go against the heavyweights. For that you would go to ARC's reference gear. This is a stripped-down, lithe, nimble performer that delivers the goods. Whether you hanker for a little more bloom or pulchritude is a question that you can only answer by demo'ing the GSi75. On the yin-yang continuum, as HP used to say, this definitely lands on the cooler side. This is emphatically not an old-school piece of tube gear.

But when you hear how quiet the backgrounds are with the GSi75 and its commendable fidelity, it's hard not to be smitten by this superbly engineered new piece from ARC. Coupled with a loudspeaker that's relatively easy to drive—I used the 4-ohm taps with the Wilson XLF loudspeakers—I never found it wanting. With the GSi75, ARC has produced an integrated amplifier that is more than worthy of its illustrious heritage.



Hegel H360

Powerhouse

Kirk Midtskog

Hegel Music Systems, of Oslo, Norway, has developed yet another fantastic-sounding integrated amplifier/DAC. Hegel also makes preamps, power amps, and digital products, but it is its continually evolving line of integrated amps that, in a way, represents the heart of the company. Bent Holter, the founder and chief engineer behind all things Hegel, truly believes in bringing as much sonic performance, versatility, and reliability to the music-appreciating public as possible for a reasonable price. He applies his considerable engineering skills—he holds a Master's Degree in Semiconductor Physics from Norway's principal technical institute Trondheim University—to designing high-performing audio products that will work in real-world situations and can be purchased by ordinary citizens, not just well-heeled aficionados.

Background and Description

I have reviewed three other Hegel integrated amps over the past few years, so I can understand that it may seem like I am "Mr. Hegel" at the TAS table. Although other TAS writers (including Robert Harley, Neil Gader, and Jacob Heilbrunn) have also reported on Hegel gear—all positively—I am happy to review yet another Hegel integrated amp because, among other things, Hegel makes good products in general, and the company has really pulled out all the stops with the H360 in particular. It is, to give you my overall assessment upfront, a truly excellent amp. I believe it can readily compete with separates costing more than its $5700 asking price.

With 250Wpc into eight ohms (420Wpc into four) and a damping factor of 4000, the H360 will drive a wide range of speakers with ease. The H360 is equipped with two line-level inputs, one RCA and one XLR, although a home-theater bypass can be configured to function as a third unbalanced (RCA) line-level input. In addition, the H360 has a very good, on-board DAC, capable of supporting 24/192 PCM files and native mode DSD64 and DSD128. The unit also supports Apple's wireless AirPlay, and can function as a DLNA digital-media streamer/renderer so you can connect a UPnP/DLNA-compatible Network Attached Storage device (NAS) through your local router and, *voîlà*, you have an amplifier that will play a lot of different sources.

To my mind, the most important aspects of the H360's performance come from the analog sections of its preamp and power amp. After all, a fantastic DAC can fall completely short if the analog amplification is less than first-rate. For this reason, I put the H360 through its paces primarily as a standard line-level integrated amp, and only evaluated its very capable DAC once I had established what the analog sections could do. (Fortunately for me, it was through my listening to the H360's NAS streaming capability that I began to reevaluate my previously less-than-stellar impressions of digital-file playback. The DAC can do more tricks, but I will cover them further on.)

The H360 represents some of the latest engineering and manufacturing acumen at Hegel. The company's patented SoundEngine technology has been further updated, and some of the rigorous parts-matching protocols, once only applied to Hegel's top power amp (H30), are now also apparently applied to the H360. To recap, one of the main aspects of SoundEngine is a feed-forward technique that reduces noise and also specifically addresses the crossover distortion commonly found in typical Class AB amplifiers when one half of the output section hands off the waveform to the other. SoundEngine adjusts the output transistors' biasing to accommodate ever-changing temperature conditions—depending on signal fluctuations—rather than setting a fixed bias for average conditions. The H360's preamp section has its own transformer to keep power-supply noise in the current-supplying power amp section from interfering with the more delicate signals in the voltage-gain preamp section. The DAC has also been completely updated from the on-board DAC in the H360's predecessor, the well-regarded H300 (reviewed by Neil Gader in Issue 233). I will compare the newer H360 to the older H300 in greater detail later. While the H360 does not run hot, it uses no switching power supplies or any mix of Class D technology. It is a 45-pound Class AB amplifier all the way. The cosmetics remain classic Hegel: simple, pleasant, subtle, functionally proficient... Scandinavian.

Listening

The commanding, clean 250W output and variety of analog and digital inputs would almost be enough to recommend the H360 from the start, but Hegel offers much more than mere competency. The real boon here comes from the H360's revealing, refined, and—best of all—musically compelling character. I could hear more deeply into recordings than I had any reason to expect from a $5700 solid-

EQUIPMENT REVIEW - Hegel H360

state integrated amplifier. Details like singers' lip sounds, guitarists' fingers on strings, or drummers' sticks on cymbals came through with clarity, and did so without sounding hyped or forced. The ease with which these sorts of musical cues flowed, coupled with stable solidity of imaging, lent the sound a liquidity and body reminiscent of a well-balanced tube amp. Likewise, the H360's dynamic sure-footed rhythmic drive underpinned the music in a way that propelled it along and made all sorts of music interesting—also somewhat like a good tube amplifier.

The H360's tonal balance is *not*, however, traditionally tube-like (as in a bit more weighted toward the midbass and midrange with a softening of the extreme upper frequencies and perhaps a slight reduction of definition and control in the low end). On the contrary, another strong suit of the H360 is its apparent neutral tonal balance—achieved without the price of sounding clinical or characterless, as too many products with neutral ambitions do. Hegel has a talent for delivering both tonal accuracy and musicality; all four integrated amps, as well as its top P30 preamp and H30 power amp combo with which I have direct experience, have this satisfying combination of fundamentally correct tonal balance and musical verve. Hegel's VP of Sales and Marketing Anders Ertzeid told me, when I visited Hegel in Oslo in 2012, that Hegel does not "voice" its products as such; rather, it pursues accuracy and noise-reduction through engineering and leaves tonal-shaping out of the design process. Of course, designer Bent Holter and his colleagues also listen carefully to various iterations of a given design, but they seek technology-improvement solutions rather than tonal adjustments. The results reveal a recording's own character as well as the music's inherent thrust—a confluence of positive attributes I more readily find in much more expensive electronics.

The H360's midrange and treble openness really help flesh out the leading edges and trailing tails of notes, as well as their overall timbral character. This fine resolution and accurate timbre, taken together, help make images properly positioned and proportioned in the soundscape. Spatial cues add up to a reasonable approximation of 3-D imaging and soundstaging—in as much as this is possible for solid-state electronics under $10,000. For example, instrumental images do not sound recessed; indeed, leading-edge sounds indicate a distinctly closer perspective, without making instruments seem disassociated from the ensemble and the hall. Other Hegel integrateds have this pleasant "greater context" presentation as well, although the H360 portrays images better than any of the others I have listened to extensively in my system (H80, H100, H200, and H300). The H360's apparent listener perspective is basically mid-hall, and the overall soundstage is quite wide, tall, and deep. Soundstaging is one of the areas of audiophilia where separate amplification components—especially monoblock power amps—seem to hold sway. An integrated amp can match or surpass some separates in areas of resolution, tonal and timbral truthfulness, power, and dynamic control, but the expansiveness of the outer reach of the soundscape seems to be aided

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EQUIPMENT REVIEW

by the separation of the primary amplification blocks—all other things being similar. I will say, the H360 portrays images and a soundstage better than any other sub-$10,000 solid-state integrated I have heard in a familiar system.

Owing to robust power supplies and—as I believe Hegel would suggest—other aspects of its designs, Hegel amps tend to sound more powerful than their nominal power ratings would suggest. The H360 did not disappoint. It drove all speakers I had on hand with ease: YG Sonja 1.2, GamuT RS3, and Dynaudio C1 II. (I would hazard a guess that the H360 will even match up well with power-hungry Maggies.) Like other powerful amplifiers, the H360 conferred serenity to music listening, perhaps because it doesn't distort or strain on crescendos, as is often the case with less powerful and clean-sounding amplifiers. Bass and dynamics are well served, too. The H360's bass always sounded deep-reaching and articulate, never weak or flabby. Macro-dynamic swings could, in fact, be startlingly powerful and the power region had plenty of slam.

Even though the H360 is powerful, with lots of commanding grip and control, it still sounds beguilingly delicate and detailed. An example of this "play big" and "play refined" ability came through when I listened to the second movement of "*Three Meditations from* Mass" on *Bernstein* [Oue, Minnesota, RR]. The opening cello solo was rendered with fine detail and emotional intensity, but when the orchestra joined in and welled up, the weight and force of the ensemble was reproduced realistically and with dimensional verisimilitude. No raggedness crept in, and the soundscape did not congeal.

SPECS & PRICING

Power output: 250Wpc into 8 ohms, 420Wpc into 4 ohms
Analog inputs: Two RCA (one switchable to HT bypass), one XLR
Digital inputs: One coaxial, three optical, one USB, one Ethernet (RJ45)
Outputs: One fixed line level (RCA), one variable line level (RCA); one digital coax (from digital inputs only); speaker terminals
Frequency response: 5Hz–180kHz
Damping factor: More than 4000 (main power output stage)
Dimensions: 16.93" x 5.9" x 16.93"
Weight: 45.2 lbs.
Price: $5700

HEGEL MUSIC SYSTEMS USA
East Long Meadow, MA
(413) 224-2480
usa@hegel.com

ASSOCIATED EQUIPMENT
Analog source: Basis Debut V turntable & Vector 4 tonearm, Benz-Micro LP-S cartridge
Digital sources: Ayre C-5xeMP universal player, HP Envy 15t /JRiver MC-20, Hegel HD12 DAC
Phonostage: Ayre P-5xe
Linestages: Ayre K-1xe, Hegel P30
Power amplifiers: Gamut M250i, Hegel H30
Speakers: Dynaudio Confidence C1 Signature, GamuT RS3, YG Sonja 1.2
Cables: Shunyata Anaconda ZiTron signal cables, Cardas Clear Reflection, Nordost Heimdall 2 USB, Audioquest Coffee USB and Hawk Eye S/PDIF, Shunyata Anaconda S/PDIF, Shunyata Anaconda and Alpha ZiTron power cords
A/C power: Two 20-amp dedicated lines, Shunyata SR-Z1 receptacles, Shunyata Triton/Typhon power conditioners
Accessories: Stillpoints Ultra SS and Mini footers, Shunyata Research DFE V2 cable elevators
Room treatments: PrimeAcoustic Z-foam panels and DIY panels

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Nordost Heimdall 2 USB Cable

Hegel's Anders Ertzeid provided a two-meter run of Nordost Blue Heaven USB 2.0 cable (starting at $249/1m) to use with both the HD12 DAC and H360 integrated amp. Because of a greater distance between my computer and the DAC, I asked about getting a longer run. Accordingly, Nordost's affable and knowledgeable Jon Baker very kindly sent along a three-meter run of Heimdall 2 USB cable (starting at $499/1m). Not only did I then have a longer length of cable to work with, but the sound quality also improved substantially. I experienced, in my own system, what others have been pointing out: USB cable can greatly impact sonic performance. The Blue Heaven USB cable was quite good, but I was impressed by how much more detail, texture, body, and spatial information came through with the Heimdall 2 USB cable in place. It all added up to a more lifelike and enjoyable musical experience.

I had heard a demo of Nordost's complete line of USB cables at Rocky Mountain Audio Fest 2011. A Nordost representative started at the bottom of the line and worked up the product offerings with ever-improving sonic performance (and higher prices) at every cable swap. (At that time, Nordost had carried more than three USB models.) The source material remained the same, as did the volume setting and the rest of the system. Only the USB cables were changed. Every cable upgrade yielded more detail, less grain, better spatial cues, and greater musical involvement. My recent experiences in my own system with this critical link in the digital chain confirmed my impressions at the RMAF demo.

Bits are supposed to just be bits in the computing world. If the digital stream makes it intact from output to the desired input with the proper interface "hand-shaking," the cable is not supposed to matter, right? Well, what constitutes "intact" on the audio side of digital signal processing may be more involved than other common computing tasks. In high-performance audio, the USB cable matters a lot. In a way, it bothers me that the USB cable turns out to matter as much as it does because it then becomes yet another factor we need to pay close attention to—as if we don't obsess over enough already. On the other hand, better sound is better, and if we know how to improve it, then why not pursue it? Such is the nature of our hobby.

The sonic improvements brought about by the Heimdall 2 USB cable were highly instructive. Other writers—TAS' Robert Harley, Steven Stone, Alan Taffel, and Neil Gader, to name a few—have been commenting on the importance of the USB cable, and I concur. Considering how much we already spend on analog signal cables, $699 for a three-meter run of Heimdall 2 USB cable seems to be in line with current industry pricing practices. **KM**

Comparisons

So how does the H360 compare to its progenitor, the award-winning H300? Both are rated at 250Wpc, but H360 has a damping factor of 4000 where the H300's is 1000. Thus the H360 will, theoretically, offer even greater control over difficult speaker loads. The newer model also boasts 50 percent higher current capacity. The computer-controlled analog volume attenuators remain the same, but Hegel says its new individual voltage regulators reduce high-frequency noise. The new DAC has been extensively re-designed, and much of it is actually based on Hegel's top HD30 DAC. The USB input, according to Hegel, has a new receiver chip, which supports DSD128, has better voltage regulators, and has a superior "first-level" jitter-reducing layout. The new DAC chipset is the AKM 4490 instead of the 4399 in the H300. Both models sound very similar overall, but two performance areas add up to significant improvements in the newer model: First, the H360 sounds smoother and more transparent, especially in the treble; and second, the H360 is just plain more musically enjoyable. The boogie or sadness or tension in the music registered more easily—especially when the amp was mated to the wonderfully revealing and involving GamuT RS3 speakers (review forthcoming).

What about going up in the Hegel line? The top-level P30 preamp and H30 power amp (reviewed by Robert Harley in Issue 223) sounded even more solid and commanding, and the soundscape expanded in all directions. The pre/power amp combo also sounded more revealing, direct, and immediate—quicker, so to speak. The H360 did, however, have a more liquid and musically enticing presentation—at least when it was paired with either the Gamut RS3 or Dynaudio C1 II speakers. To my mind, the H360's ability to perform so well when stacked up against Hegel's own $21k combo is highly commendable. Hegel will probably cringe, here, but I am not at all sure the roughly additional $15k for the P30/H30 would be worth it to a lot of customers, even though the combo is technically more accomplished from an audiophile perspective.

The DAC

I compared the H360's DAC to Hegel's very nice sounding HD12 DAC ($1200) on its respective USB ports, and also listened to the H360's renderer/NAS functionality. On USB, I don't believe I could consistently tell which DAC was engaged if someone else were operating the system. If I had to really seek out (or *project*, some might assert) sonic differences, I would favor the sound of the H360. It seemed to have a little less grain and sounded a bit more natural overall. Mind you, the HD12 had compared favorably against an Oppo HA-1 DAC (also $1200) in my system; so, one could think of the H360's DAC as equaling or surpassing a $1200 separate DAC. BTW, since I have been listening to more digital audio files in the last few months, I've discovered—like many others have—that the quality of the USB cable can make a substantial difference in sound. (Please see the sidebar about Nordost's excellent Heimdall 2 USB cable.)

The H360 also supports Apple's wireless AirPlay, but the user has to supply the wireless router. Hegel did not include an on-board wireless receiver because it claims that would introduce too much noise. Besides—from my own perspective—as wireless technology advances, consumers can more easily advance with it by upgrading the external wireless router. AirPlay works but is probably more appropriate for casual listening than serious audiophile sessions at this point, sounding, in my opinion, a bit muffled and thin. It will most likely appeal to many consumers, though, because they can easily stream their music from

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EQUIPMENT REVIEW - Hegel H360

familiar Apple devices to their home system with the H360 as the main hub.

As I mentioned earlier, the real surprise on the digital side was the H360's streamer/renderer functionality. Using BubbleUPnP software on an Android tablet, I could control the H360's renderer to play the files on the attached QNAP TS-251 dual drive (configured and pre-loaded by Hegel). Digital files sounded much more lifelike through the H360/NAS than through my HP Envy 15t laptop running JRiver MC-20 and a HD12 DAC—even when this setup was tricked out with a good power cord, power conditioning, and aftermarket footers. The H360/NAS playback was truly musically rewarding. It sounded like a hybrid between my turntable rig and my regular universal-format disc player, and all in good ways: clarity, musical fluidity, focus, and lack of underlying graininess. Soundstaging and imaging also were more fleshed out, and timbres sounded more natural. The renderer/NAS method has the potential to turn this reluctant computer-audio guy into a more receptive digital explorer. Hegel has yet another trick in its digital repertoire, though.

If you already own a good stand-alone DAC (with a coax input), and you want to make use of it to improve performance, Hegel offers a neat DAC-loop feature on both the H300 and H360. You can route any digital input's signal (up to 24/192, no DSD) on the H360 through its coax output to your outboard DAC's coax input, and then route the converted analog signal from the external DAC back to the H360 through its balanced analog XLR inputs. A couple of activation button selections on the remote, and you now have cleaner, re-clocked, jitter-reduced digital-file playback. I used it with both my computer and with the NAS drive as sources, and it worked with both like a charm. Everything sounded cleaner and more continuous through the DAC-loop, with less interstitial haze, greater transparency, and more 3-D depth.

Improvements

Could the H360 be better? Sure, at least one more analog input would be nice. The home-theater bypass input should probably be left as a single-purpose input, rather than allowing it to be configured as another line-level analog input. The display doesn't bother me, but some folks might like an improved screen, in which characters are nicer to look at, rather than the mix of somewhat crude upper- and lower-case characters Hegel currently offers. I realize there are probably good reasons why Hegel has not done this already—increased cost, possibly lower reliability, and maybe added noise. (I can almost hear designer Bent Holter grumbling.)

Conclusion

The Hegel H360 is simply a marvelous piece of audio kit. Its neutral tonal balance, articulate and lovely rendering of details, commanding power reserves, spacious soundstaging, and natural imaging are laudable. At $5700, as solely a linestage integrated amp of its quality and power output, it is a bargain; the included nice-sounding and versatile DAC makes it a real winner. I absolutely loved listening to the H360. I never tired of its low noise, dynamic liveliness, and winning musicality. A very easy recommendation. tas

Robert Harley Listens to the H360

I've long admired Hegel's electronics for their fundamental sense of musical communication and involvement. These are amplifiers that go a long way toward making you forget the playback system and just enjoy the music. I listened to an H160 for about two months recently while the Magico Q7 was being updated, and the Soulution electronics made the rounds of some hi-fi shows. I found the H160 to be a superb performer, and spent many enjoyable hours with it.

As good an integrated as the H160 is, the H360, which I auditioned in my reference system with the Magico Q7 Mk.II, is in another league. Hegel's new integrated has beautifully rendered timbre, with a smoothness and lack of grain and glare that you expect from very expensive separates. The lack of electronic artifacts overlaying instrumental and vocal textures went a long way toward engendering the relaxed engagement I felt when listening to the H360. I was also impressed by the H360's dimensionality and totally natural rendering of a recording's spatial information. Again, this level of performance isn't expected from an integrated amplifier.

But it was the H360's bass extension, weight, dynamic authority, and visceral drive that put this integrated amplifier over the top. The H360 took iron-fisted control over the Q7's dual 12" woofers and 10" mid/woofer, delivering a huge dose of physical involvement on rock and blues. Bass lines were crystal clear and dynamic, with no hint of strain from the amplifier. There was a sense of unlimited power and dynamics, even on the most demanding orchestral climaxes.

Finally, the H360's DAC is exceptional. I drove the H360 alternately with the analog output of the Berkeley Alpha Reference DAC, and with a USB source. Although not the equal of the Alpha Reference (nothing is), the H360's DAC showed that it's a big step up from the H160's DAC and a worthy addition to this outstanding integrated. In short, the H360 is a terrific-sounding amplifier/DAC, as well as an amazing bargain.

Pass Labs INT-250

The Outer Limits

Neil Gader

When Pass Labs introduced its first-ever integrated amplifier, the INT-150 in 2009, the debut was hailed by many, myself included, as a watershed moment for a sector often derided as "down-market." Reviewing the amp in Issue 184, I noted, "The Pass Labs INT-150 lays to rest the arguments and perceptions of the past about integrated amplifiers. It's a musical force of nature and arguably about as good as it gets in the here and now." In my view, it quickly became one of the handful of integrateds that could compete with high-end separates at all but the most extreme levels—and even then, it made for awfully close competition.

With the success of the INT-150 under its belt, Pass Labs has taken the next logical step by releasing not one but two new integrated offerings, the INT-60 and INT-250. Both are Class AB designs with heavy Class A bias based on Pass Labs' latest Point 8 Series of amplifiers. The INT-250—the subject of this review—weighs in at 105 pounds and outputs 250Wpc into 8 ohms and a stump-pulling 500Wpc into 4 ohms. It was optimized for greater flexibility with grunt-worthy speaker loads of 86dB sensitivity or less. The INT-250 features high-voltage rails and output stages, along with the iconic glowing meter found on Pass Labs' Point 8 amplifiers, direct-access buttons for the four inputs on the faceplate, and a blue LED output-level display. The volume control knob, which is about the size of a hockey puck, is solid aluminum and beautifully weighted—it's an old-school joy to use.

Most IA platforms look more like buffed-out preamps, but the INT-250's tall front panel and industrial-scale heatsinks really mirror those of Pass Labs' massive power amplifiers. Only the aforementioned front-panel input buttons indicate that it has also gobbled up an entire linestage. That said, not a lot of information is observable from the front, so if you're expecting to rename inputs, forget it. The spacious back panel features four line-level inputs, a line-level output, and two pairs of Furutech ratcheting binding posts designed to prevent over-tightening. Included is a hefty, full-featured remote control cast in aluminum. The elegantly tactile volume control is a digitally controlled ladder with 1dB steps, similar to the one in the XP-30. The input is buffered by a simple stage that adds 4dB of gain to feed both amplifier channels and the pre-out connections.

I asked the man himself, Nelson Pass, to provide a basic compare/contrast between the INT-150 and the INT-250. He replied, "The output stage of the INT-150 is identical to the X150.5. The INT-60 and INT-250 use the Point 8 output-stage topology and power supply, having 20 output devices per channel and the same bias current, but neither are identical to their respective Point 8 amplifiers. The output stage of the INT-250 is similar to the X250.8. The 'on-state' power consumption of these units is minimally about 200 watts and 300 watt respectively, reflecting the high Class A region of the output-stage bias. These amplifiers leave Class A at about 15 and 25 watts peak, respectively. All the output devices are power MOSFETs rated at 150 watts and 20 amps continuous (80 amps peak) for short term aggregates of 3kW and 4.2kW per channel." He also explained that the new INT-250 and INT-60 are not "literally identical" to their standalone counterparts, the X-250.8 and XA-60.8. Nevertheless, "the essential details that deliver the sound of the Point 8 power amplifiers have been tweaked in subjective testing, and the result is very close."

In sonic performance, the INT-250 is a thoroughly modern amplifier with effortless dynamics at the micro and macro levels, an ultra-wide bandwidth, superb low-end control and grip, and effortless highs. The orchestral soundstage is as expansive and dimensional as I've experienced in a solid-state amplifier—or a tube one, for that

SPECS & PRICING

Power output: 250Wpc into 8 ohms, 500Wpc into 4 ohms
Inputs: Four RCA, two XLR
Outputs: Two RCA and XLR
Dimensions: 19" x 21.5" x 9.06"
Weight: 105 lbs.

Price: $12,000

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EQUIPMENT REVIEW - Pass Labs INT-250

matter. Both the Vandersteen Treo CT (reviewed in Issue 262) and the ATC SCM20-2SL, and later, the new B&W 805 D3 (review forthcoming) simply opened up, became less of a localized source, and in many instances virtually disappeared from the listening space. In fact, the Pass is so open and holographically transparent that it encourages the listener to consider getting up and taking a walk through the orchestra—and dispensing some high-fives to the conductor along the way. As I listened to a *cappella* singer Laurel Massé's performance on *Feather & Bone* swirling into the deepest recesses of the Troy Savings Bank Music Hall, I concluded time and again that the INT-250 just broadens the soundspace so effortlessly, even the ceiling of the venue seems to elevate without restriction.

That's not to say the INT-250 is characterless. Actually it's the amp's lush, Falstaffian midrange that overcame my critic's ear, occasionally freezing my pen midsentence as waves of nostalgia caused me to think back to my earliest experiences with iconic high-end amplifiers such as the ARC D150. (What an amp with the original Magneplanar Tympani 1D!) But its rose-gold signature sound was not due to deviations from accuracy, but rather to the strapping power and fluidity that come from its canny balance of Class A bias and Class AB output. The INT-250 might invite comparisons to tube amps, but only in the sense that, like every Pass amp I've heard, there are strong whiffs of the warmth and harmonic bloom of the actual event. But then there was also the very un-tube-like "management and control" aspect that produced explosive bass dynamics and supported images on an unyielding foundation in an impeccably delineated stage.

The Pass Labs was a master of serving the extremes in audio reproduction. Timbral contrasts were more vividly distinguished. The baritone sax deployed on Jen Chapin's *ReVisions* [Chesky] retained the throaty weight and dark resonance that can be constricted and diminished in the company of smaller, less-pedigreed amplifiers. The INT-250 also throws its prodigious weight around in the most unexpected and tender ways. Its transient behavior with percussion instruments was quick-footed and unconstricted, with an almost instinctive ability to capture low-level immediacy, superbly tracking acoustic idiosyncrasies such as an errant footfall, the buzz off a guitar string, a piano's sustain pedal releasing or—even providing a headcount of the voices in a chorus. As I listened to the animated musical exchange between acoustic bass, fiddle, and cello during *Appalachian Journey*, the Pass Labs amp outlined textural and timbral specifics that exposed more of the entire character of each instrument. Whether reproducing a pianist or cellist, the INT-250 pushes a loudspeaker to the very edges of its performance envelope. I was reminded of the Jack Nicholson line to Helen Hunt in the movie *As Good As It Gets*: "You make me want to be a better speaker." And this was true of every speaker that the INT-250 drove during my evaluation.

Since I had still had the superb Esoteric K-03X disc player in-house (reviewed in Issue 261), I was primed to return to a favorite recording that I referenced in the INT-150 review. It was the SACD of Anna Netrebko singing Donizetti's "Ardon gli incensi" on the DG SACD *Sempre Libera*. She's accompanied by a playful glass harmonica that urges her voice upward past a high C, while the delicate layering from the Mahler Chamber Orchestra and chorus defines the limits of the hall behind them. I know I'm quoting myself but, as I said then, for those audiophiles who maintain LP and SACD collections this is where the Pass Labs will show you the money. Its micro-dynamics, fluidity, and spatiality plays to the strengths of these enriched formats and can leave you breathless.

Since the INT-250 was designed for the grunt work of driving low-sensitivity loudspeakers, roughly 86dB and below, my first thought was, "Have I got the loudspeaker for you." My own ATC SCM20-2SL compacts are the passive version of the company's active pro monitor. Rated at 83dB sensitivity—a *Marat/Sade*-like spec—I figured the ATC's would give the INT-250 a sufficient run for the money. Interestingly the pro version of the ATC is driven in a biamplified configuration allotting 200W to the woofer and 50W to the tweeter—250 watts total, just like the Pass Labs. I know this loudspeaker like the back of my hand. I own it and it has labored steadily as my reference compact for years. It's an acoustic-suspension thoroughbred, tonally neutral and balanced, capable of superb resolution, pitch control, and transparency, with solid midbass response into the 40–50Hz region (and perceptibly lower depending on the room reinforcement). However, it's also a real trouble-maker. It can sound shockingly dull and dynamically flat when driven by lesser, power-challenged amplification. It thrives on a level of juice that doubles down at 4 ohms, and yes, is also a stickler over the quality of that power.

The INT-250 set a new benchmark for the ATCs. Like a sports car suddenly given another gear, the ATC found a new level of speed and resolution. The airspace between orchestral images was more defined. Textural details were more clarified. Often, low-level information—the harmonic decay of a piano and resonances of cello or of drum skins, for examples—extended a little further.

A true reference integrated such as the 180Wpc MBL C51 made it a contest throughout most of the audio spectrum, but the difference in the Pass Labs' raw power was telling in midrange dynamics and mid/upper-bass grip. In my experience only the Vitus Audio SIA-25 (Issue 218), a pure 25Wpc Class A integrated, has exhibited a more transparent top-end but its relatively low power removes it from the equation with lower-sensitivity loudspeakers.

Finally I should add that the INT-250's soothing and seductive sonics proved an ideal companion for analog LP playback. It just makes you want to spin vinyl, to take a moment to slow life down a bit and appreciate the gatefold art or follow along with the lyrics, or check out who's playing drums, or singing backup on a particular track—elements that are all missing when I plug in a USB stick. With something like Mobile Fidelity's newly remastered, two-disc, 45rpm mono pressing of Jefferson Airplane's *Surrealistic Pillow*, it's hard to imagine ever sitting down to listen to Grace Slick's fluttering vibrato on "White Rabbit" and "Somebody to Love" on any other format again.

The INT-250 is a force to reckon with. With musicality that is second to none, it operates at the outer limits of what is currently possible in today's integrated amplifier marketplace. It does have rivals breathing down its neck, and it's heavy lifting both physically and financially, but overall I simply don't know of a better

Rowland Continuum S2

Giving Separates a Spanking

Neil Gader

The Continuum S2 integrated amplifier from the Jeff Rowland Design Group represents the latest chapter in the iconic brand's pursuit of the state of the art, in this instance within the more rigid confines of a "single-box" integrated amplifier. Unlike a great artist working on a smaller canvas, confinement is not how I would describe the picture that Rowland has created here. This 400Wpc, fully balanced Class D design is an exemplar of refinement and scope for an electronic segment that has seen an explosion in popularity in recent years. In a conversation at CES, Jeff Rowland posited some reasons for the current trend toward integrated amplifiers. Simplicity for one—busy audiophiles searching for the performance of separates but disenchanted with their size and complexity. There's also real-estate downsizing among empty-nesters. Condo living, however lavish, is vastly more conducive to smaller-footprint solutions. Compared with separates, premium integrated amps make for a better fit in a wider variety of applications.

Visually, the Continuum S2 is pure Rowland. The vault-like chassis is precision machined from aircraft-grade 6160-T6 aluminum, well known for its low resonance and structural rigidity. Set off by the optical elegance of Rowland's trademark prismatic faceplate is an in-line series of small pushbuttons and indicator lamps for input selection, bypass, polarity reversal, and mute. A large, legible display accompanied by a volume wheel is offset to the right of center. The striated and matte-finished aluminum top and side panels are affixed via robust Allen bolts. Don't go looking for massive external heatsinks or vents—the Continuum S2 circuits run cool, and are so efficient that the chassis can be completely sealed for high RF and EMI isolation. The back panel provides analog connectivity in the form of a pair (each) of balanced and RCA inputs, plus a pair of unity-gain inputs that can be converted via internal jumpers to a set of normal inputs. A set of balanced and unbalanced outputs is provided, as well. Cardas' excellent clamping binding posts ensure a tight connection for speaker cables.

The nicely weighted volume control incorporates a noiseless optical encoder, has an excellent tactile feel, and is speed-sensitive to user input. Level adjustments occur over a nearly 100dB range and can be implemented at two speeds—rapid turns adjust the volume in 1.5dB steps, while normal spins are for ultra-fine 0.5dB changes. In contrast, the plastic remote control is more of an afterthought than an extravagance. But it's usable and ably handles basic functions. (You might slip it into a drawer before giving your audiophile friends a tour of the Continuum S2.)

The Continuum S2 linestage is based on the topology of Rowland's Capri 2 preamplifier. This circuitry is housed on one side of a four-layer circuit board to allow for continuous, unbroken, low-impedance ground and power-supply distribution planes. Signal path lengths have been minimized. Input circuitry is transformer coupled, which virtually eliminates

EQUIPMENT REVIEW - Rowland Continuum S2

ground loop noise and RFI/EMI, while also ensuring identical overall gain with all inputs. All resistors are of the 0.1% thin-film type, for extremely low thermal noise. The power amp section uses an ultra-high-efficiency power-conversion module. Sourced from Pascal of Denmark, it yields 400 watts per channel into 8 ohms, doubling into 4 ohms, with a peak current of 21 amps. A regulated, high-speed, low-noise, auto-ranging switch-mode power supply accepts all worldwide mains voltages. The role of the Continuum S2 can be expanded beyond its traditional linestage function via a pair of optional plug-in cards, specifically a phono card and a 192/24-bit DAC card. Choose wisely, however, as interior space dictates that only one of these can be installed at a time. The DAC card accepts SPDIF in sample rates up to 192kHz and bit depths of up to 24 bits. For the phonostage there are three gain and loading options to accommodate moving-magnet, moving-coil, and high-output moving-coil cartridges. Although installation is best left to the dealer, it's easy to drop in either card. Take the phono card, for example: Simply remove the six Allen bolts and the bottom plate of the Continuum, select the load (100 ohm, 400 ohm, 47k ohm) and gain (40, 50, 60dB) settings on the left- and right-channel modules, remove jumpers, and then slip each one onto the waiting pins of Input One. A small bolt secures the modules onto the input board.

Tonal neutrality prevails in modern solid-state amplification and in much of the contemporary tube world. The Continuum S2 is no exception. In tonality and fidelity to the source, the S2 is a down-the-middle straight-shooter. Treble performance is lucid, with just a hint of dryness but absolutely no grain. Strings sing; brass is a mixture of lightning-bolt transients and honey-gold bloom. Soundstage width and depth are the only areas that seemed underrepresented by the Continuum, which is solid here but not transcendent. Still and all, the S2 reproduces music with an overarching clarity and definition whereby images seem to physically pop from within the soundspace—a characteristic that I noted time and again as I listened to the plucked harp and chamber ensemble that introduce Audra McDonald's "Lay Down Your Head" from *How Glory Goes* [Nonesuch]. This Rowland separates out low-level information and defines the surrounding acoustic in a manner so convincing that even Felix Unger would drop his Swiffer in admiration.

A key S2 attribute is the dark silent backgrounds that the Rowland confers on acoustic recordings. There's a complete absence of electronic hash—no veiling and no sense that a fine layer of dust needs to be brushed away from an acoustic image. The benefits that this lower noise brings are finer gradations of micro-dynamics and greater contrasts in tonal color and richness. The Rowland serves up a symphony orchestra with neat-freak orderliness, every instrument placed just so, but also with the ability to hone in on each instrumentalist without losing connectedness across the soundstage.

Lower mids and bass reproduction are superb in pitch and timbre. Bassoon, cello, and contrabass are darkly burnished, harmonically ripe, and pitched with tuning-fork precision. Bass control is as tight as the proverbial drum, and only as loose as a loudspeaker allows it to be. While the S2 doesn't quite have the imposing, saturnine weight of big monoblocks, there is little sense of any attenuation of dynamic energy. I repeatedly listened to the orchestral kettledrums from Copland's *Fanfare for the Common Man* and the rhythmic beat from Mick Fleetwood 's drumkit on Fleetwood Mac's *Rumours*, and in both instances bass was tightly controlled, punchy, and absolutely pitch perfect.

The performance of the S2's internal DAC is very, very good across the board, and will likely satisfy all but the most finicky digital devotees. Throughout Peter Gabriel's *New Blood*—a collection of orchestral versions of the singer's classic hits—the Continuum teased out low-level details with ease, from the large-scale and spookily immersive atmospherics of "Don't Give Up" to the harmonic sustain of the triangle motif on the tender "Mercy Street." Equally compelling were the delicate metallic ring and sustain of the distant mandolin played during John Gorka's "Let Them In" [AIX Records]. Of course there are an infinite number of pricier outboard DAC options from third parties, but keeping sources under one roof, so to speak, is what makes integrated amplification so appealing in the first place.

However, the last thing I expected was that the performance of the phonostage would catch me on my heels. Perhaps the analog audio gods were smiling on me, but shortly after I plugged in the phono card the Julie London classic 1958 Liberty Records LP, *Julie Is Her Name, Volume II*, arrived from Analogue Productions. It was the first record that the Continuum S2 phonostage saw. As I listened to "Blue Moon," I heard that this early stereo disc had all the hallmarks of the day—from the reassuring tape hiss to the widely panned guitar and standup bass, and, of course, the seductive, satiny, "come hither" vocals of Ms London. It made an interesting contrast to Boxstar Records' remastering of the earlier (1955) original mono release, *Julie Is Her Name*, which featured the astounding guitar fills and flourishes of the legendary Barney Kessel. Like all good mono LPs, especially those remastered by great engineers like Bernie Grundman, songs such as "Cry Me a River" and "I'm in the Mood For Love" sonically transcend the supposed limitations of the monaural medium and embody the dimensional aspects and image focus that we presume only stereo can capture. Listening to Holly Cole's "Frank's Theme"—a spare piano and harmonica piece—image specificity on a stunningly realistic and engrossing level

SPECS & PRICING

Power: 400Wpc into 8 ohms, 800Wpc into 4 ohms
Inputs: Two pair balanced (XLR), two pair unbalanced (RCA), one pair unbalanced (RCA) unity gain (bypass)
Output: One pair balanced (XLR), one pair unbalanced (RCA)
Dimension: 5.3" x 15.5" x 15"
Weight: 35 lbs.
Price: $9500 ($350, phono; $450, DAC)

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EQUIPMENT REVIEW - Rowland Continuum S2

emerged from the soft acoustic pockets on stage. While the S2's phonostage can't match the tonal density, three-dimensionality, and micro-dynamic nuance of a near-reference-level standalone unit like the Parasound JC 3+, it is still pretty darn good. And like the DAC option, it is a genuine bargain.

Perhaps the most striking statement the Continuum S2 makes pertains to the overall musicality of Class D amplifiers. Just a few years ago, the argument asserted in these very pages was that Class D wasn't ready for prime time—the primary gripe being that it lacked extension, air, and transparency on top. True enough then, but that argument has been firmly laid to rest by a component like the Continuum S2. I asked Jeff Rowland what had changed. He replied that Class D is only as good as its implementation and integration within a greater amplification strategy—just as the engine in a Formula 1 car is only as powerful as the chassis, suspension, drive train, and transmission allow it to be. Rowland, a man whose knowledge about electronics is matched by few others in the high end, still feels that much of the Class D debate is like complaining about the first Prius while standing next to the Tesla P85D. You have to just get in and drive it. In the case of the Continuum S2, I couldn't agree more. It's elegant, poised, powerful, and a pleasure to experience. High fidelity just doesn't get much better than this. tas

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Aavik Acoustics U-300

What Price Glory?

Don Saltzman

At CES 2015, I spent all of my time at The Venetian. After burnout from visiting too many rooms playing too many female voices, I wandered the halls kind of aimlessly, thinking mostly about whether or not to visit the Bouchon Bakery on the ground floor. Before I reached the elevator, I heard what sounded like a party in one of the rooms and snapped out of my high-calorie reverie.

The closer I came to this room, the more it sounded like a small club playing loud music. When I saw the "Raidho Acoustics" sign by the door, I was even more intrigued. I had read great things about Raidho speakers, but had never even seen one. So when I entered I heard a system with which I was completely unfamiliar. (That's what makes CES so much fun.)

This particular room contained a number of listeners tapping their toes to the music, a pretty happy exhibitor/DJ having a great time spinning digital tunes, and a very minimalistic set of audio componentry, too little in fact to account for the propulsive sound knocking down the walls. I decided the chocolate croissants downstairs would have to wait (a while).

I happened to walk in when Raidho principal Lars Kristensen was playing "Welcome to My World" by Depeche Mode. He was playing his own sampler CD and it was rocking—driving bass line, crystal-clear vocals, and a huge sense of space. I expected more gear but I only saw a pair of fairly compact speakers on the floor about ten feet in front of the backwall. Each slender and beautifully finished speaker was just a little over four feet high. The sign said X-3, and I soon realized the X-3 was a new model somewhere in the middle of the Raidho line, at $30,000 per pair far from the top but certainly not inexpensive. Each speaker had an array of four 4" ceramic mid/bass drivers, the highly regarded Raidho ribbon tweeter, and one measly eight-inch bass driver mounted on the side. There was no way two of these were putting out all that bass, so I looked carefully for subwoofers hidden somewhere in the room. None to be found. I looked at the floor around the speakers for the presumably massive amplifiers, but no amps were to be found either. It was either some sort of trickery, or the Raidho guys were really onto something special.

On a stand in the middle of the room was a smallish black component that looked like it could have been designed by Darth Vader in one of his more creative moments. Sleek, black on black on black, solid metal with holes drilled for cooling, it could well have come from the command center of the Executor. It possessed a huge volume-type control on the front, silky smooth in operation and surrounded by a circle of tiny white LEDs. The curved top plane bore the name "AAVIK" deeply engraved in the metal, plus three small metal buttons above the volume control. Whatever it did, or however it worked, it was undeniably cool.

Raidho chief designer Michael Børresen then took the floor and told us about the loudspeakers. He also answered questions, the general tenor of which was, "How do you do that?" Unassuming and mild-mannered, he described what sounded like a new way of loading the bass drivers. He quietly extolled the virtues of the ceramic drivers and the almost massless ribbon tweeter. He didn't even mention the Vader box until I asked him about it. Almost nonchalantly, he gave me a brief tour of the device and informed me that he had been working on its design for a while. Aavik is a new compa-

SPECS & PRICING

Type: Integrated amplifier with built-in DAC and mc phono preamplifier
Output: 300Wpc into 8 ohms, 600Wpc into 4 ohms; stable to 2 ohms
Inputs: One RCA (phono), three line-level, two RCA SPDIF (32k–192kHz), two TosLink optical (32kHz–96kHz), one USB (PCM 32k–192kHz)
Input impedance: 10k ohms
Dimensions: 17.3" x 3.9" x 14.6"
Weight: 36 lbs.
Price: $30,000

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ASSOCIATED EQUIPMENT
Kuzma Stabi M turntable with Kuzma 4Point 'arm; Lyra Etna, Koetsu Rosewood Platinum Signature cartridges; EMM Labs; Aesthetix Eclipse Io phonostage, Aesthetix Eclipse Callisto linestage; Aesthetix Atlas Signature monoblock and VTL 750 amplifiers; Purist Audio Design, Transparent, and AudioQuest cabling

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EQUIPMENT REVIEW - Aavik Acoustics U-300

ny helmed by Børresen and Kristensen, and the U-300 is the first of a new line of electronics they will be introducing. They have also started a cable company called Ansuz Acoustics. Not to be overlooked is their less-expensive speaker line, Scansonic.

In that brief meeting at CES, Børresen explained that the "U" in the U-300 stands for "Unity" and the 300, not surprisingly, for the power output in watts. It was the component powering the X-3s. He said its output doubles to 600Wpc into 4 ohms, is stable to 2 ohms, and was distinctly *not* apologetic that it was a Class D design. The burly amp I had been looking for was contained in the svelte Aavik package. Matter-of-factly, he acknowledged that Class D amplification did not enjoy the best reputation in the high-end community. Nevertheless, he stated that design of Class D circuitry had come a long way in the past five years and, after all, he and Lars were forced to improve upon prior Class D design because they wanted the U-300 to have the ability to drive virtually any loudspeaker. In short, Class D was the only way they could get truly high power into a relatively compact package and not worry about heat dissipation. Personally, it doesn't matter to me what class the circuit is, as long as it sounds great. I admired his goal of building a take-no-prisoners integrated amp as his first project for Aavik.

Indeed, the U-300 is more than just a preamp and amplifier in one chassis. It also houses an internal DAC which was playing at the time. (He was using a dCS Puccini transport to feed digits to the U-300.) To complete the "Unity" aspect of the project, Børresen pointed out that the U-300 also contains a state-of-the-art RIAA phonostage. Press one of those buttons on top and start turning the volume control, and bingo—adjustable loading for a moving-coil cartridge. Overall, I thought the sound in the room was terrific and went back to visit three or four times during the show.

Fast-forward to the Newport Beach 2015 show. Raidho was again exhibiting, and this time Børresen was using the U-300 with the superb X-1 monitor speakers. Robert Harley wrote very highly of the X-1s last year and just as that came to mind, Mr. Harley himself walked into the room and sat down next to me. After extolling the virtues of the Raidho ribbon tweeter, he and I simply listened to the great sound. Robert had also enjoyed the U-300 at CES and said we needed to review this amplifier. I was mightily interested in doing it but was concerned about its (possible) limitations. I had a short discussion with Børresen about use of the U-300 with my reference Magnepan 20.7 speakers. I had several issues. First, I'm a tube guy and, through the years, have only really been satisfied with a tube front-end and large tube amplifiers driving the Maggies. Was the solid-state Class D U-300 going to sound thin, bright, and/or two-dimensional on the planars? Second, the 20.7s are power hogs. Simply put, the more (clean) power, the better. They will do a creditable job with 200Wpc, but require (IMHO) at least 300–500 watts, or more, to really sing in a mid-to-large-sized room. Believe it or not, if driven properly, the large panels will actually disappear, leaving the listener sitting in a pretty vast acoustic space. (My colleague JHb misquoted me when he commented that imaging must not be that important to me because I use the 20.7s. I specifically wrote that the 20.7s won't image with the best cone-driven systems, but they nevertheless image extremely well and certainly at no less than the same level I hear in a large concert hall, even sitting fairly close to the orchestra.) But could the smallish single Vader box deliver the goods? Michael's nonchalant response to all of my questions: "Don't worry about it."

Aavik's Design Philosophy

At Newport, as well as in subsequent conversations, Børresen told me more about his thinking behind the design of the Aavik U-300. He was not aiming for an entry- or mid-level integrated amplifier. Instead, he wanted to embrace the benefits offered by a single box and to design an all-in-one unit that would compete favorably with the best equipment in the world. As noted, he decided early on that the only way to provide major power for virtually any loudspeaker, in a relatively small enclosure, was through Class D circuitry. Even though the circuit might have a negative connotation to some audiophiles, he was convinced that he could do better and that the proof was in the listening.

Børresen also extolled the inherent virtues of an integrated amplifier/DAC/phonostage: Very short connections and no interconnects required! And he was not necessarily looking at this as a cost-saving measure, which it undeniably is. Instead, his point was that with proper circuit design and layout in a single box, there was great potential for the resulting sound to be faster and more unfettered than if the signal were traveling through yards and yards of interconnect between components. Again, he did not say that separates could not sound fast, and he was not putting down any particular design. He simply remarked that, with a well-designed integrated, there was *potential* for faster, more open sound.

The designer gave me a breakdown of the design philosophy and circuit implementation for each of the main sections of the U-300. The U-300 phono section is based on a discrete, floating, balanced, ultra-low-noise, bipolar input circuit. He said he did this to maintain the inherent floating, balanced signal of a moving-coil cartridge. Paralleling several transistor pairs has resulted in a dead-quiet phonostage. At 62dB, the U-300 phono section has ample gain for any of the better moving-coils. Børresen believes that designing a phono section to accommodate a wide range of cartridge outputs is detrimental to absolute performance. Accordingly, he designed this section to accommodate mc's from the lowest output to approximately 1.5mV. This narrower focus allowed him to avoid the JFETs used in most competing designs. Moreover, the use of six, individual, low-noise power supplies for the phonostage, together with a four-layer PC board with shortest possible traces, has allowed Aavik to obtain an extremely high 94dB signal-to-noise ratio. Cartridge loading is adjustable from 50 ohms to 5k ohms.

The U-300 24-bit/192kHz DAC section is also designed in-house and offers five digital inputs: two TosLink, one USB, and two SPDIF. The DAC's circuits are fitted with ultra-low-jitter onboard clocks to minimize timing errors in digital-to-analog conversion. Børresen indi-

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cated that when designing the DAC, he had to decide if it should handle both PCM and DSD. In his view, multi-format architecture, at least at this time, does not offer the ultimate performance of a single-format DAC; thus, he settled on a PCM-type DAC, a decision that he said made it easier to deal with all bit depths and sample-rates in an optimum manner.

For the amplifier section, Michael stated that Class D was the obvious choice as no other technology offers comparable performance in regard to power, size, and the need for cooling. He acknowledges the inherent issues with Class D designs and does not assert that Class D is superior to Class AB or Class A amplifiers. But he does believe that great progress is being made in Class D technology and has devoted a lot of time and energy to building the best Class D amplifier he can at this time. Someday, he speculates, Class D may become the best performer of them all.

The rear panel of the U-300 is reasonably accommodating. Aside from the five separate digital inputs, it has a dedicated RCA input for the phonostage and three other line-level, single-ended inputs. A really useful feature is that the gain of each input may be separately adjusted in three steps: 3, 6, and 12dB. This makes it much easier to match volume levels from different sources. The loudspeaker binding posts are easy to use and will accommodate bare wire, spades, or banana plugs.

Is anything missing? At first I thought it would be helpful to have at least one balanced input, to accommodate owners who already own a balanced cable they prefer. But as I used the Aavik, I came to realize the absence of an XLR in does not really present a hardship. Connections from a turntable are always going to be single-ended. With its choice of five digital inputs, only a digital connection is required between a transport and the Aavik DAC. Of course, if one also wants to use additional line-level sources, such as a tuner or a different DAC, single-ended cables would be required.

Some users might also want a volume-controlled line-out, but Børresen explains that is not really the purpose of the U-300. It was designed to literally encompass all front-end and amplification needs, rendering line-out superfluous for most users. If the intended system is fairly complex and includes subwoofers, for example, he correctly points out that many high-quality subs allow connection at speaker level for most coherent performance.

The Aavik remote is clever and worth a few words. A small piece of brushed aluminum with three controls, it was designed by Apple! In fact it's the same remote Apple uses for many of its products. In the Aavik application it controls volume, allows selection of source, and enables muting.

So the U-300 was conceived to be competitive with the best high-end separates and is gorgeous to behold. It sounded wonderful on two different sets of Raidho speakers at two different shows. But only a trial period at home would let me know if Børresen was right about whether I had no need to be concerned that this small box could get the best from Maggie 20.7s.

How Does it Sound?

It was almost too easy to set up the U-300. It weighs slightly less than 40 pounds, so no problem moving it around. In my system, the Aavik replaced a *lot* of gear: Aesthetix Io Eclipse phonostage with two power supplies, Callisto Eclipse linestage with two power supplies, Meitner DAC, and a variety of heavy amplifiers currently on hand (including Aesthetix Atlas monos and a pair of VTL 750s). (I also have Audio Research REF 250 SE amplifiers and a REF phono and linestage waiting in the wings, but they were not in use when I auditioned the U-300.)

To get on with the show, at first I simply connected my Kuzma Stabi M turntable (with 4Point arm and Lyra Etna cartridge) and two-box Meitner CD transport and DAC directly to the U-300. I did not have to change speaker cables as they were long enough to reach the centrally-located Aavik. It was a breeze to set cartridge loading at the recommended 500 ohms. I prefer vinyl but first I put on some CDs just to see if the U-300 could actually drive the 20.7s to satisfying levels without a meltdown. Taking it slowly at first, I put on one of my favorite discs, Beethoven cello sonatas with du Pre and Barenboim [EMI]—the Allegro Vivace from Sonata No. 1, and the Adagio and Allegro from Sonata No. 2. As I turned the volume slowly upward, it wasn't long before I was simply blown away. Cello tone was ravishing, and Barenboim had never sounded this dynamic. I know it's hackneyed, but the performers were in the room. More accurately, I was in their room as I heard sounds from the live audience I had barely noticed before. I love this version of the sonatas (du Pre is sensational), and it never sounded better. I easily achieved lifelike levels without any sense of strain or compression from the Aavik or the speakers.

Very pleasantly surprised, I decided to throw subtlety out the window and try more hard-hitting CDs. These included the Raidho show sampler given to me by Lars Kristensen (not true that I pried it out of his hands), the soundtrack from *Lost Highway* [Nothing/Interscope], and some of the fabulous CDs that Philip O'Hanlon (owner of distributor On a Higher Note) makes and occasionally hands out to a lucky few. From the Raidho sampler I went right to the Depeche Mode cut I had heard at CES. Fresh in mind was the huge sense of space and driving bass of the demo. I played it *really loud*, and was stunned. I knew the 20.7s could do tight, deep bass, but again I had never heard it like this. Amazing definition, control, and extension in the lower frequencies. Dave Gahan's voice was crystal clear and the soundstage was huge. I just couldn't get over the ease with which the U-300 was driving the big Maggies. The amp was in total control and played cleanly at any level I could tolerate. The U-300 is rated at 600Wpc into 4 ohms, but in use it felt like 1000 watts or more, with pretty much unlimited headroom. No wonder Børresen had smiled when he told me, "Don't worry about it." I was not only amazed at the amp, but had new appreciation for the capabilities of the 20.7s, the limits of which obviously I had not previously reached (and may still not have reached). Equally important, there was no sense of transistory hardness or thinness, all of which are eagerly exposed by the Maggie ribbon tweeter. The music just sounded *alive*. Very transparent, emotional, and dynamic. The stage was panoramic.

Still anxious to get more of a take on the raw drive capabilities of the U-300, I put on the *Lost Highway* soundtrack. At a CES a few years

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ago, Jon Valin introduced me to this CD. In one of the show rooms, after hours, he put on "The Perfect Drug" and told them to play it *very* loud. Clearly his goal was to drive everyone from the room, leaving it for himself. I braved it and became a real fan of the entire album. I'm not embarrassed to say I especially get a kick out of the Marilyn Manson and Rammstein selections, not to mention the David Bowie opening and closing numbers. Manson's cover of "I Put a Spell on You" is killer. In Rammstein's disturbing but powerful "Hierate Mich," the lead singer makes Leonard Cohen almost sound like a soprano. At the highest sound level I could tolerate, which is high, the Aavik fed the 20.7s enough juice to bring the hounds of hell into my room. The bass line was throbbing; the full band was aggressive but never sounded unnaturally harsh or bright, and vocals were moving through the room. Scary, actually. It confirmed my earlier impression that the U-300 has wide-open dynamic range, as if the designers had managed to capture and restrain some small nuclear reactor inside the Vader box.

It was time to really get serious with vinyl. I now knew the U-300 had the power to drive the 20.7s with ease, but could the phonostage compete with high-quality separates? First up on the orchestral side was my favorite Mahler Third, with Zubin Mehta at Royce Hall [King]. The first thing I noticed with the Aavik was that the sense of air and space was huge and gave up nothing to the tube gear. The Royce Hall acoustic enveloped most of my room, making it easier to get lost in this massive symphony. The bass drum's thunder at the opening of the first movement (almost a symphony in itself) soon subsides into some relatively delicate strokes of the drum, far back, stage left. The Aavik firmly differentiated the varying intensities of the drum and left no question about the significant space between the bass drum and the front of the stage.

Throughout the first movement, the brass section (trumpets, trombones, and tuba) was sensational, burnished, and piercing as in life, but never harsh as in hi-fi. The orchestra was illuminated from within, not with spotlights but with the warm glow of the orchestral stage during a performance. Timpani rolled through the room while massed violins and doublebasses sounded as they do in the concert hall. Solo violin was lovely and the woodwinds floated throughout this massive orchestral undertaking (Mahler's largest symphony and, IMHO, also one of his most uplifting).

Orchestral piano was also beautifully rendered by the Aavik and 20.7s. I'm a fan of Julius Katchen, and his playing of Brahms Piano Concerto No. 1 with Pierre Monteux [Decca] highlights his skills. After the lengthy introduction by full orchestra, the piano's entry is precisely located well behind the speakers, rich in timbre and fully percussive when the playing becomes more intense.

The next record to settle on the Kuzma was *Miles & Quincy Live at Montreux* [Warner]. A wonderful performance and atmospheric recording, the *Porgy and Bess* medley is fabulous. Great definition of all instruments with Miles' trumpet riding above and through it all with authority and explosiveness. Speaking of explosive, the song "Pan Piper" (from *Sketches of Spain*) on side two was breathtaking.

On the terrific early stereo (1958) recording *What Is There to Say?* by the Gerry Mulligan Quartet [Columbia], Mulligan's sax and Art Farmer's trumpet were full-bodied and right in front of you in the room, leaving nothing to the imagination. My aunt was friends with Peggy Lee, and some years ago she gave me her Peggy Lee records. They generally suffer from early "left-right" recording techniques, but the sound is pretty good and Lee's voice and interpretations are still fresh and relevant. The old standards "The Lady Is a Tramp" and "Days of Wine and Roses," both on *Mink Jazz* [Capitol], exhibited new life through the Aavik. It didn't turn the recordings into the state of the art, but it allowed all of the singer's expressiveness to shine through as if the tracks had been recorded yesterday.

I've played *The Red Hot Ray Brown Trio* 45rpm reissue [Groove Note] dozens of times in the past few years. It never gets old. With the Aavik in the system, Ray Brown's bass had an unexpected level of definition and expression. Likewise, Gene Harris' piano playing beautifully ran the range between subtle and driving. It was never more clear that they were having fun—and so was I. The Aavik just seems to deliver intact all of the *energy* of the original performance. Put another way, it doesn't seem to restrict or compress the dynamic range of the musicians. Could this be a function, at least in part, of all electrical components being closely together in one enclosure, with minimal wiring and almost no interconnects? Why not?

Time to try the U-300 with other genres. My daughter Serena has her own weekly blues radio show at Indiana University. She's teaching me a lot about blues music and history and I'm enjoying the blues (the music, that is) more than ever. She sent me on a record-buying mission at last year's Newport Show (great show with a pretty spectacular selection of vinyl for sale). One of those purchases, Otis Rush's *Cold Day in Hell* [Delmark], is seeing more than its fair share of turntable time. How bad can any album be when Mighty Joe Young is playing guitar? Rush's songs are addictive and, yet again, the Aavik lets this raw-boned music through in all its gritty glory. The more I listened to the U-300, the more I realized one of its greatest strengths is what it *doesn't* do—it just doesn't get in the way of the music.

How about the U-300 with rock 'n' roll? Jack White headlined Coachella last Spring and put on a helluva show, not to be forgotten. Since that show, my White Stripes and Jack White (solo) vinyl collection has substantially expanded. They're all really good, but if you're new to the White Stripes on vinyl, the two-record set *Elephant* [Third Man Records] is a great place to start. (All songs were recorded to eight-track reel-to-reel and, so state the album notes: "No computers were used during the writing, recording, mixing or mastering of this record.") I just read that *Rolling Stone* called it the fifth-best album of the decade. It's all good, with "Seven Nation Army" and "Ball and Biscuit" ("Let's have a ball and a biscuit, sugar, and take our sweet time about it") still receiving a lot of airplay on the indie channels. Jack White is undoubtedly one of the greatest guitarists of our era and this album finds him pulverizing just about every cut. Through the Aavik, his guitar *shreds* and the bass buckles the walls. But through it all, his voice remains crystal clear and the lyrics are in-

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telligible, a rarity today. This record has always sounded awesome on my tube gear, but the Aavik just cranks up the energy to another level without any loss of clarity.

Digital Redux

I wanted to audition the Aavik's built-in DAC but my Meitner transport apparently has proprietary connections that are incompatible with the Aavik. I didn't have the time to accumulate a number of transports for the purposes of this review, but I do have a perfectly good Oppo multiformat player with TosLink and RCA digital outputs, both of which are accepted by the U-300. I understand the Oppo is not the ultimate high-end source, but it is a great value, and I thought it would be interesting to see if an inexpensive transport would work well with the Aavik.

I connected the Oppo and re-played all of the CDs I played when I first received the Aavik, discussed above. When finished, the Oppo/Aavik combination had demonstrated some distinct differences from my Meitner transport/DAC. I have been very happy with the Meitner for a long time and never thought it was anything but "quiet," but the greater background blackness of the Aavik DAC was noticeable on every CD. Second, the Meitner was a little more laid-back in presentation, while the Aavik was more upfront. I can't say that one result is better than the other, but over time the Aavik seemed to flesh out small nuances a little better than the Meitner, while the Meitner seemed to offer slightly more air and space on orchestral recordings. Call it a tie. The Oppo/Aavik combo sounded very slightly more transparent than the Meitner; perhaps that is why musical nuances were more easily heard with the Aavik. But the biggest difference between the two combinations, by far, was in the bass range. The Meitner has powerful bass which sometimes seems a little overblown (in my system). The Aavik DAC also has powerful bass, but through the Maggies the low end with the Aavik is *much* better controlled and more tightly defined than the Meitner. I could imagine some systems where it would be a close call choosing between the two sets of transport/DACs, but the 20.7s loved the control and definition of the Aavik.

I can only imagine what higher-end transports might sound like with the Aavik. But I can report that even with a low-cost but outstanding player like the Oppo used solely as a transport, the Aavik digital section was competitive with the Meitner and superior in some important respects. Sonically, there is little doubt but that the Aavik DAC was designed and built, like the phonostage, to compete with or exceed the best separates. In my view, Aavik has more than achieved its goals with both the digital and the phono sections of the U-300.

Does the U-300 Offer Good Value?

Where does the Aavik U-300 fit in the audio universe? One thing it did for me, immediately, was to change my view of integrated amps and Class D technology. Before I tried the U-300, my general impression of integrateds was that they were a convenient and cost-effective means of driving less assuming speakers in a smaller room. But the U-300 shows that an integrated amplifier system can be the heart of a cost-no-object system. This single box is truly competitive with a host of *very* expensive separates. Based upon my very positive experience with the U-300 and my power-hungry 20.7s, it is hard to imagine the Aavik having difficulty cleanly driving any speaker to any level you might want. It's a true powerhouse. It is also supremely transparent, removing even the clearest pane of glass between you and the music. It is not thin or harsh. Nor does it sound like my preconception of "solid-state" or "Class D." It is rich and full-bodied when the music allows, but it is never syrupy or overripe.

I have taken pains, so far, to avoid a detailed comparison of the U-300 with my reference tube gear. I can't say that the Aavik sounds like tubes, but neither can I say that it sounds like solid-state. It sounds like music. Perhaps it is not *quite* as full-bodied or three-dimensional as competitive tube gear, but it is so close as to be totally satisfying on the broadest range of music. And it is so fast, and so black of background, that it leaves much tube gear in its wake. Moreover, finding tube preamps and power amps that will drive the 20.7s with the ease and alacrity of the Aavik is not an easy or inexpensive undertaking. The U-300 is the first solid-state preamp and amp combination I have auditioned, in my own system, that offers a fully satisfying alternative to high-powered tubes.

I do not mean to imply that the U-300 is unbeatable. I love my tube front end and some tube amps sound outstanding with the 20.7s. I have not heard them all. Perhaps a more interesting question today, in light of the wealth of new, superb solid-state equipment from many manufacturers, might be how the Aavik sounds compared to the best of the latest solid-state gear. I have not heard all of the latest amplifiers in my room and cannot make that assessment. What I am prepared to say, with a high degree of certainty, is that it would be very difficult to find separates (tube or solid-state) with performance equal to or greater than the Aavik, at anywhere near its price. In drawing this conclusion, I am considering the cost of a state-of-the-art phonostage, a state-of-the-art DAC, and a superb amplifier with sufficient power to drive most, if not all, speakers with ease and enormous headroom.

After living with the U-300 for over three months, I still look forward to every listening session and am still discovering subtle nuances to old recordings I thought I knew well. I get goosebumps at almost every session. Fun bonuses that don't affect the sound: It's nice to turn on the whole system with a single switch; it's refreshing not to have to turn on the air-conditioning every time I play the system for more than an hour; it's a pleasure to only need a few cables and power cords to hook up the entire system.

To answer my own question, I believe the U-300 offers enormous value, even at $30,000. When considering the combined cost of separates that are truly competitive with the Aavik, the U-300 is a relative bargain in today's high-end scene. To my way of thinking, the U-300 is a game-changer in the high-end industry. It is now possible to think about state-of-the-art performance *for all necessary electronics* in a single, very stylish box. The U-300 welcomes with open arms almost any speakers, not just monitors or high-sensitivity models. I hope some of you take or make the opportunity to audition the U-300. I think you'll be impressed. tas

T+A PA 3000 HV and MP 3000 HV

Swiss Sound for less

Alan Taffel

I've been testing these two flagship T+A components for longer than any other review equipment in memory—over a year now, on and off. One reason is that they are so fascinating; in some ways they're downright unbelievable. Another is that they are so comprehensive (especially the MP 3000 HV music player) that there are seemingly infinite modes to evaluate. Throughout this odyssey, T+A has been gracious, helpful, and patient. (I offer my profound thanks to them for indulging me for so long.)

During this extended evaluation period, my perspective on these two components has gone through several phases. It seems fitting to recount them to you, in the order they occurred, so that you can share my journey with these unusual and in many ways remarkable products.

Phase 1: Abject Lust

I've had the opportunity to test quite a lot of very expensive gear lately, but none of those has inspired more lust than the T+A HV series. To uncrate these components is to be smacked upside the head by their obvious top-drawer quality. They are weightier than you'd expect. Hoist one of these things and you know you're getting something for your money. Then there are the aesthetics. These are ruggedly handsome pieces that instantly telegraph "we mean business." Yet there are also stylishly extravagant touches, like the glass inset on top that lets you peek at the classy componentry within.

There are lust-worthy operational touches, too. Large informative screens with touch controls dominate the front panels. The PA 3000 HV integrated amp's screen includes very cool, cassette-deck-like power output meters. The screens are flanked by enormous, positive-action knobs that imbue the user with a sense of complete command.

The FD 100 remote, which is included with the MP 3000 but treats all HV units as an integrated whole, is the most tricked-out device of its kind that I know of. A two-way system, it not only governs every imaginable function, but also displays status information such as the source selected, volume level, and album cover art. Although T+A also offers a nice tablet app, I never felt the need to use it. Meanwhile, HV units communicate with each other via an "H-Link" connection, making operations even simpler and more seamless.

Finally, lust springs from the no-compromise sonically-oriented features. Like *two* AC inputs—one for digital and one for analog—on the player. Want to tweak the digital sound to your liking? The music player's DAC lets you select from four available filters. You can make your choice on the fly from the listening position using that incredibly resourceful remote. For its part, the integrated amp sports an oversized AC input socket, massive heatsinks, and dual sets of binding posts made of rhodium-plated solid brass.

And these are just the visible signs of serious sonic design. The spec sheets and technical details read like audio porn. For instance, as is the case with such benchmark brands as Soulution, CH Precision, and Spectral, the HV-series is ultra-wide bandwidth. T+A employs additional top-tier touches like highly-regulated power supplies and dual-mono, symmetrical, discrete, fully balanced, zero-global-feedback circuitry. But these products are far from copy-cats; T+A has gone in some bold new directions. Most notably, the "HV" in its model names indicates that these pieces run at an unusually high voltage. Whereas most solid-state amp electronics operate at about 100 volts internally, T+A gooses its HV units to a whopping 360 volts—roughly the range of tube gear. As in valve equipment, these voltages ensure that the amplification devices are working well within their operating parameters. Indeed, the HV models utilize only about 20 percent of their amplification transistors' available range. This, in turn, greatly reduces non-linearities. The goal, says T+A, is to mate the naturalness of valves with the speed of solid-state.

With all these aesthetic, operational, and technological goodies, it's impossible to meet these HV components and not fall at least superficially in love with them. I certainly did. Ah, but would the promise be fulfilled? The need to hear what these HV Series components sounded like was becoming urgent.

Phase 2: Corporate Culture Envy

In the course of getting ready to do just that—what with setting everything, meeting company reps, and poring over manuals—I learned a few intriguing things about T+A. One is that those letters don't stand for what you thought they did. (And, by the way, shame on you!) Rather, they stand for Theory + Application. That's not hype. As its name implies, T+A has always prioritized pure theoretical research over

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technological ideology, marketing trends, or price points. As a result, the company's history is impressively replete with innovations that T+A either spawned or was among the first to adopt, including software-based digital filters; multiple speaker advances, like active amplification, transmission-line configuration, and digital room matching; and discrete, switching power supplies.

T+A's culture also includes a genuine commitment to social consciousness. The Herford, Germany, campus consists entirely of green buildings, and the production line avoids substances that are potentially damaging to the environment or worker health. That means no CFCs or even chlorine-based cleaning agents. Most plastics and PVCs are also shunned. Wherever possible, parts and casings are made of recyclable metals, an approach that serves the dual purposes of screening components from external electrical interference while protecting the atmosphere from electro-magnetic radiation.

As much as I admire these corporate touchstones, the element of T+A's culture that I most wish other companies would emulate is its dedication to fair pricing. Almost all high-end manufacturers give lip service to this principle, but T+A walks the walk. For example, as you may be aware, over the past two years the exchange rate between the euro and the dollar has undergone a seismic shift in favor of the greenback. This makes European goods sold in the U.S. cheaper—at least in theory. Yet, can you name any European audio company that has reduced its prices accordingly? I didn't think so. In contrast, when the rates shifted, T+A lowered U.S. prices across its entire lineup. That's just the kind of company T+A is, and I for one applaud it.

Phase 3: Value Incredulity

As I (finally!) embarked on the listening stage of my time with the HV components, the word "Value" with a capital "V" constantly swirled around my brain. Let me tell you why. As readers will know by now, I am a dedicated fan of what I call the Swiss Sound. At first this school was represented by Goldmund and Spectral; now there is Soulution and CH Precision as well. What makes them arguably the best electronics on earth is that their high-speed circuitry and power supplies deliver fast, virtually unlimited dynamics, well-defined transients, vanishingly low distortion, tremendous timbral detail, and near-perfect linearity in both frequency and time domains. The resulting sound is exciting, engaging, and true.

But these virtues come at a price. Circuitry bandwidth must be much wider than usual, power supplies have to be carefully regulated, and the builder is obliged to include extensive protection mechanisms. None of that is cheap. So the first miracle of the T+A HV-series is that it employs all of these design principles yet delivers them at a fraction of the price of the Swiss alternatives. The second miracle is that—significant price difference notwithstanding—the sonic result is a dead ringer for this school's more expensive gear.

How close is the sound? Let me start with the PA 3000 HV. At $17,000, this 300-watt integrated amp costs about 15 percent of my reference CH Precision C1/2xA1 combo. Yet when I switch between them the most striking thing I hear is their utter similarity. Of course, I tried to find differences. On the Original Master Recording LP of Donald Fagen's *The Nightfly*, I queued up "The Goodbye Look" and carefully compared bass (identical), vocals (identical), the twang of the solo guitar (identical), and the snap of the xylophone (identical). Most importantly, both presentations preserved the percolating rhythm that make this—and many of the album's other songs—such an enduring pleasure. To be sure, the reference CH equipment creates a wider soundstage, and its tonality is a little more fleshed-out. But I seriously doubt I'd be aware of either of these without a back-to-back comparison.

The biggest difference between the T+A and the CH Precision is at the very top end, where the reference is more refined, though not any more extended. Bear in mind that even this difference, though audible as a touch of roughness, still falls into the subtle category. As evidence, consider that while trying my darndest to ferret out differences like this one, I frequently put down my pen and succumbed to the music. I listened to entire sides of even the most familiar albums. That's an indication of how little these scant distinctions matter, and how miraculously close the PA 3000's sound and capacity to captivate come to the higher-buck Swiss Sound stalwarts.

As icing on the cake, T+A offers an optional phono module for this amp. I'm sure such an option, were it available from a Swiss brand, would run many thousands of dollars. But T+A's module costs just $1500. Eminently fair, as always. Naturally, I compared it to my Swiss

SPECS & PRICING

PA 3000 HV Integrated Amplifier
Power output: 300Wpc into 8 ohms
Inputs: 4 XLR, 2 RCA, H-Link (HV data bus), LAN (system control), trigger input
Outputs: 2 pairs speaker binding posts, XLR balanced line-level, RCA line-level, 3/8" headphone jack
Input impedance: 20k ohms single-ended, 5k ohms balanced
Gain: 38.6dB
THD: .001% (pre-amp stage), .03% (power amp stage)
Frequency response: .5Hz–450kHz (pre-amp stage), .5-150kHz (power amp stage)
Dimensions: 18" x 6.7" x 18"
Weight: 84 lbs.
Price: $17,000; optional phono module $1500

MP 3000 HV Music Player
Inputs: FM antenna, remote antenna, 5 SPDIF (2 BNC, 1 coax, 2 TosLink), 1 AES-EBU, LAN, USB, USB Master-Mode (stick or HDD)
Outputs: USB, SPDIF, H-Link (HV data bus)
File formats: CD, UPnP 1.1 streaming, UPnP-AV streaming, DLNA streaming, WiFi streaming, FM, Internet radio, MP3, WMA, AAC, OGG, FLAC, WAV, AIFF, ALAC
Dimensions: 18" x 6.7" x 18"
Weight: 57.3 lbs.
Price: $13,500

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EQUIPMENT REVIEW - T+A PA 3000 HV and MP 3000 HV

reference, a Goldmund PH-01. Once again, the similarities vastly outweighed any differences. Speed! Dynamics! Nuance! As before, there were some disparities; however, in this case, they were not all in favor of the reference. For instance, the T+A phonostage is actually more linear and less euphonic than the Goldmund, with purer tonality. On the other hand, the HV's bass is less meaty. A tradeoff—and a tossup. Without question, if you don't already have a high-quality phonostage and are investing in a PA 3000, the optional phono module is a no-brainer.

While the integrated's value proposition is based on sonic miracles, the MP 3000 HV is attractive partially for the same and partially for different reasons. In the latter category, know that this is one of the most all-encompassing units of its kind you're likely to find. Let me count the ways in which this thing delivers music. First, naturally, there is the superb built-in CD player (more about that later). But that's merely the iceberg's tip. The MP 3000 is also a full-fledged DAC that handles USB and SPDIF—the latter via coax, BNC, AES/EBU, and TosLink interfaces. You can also plug a USB hard drive or thumb drive directly into the unit. Then, too, the MP 3000 will happily stream music from a NAS, and it will do so through either a wired or a wireless connection. As if all this weren't enough, the MP will play Internet radio and even pick up good old FM. You may be thinking that managing all these source options—and the content within each—must be a nightmare. The truth is that the remote (or the tablet app) makes it easy.

Of course, sonics matter too. In its CD mode, the MP 3000 is every bit as impressive as the PA 3000. This is one remarkably good CD player. Not only is it clean, open, richly detailed, and dynamic, but it gets completely out of the way of the music and imposes virtually no coloration or digital artifacts. While the CH Precision C1/D1 DAC/transport combo (about $80k) has certain advantages—greater scale, timbral density, and dynamic jump—when considered independently, in the context of a PA 3000-based system, the MP 3000 actually sounds better. This is not unheard of; the synergies reaped by staying within a given manufacturer's line can be surprisingly powerful. In any event, the HV combination plays music more organically than when mixing and matching, with greater rhythmic drive and coherence.

As an additional reference point, I compared the MP 3000's CD playback with that of my trusty Bryston BCD-1. Although this great CD player is no longer in production, when it was available and selling at $3500, it punched well above its weight class. My goal in this comparison was to see if the T+A, even without all those other inputs, justified the extra money. So, did the Bryston come close to the MP 3000? No, it did not. Not even a little. The MP 3000 is far more open, larger in scale, deeper in dimensionality, more extended, and even more musically compelling than the Bryston.

Another of the MP 3000's inputs that squarely hits the sonic mark is SPDIF. This input runs a bit mellower than the CD, but in every other way the two sources are very close. Of course, the SPDIF input has an advantage in that it can handle hi-res source material, and this sometimes gave it the edge over CD. All in all, listening to either of these two sources had me once more agog at what I was hearing.

Stage 4: Reality Check

As it turns out, the MP 3000 is not perfect. Specifically, its other sources don't measure up to the benchmark set by its own CD and SPDIF prowess. Switch from either of these to NAS streaming, for instance, and the soundstage and instruments flatten. The sound isn't objectionable, mind you, but nor does it engage. If you must stream into this DAC, be sure to use a wired connection. That route will still be less dynamic, open, and extended than the CD, but not to the same extent as going wireless, which throws a thick soggy blanket over the proceedings. For all I know, this is no fault of the MP 3000's and is instead endemic to wireless connections. More research is required, but I can say for sure that this particular instance of WiFi streaming isn't suitable for anything other than background music.

There is better news on the USB front. This interface, at its best, sounds way better than streaming. "At its best" means downloading T+A's custom USB2 driver rather than using the ones that self-install when you first connect the unit to your computer. T+A's research revealed sonic problems with kernel streaming drivers as well as ASIO drivers, so it developed its own approach. The MP benefits from the use of a good USB cable. You'll want to select the "Bezier"—as opposed to the "Bezier plus IIR" or any other—filter. Thus armed, the MP 3000's USB sounds quite good. The only problem is that the CD and SPDIF sound *very* good.

The main knocks on USB compared to the MP 3000's best inputs are that vocals are more recessed, dynamics are more restrained, and the presentation isn't as three-dimensional. None of these do major damage, so USB turns out to be quite enjoyable. As an illustration, consider Charles Mingus' *Ah Um*. Listen first to the album via USB, and you'll be tapping your feet and marveling at how realistic the brass sounds. The first track "Better Git It In Your Soul" can lose all sense of cohesion in the wrong hands. But the MP 3000's USB DAC is fully up to the task. Yet when you switch to the CD, the sound suddenly bursts with more life, the stage opens up, and those tonally convincing instruments now take on three-dimensionality. The same contrast holds true when comparing CD with USB-tethered hard drives.

These discoveries tempered—but didn't eradicate—my original excitement about the MP 3000. Naturally, I yearned for USB and streaming that sounded every bit as good as CD and SPDIF. I also found myself wishing that the MP 3000's transport handled SACDs and that its DAC supported DSD files. It's worth noting, though, that T+A makes a more expensive music player, the PDP 3000 HV Reference DAC/Transport ($20,000). That model includes everything the MP 3000 HV does (except client streaming functions and an FM tuner), adds in the missing SACD and DSD capabilities, and utilizes a more sophisticated DAC.

Stage 5: Full Circle

After a Reality Check stage that, as noted, somewhat curbed my enthusiasm, I decided to set all that aside and listen afresh to the

EQUIPMENT REVIEW - T+A PA 3000 HV and MP 3000 HV

T+A combo playing either CDs or hi-res files via SPDIF. The sound, once more, just blew me away. I invited fellow TAS writer Karl Schuster to drop by and have a listen. He summed things up perfectly when he described the sound as "spooky good." That spook factor stems from how eerily close these units come to the sound of far costlier Swiss gear. And that, I realized anew, is really the bottom line here.

For $13,500, the MP 3000 delivers tremendous versatility and, on its best sources, sound that rivals digital playback from components that cost six times as much. Not all of its sources are up to that standard, so consider your own listening habits and decide if the MP 3000 is for you. Similarly, the $17,000 ($18,500 with phonostage) PA 3000 not only competes directly with integrated amps that run all the way up to $50k, it holds its own against $120k worth of Switzerland's best separates. This is a component that's not to be missed.

But these HV models not only stand up to their Teutonic brethren, they sound just like them. What T+A has done is to make it possible for audiophiles of more modest (though still significant) resources to get in on the extraordinary build-quality, sonic merit and character, and sheer musical enjoyment of the Swiss School. And that is surely a promise fulfilled. tas

PREVIOUS PAGE NEXT PAGE

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OUR TOP PICKS INTEGRATED AMPLIFIERS

NAD D 3020
$499

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

NuPrime IDA-8
$995

Sonically and functionally, there's plenty to love about the IDA-8. Essentially, it's a sleek-looking, small-footprint hybrid Class A/Class D integrated amplifier/DAC—that combines Class A warmth and resolution with Class D speed, power, and efficiency, and delivers both with remarkably low noise, thanks in part to ultra-low-noise JFETs in its input stage. Its DAC supports USB 384kHz/32-bit and DSD256, and is also capable of decoding DoP (DSD over PCM) via coaxial and optical inputs. NuPrime's SRC (sampling rate conversion) IC chip provides FPGA processing with ultra-low jitter and distortion. Though a touch dark in character (à la Class D), the well-conceived IDA-8 delivers substance with plenty of gusto—and does so from an astonishingly quiet background. It has a slightly digital-like sound in its detail resolution but doesn't cross the line into the overly analytical. Since NuPrime's founding, Jason Lim has continually sought to improve sonics through the application of innovative technologies—in addition to offering high performance and value with respect to pricing. The IDA-8 exemplifies this approach. Here's how Lim summarizes the IDA-8, "It is as if we combined the 'perfect' ST-10 and DAC-10H, made it sound like a high-end Class A amp, and brought the price down to $995." A great-sounding stone-cold bargain.

Hegel H360
$5700

The Norwegian firm's integrated amplifiers have always been overachievers, but the new H360 is, by a wide margin, Hegel's most impressive effort yet. With 250Wpc into 8 ohms (420Wpc into 4 ohms) and 50% greater current capacity than the H300 it replaces, the H360 is a powerhouse. But that power comes with Hegel's signature virtues of a gorgeous rendering of timbre, a completely relaxed and natural presentation devoid of electronic artifacts, and a spatial dimensionality that competes with expensive separates. To top it off, the integral DAC is outstanding—fully up to the quality of the amplifier. Throw in network connectivity and an innovative feature that allows you to upgrade the DAC section, and the H360 is clearly the integrated to beat at this price.

Pass Labs INT-250
$12,000

A force to reckon with, the muscular INT-250—equipped with 250Wpc and 500Wpc into 4 ohms—embodies effortless dynamics, an ultra-wide bandwidth, superb low-end control and grip, along with effortless, unpretentious highs. Optimized for greater flexibility to pair with grunt-worthy speaker loads of 86dB efficiency or less, its soothing and seductive sonics make it an ideal companion for analog LP playback; the amp just makes you want to spin vinyl endlessly. Remarkable, too, is the INT-250's Falstaffian, lush midrange that pushes a loudspeaker to the very edges of its performance envelope. With musicality that is second-to-none it operates at the outer limits of what's currently possible in today's integrated amplifier marketplace.

Joint Preamplifier & Power Amplifier Combos

Audio Alchemy DDP-1, DPA-1, and DPA-1M

Value City

Robert Harley

Audio Alchemy blazed a trail in the 1990s with a range of ultra-low-priced products housed in utilitarian cases with no cosmetic frills. The products were almost toy-like in appearance and name—the $199 DAC-in-the-Box, for example—but contained solid engineering inside. If you could overlook the Spartan casework, Audio Alchemy products delivered exceptional performance for the money. I reviewed quite a number of these components in the mid-1990s and found them to be excellent. Audio Alchemy folded in the late 1990s, probably because it didn't build enough profit into the products' retail prices.

But that was then and this is now. The company is back, headed by industry veteran Peter Madnick, the design talent behind the original Audio Alchemy (and many products from other companies). Audio Alchemy has retained the same value orientation as before, but this first wave of products from the new company is a far cry from the black stamped-metal chassis and faceplates of the original. Instead, the new company's first offerings boast upscale casework, an extensive and modern feature set, and more ambitious engineering.

The products reviewed here are the $1995 DDP-1 linestage preamplifier/DAC/headphone amplifier, along with the $1995 DPA-1 stereo power amplifier and $1995-each DPA-1M monoblock amplifiers. All are housed in compact chassis of the same size and shape, their rounded edges and satin-silver finish exuding a decidedly upscale vibe.

The DDP-1's front panel is dominated by two large knobs, one for volume and another for input selection as well as navigating the menus. The oval display shows the input selected, the volume setting, whether the unit is locked to a digital source, the digital filter selected, and whether "resolution enhancement" is engaged (more on these features later). Four small buttons provide additional controls, including mute, selecting between headphone output and preamplifier output, and back/enter buttons that are used in conjunction with the menu/input selector knob. An 1/8" headphone jack, a feature that for many years all but disappeared from preamps but is now mandatory, adorns the front panel. The power button just below the display rounds out the controls. A well-laid-out remote handles nearly all the DDP-1's functions.

The outboard power supply, a little larger than a "wall wart," can be upgraded to a more sophisticated supply, the $595 PS-5 Power Station. The PS-5 is housed in a chassis that matches aesthetically with the DDP-1, "nesting" into that unit's curved side panel. It offers independent supplies for the DDP-1's analog and digital circuits, more elaborate voltage regulation, and more filter capacitance. Audio Alchemy claims that the PS-5 offers lower noise and wider dynamics than the stock supply.

The DDP-1's sensible array of controls and buttons, its feel, and the display itself are all superb—this is one well-thought-out user interface. The display's source-selection is unique; as you scroll through the list of inputs, the one selected becomes larger in type size. The remote is also outstanding; your index finger naturally falls on the volume up/down buttons. Even the volume-control ballistics are perfectly dialed-in; I could quickly make large volume changes, yet had fine control once I was in the ballpark. Moreover, the chassis' industrial design and metalwork are far above what's expected at this price. The compact package, with the rounded edges and satin-silver finish, is extremely attractive, and a welcome departure from the less inspired chassis work of competing products. My only complaint is that the front-panel markings are white against a silver panel, with almost no contrast. Between the low contrast and the small type, the text is difficult to read. There are, however, so few controls that it doesn't take long before you're operating the DDP-1 without need for the legends. Audio Alchemy reports that they are increasing the contrast of the lettering, which, incidentally, is laser-

EQUIPMENT REVIEW - Audio Alchemy DDP-1 , DPA-1, and DPA-1M

etched in the front panel. No channel-balance control is provided.

The DDP-1 offers two unbalanced inputs on RCA jacks, one balanced input on XLR jacks, and an extensive array of digital inputs. These include AES/EBU, two TosLink optical, two coaxial, USB, and even I2S. The USB input accepts PCM up to 216kHz/32-bit along with DSD64. The other digital inputs accept PCM only (also up to 216kHz/32-bit). Mac users can connect to the USB input and start playing music. Windows users must download a driver. You can select from four digital filters, including an apodizing filter. (To recap, an apodizing filter shifts the filter ringing in time so that the ringing occurs after the transient, rather than before and after the transient. This is an important distinction, because in nature we never hear part of a transient signal's energy *before* the transient itself. This filter "pre-ringing" is particularly deleterious to music, and contributes to the glassy hardness of textures and flat soundstaging of most digital. In my experience, there's a slight penalty in bass tautness and definition with apodizing filters, but it's a worthwhile tradeoff.)

Through the front-panel display and controls, you can select any one of the filters as the default for a particular input. Similarly, resolution enhancement can be turned on and off for the individual inputs. The front-panel "Enh" legend turns green when resolution enhancement is on, red when off (see sidebar for more detail on resolution enhancement).

An important consideration when buying a DAC today is whether the its software can be updated to decode Master Quality Authenticated (MQA). I've written extensively about this new technology (Issues 253 and 261) that greatly improves digital sound quality. Because the DDP-1 is a purely software-driven product that runs on two XMOS general-purpose DSP chips and a field-programmable gate array, it may be possible that the DDP-1 can up updated to offer MQA decoding. Although Audio Alchemy hasn't committed to this possibility, it's worth noting that the demonstration board MQA has provided to manufacturers runs on the same XMOS chip used in the Audio Alchemy DAC, and that the Alchemy's software can be updated via the read-panel micro-USB port.

Overall, the DDP-1 is a highly capable and versatile centerpiece of a system that's a pleasure to use on a daily basis.

Looking next at the DPA-1, this stereo power amplifier delivers 125Wpc into 8 ohms and 200Wpc into 4 ohms. The front panel offers more features than are traditionally found on power amplifiers, including selectable gain (a +6dB button), clipping indicators, a mute button, and soft-start warm-up. Both balanced and unbalanced inputs are provided, and the binding posts are of high quality. A 12V trigger input allows connection to the DDP-1 (or other product with 12V trigger output) so that powering on the DDP-1 automatically powers on the amplifier as well. The DPA-1M is simply a monaural version of the same amplifier, delivering 325W into 8 ohms and 400W into 4 ohms. At the most recent CES, Alchemy announced the DPA-2 stereo amplifier with 250Wpc ($2995). The company also showed the matching PPA-1 phonostage and the Roon-ready DMP-1 Media Player, both of which are $1795.

The amplifier features a Class A input stage built from discrete FETs, the same topology found in expensive amplifiers. Most amplifiers at this price rely on op-amps rather than discrete circuits. The output stage is Class D, which explains the DPA-1's compact size and light weight—the amplifier weighs just 16 pounds. Specifically, the output stage is a Hypex UcD module, designed by Bruno Putzeys. The DPA-1M monoblock simply bridges two of these modules for greater output power.

From first impressions, these new products from Audio Alchemy appear to be quite a step up from those of the company's first incarnation.

Listening

I was eager to review the new generation of Audio Alchemy products for several reasons: I was a fan of the company's earlier offerings; I have great respect for the design talents of Peter Madnick; and most importantly, I heard the DDP-1 and DPA-1M sound amazingly great in very-high-end systems at several shows. One of those show systems (Munich) featured TAD CR-1 loudspeakers (perhaps the best stand-mount speaker extant) and another (Rocky Mountain) showcased the Alchemy products with the outstanding Wilson Sabrina speakers.

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SPECS & PRICING

DDP-1 Linestage Preamplifier/DAC and Headphone Amplifier
Analog inputs: One balanced, two unbalanced
Analog outputs: Balanced on XLR jacks, unbalanced on RCA jacks, 1/8" headphone jack (plus 12V trigger)
Digital inputs: Coaxial (x2), TosLink (x2), USB, I²S (additional micro-USB for software updates only)
Digital format supported: Up to 192kHz/24-bit on all inputs, plus DSD64 on USB input
Digital filtering: Custom, with four user-selectable filters
Outputs: Balanced and unbalanced
Headphone amplifier power: 1W into 32 ohms
Input impedance: 50k ohms
Output impedance: 75 ohms
Channel separation: 100dB (digital input), 130dB (analog input)
Dimensions: 10.5" x 3" x 11.6"
Weight: 8 lbs.
Price: $1995

PS-5 Power Station (for DDP-1)
Dimensions: 5.5" x 3.5" x 11.6"
Weight: 9 lbs.
Price: $595

DPA-1 Stereo Amplifier
Output power: 125Wpc into 8 ohms, 200Wpc into 4 ohms
THD: 0.05%, 1W into 8 ohms
Input impedance: 100k ohms
Output impedance: 0.06 ohms
Gain: 20dB or 26dB (switchable)
Channel separation: 80dB
Dimensions: 10.5" x 3" x 11.6"
Weight: 16 lbs.
Price: $1995

DPA-1M Monaural Power Amplifier
Output power: 325W into 8 ohms, 400W into 4 ohms
THD: 0.05%, 1W into 8 ohms
Input impedance: 100k ohms
Output impedance: 0.06 ohms
Gain: 20dB or 26dB (switchable)
Dimensions: 10.5" x 3" x 11.6"
Weight: 16 lbs. each
Price: $1995 each

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EQUIPMENT REVIEW - Audio Alchemy DDP-1 , DPA-1, and DPA-1M

The Alchemy gear more than acquitted itself in this illustrious company.

Speaking of illustrious company...I dropped the DDP-1 (with the PS-5 supply) and a pair of the DPA-1M monoblocks into my reference system. After three days of warm-up, I began by listening to LPs, driving the DDP-1's balanced analog input, with the DPA-1M monoblocks powering Magico Q7 Mk.IIs. I was immediately impressed by the Alchemy's sonic virtues and ability to communicate the music. The sound was remarkably transparent, clean, dynamic, and resolved by any measure, and even more so considering the components' reasonable price.

The Alchemy products threw a large and well-defined soundstage, with outstanding depth, dimensionality, and separation of individual instrumental lines. On "Mars" from *The Planets* (Mehta, LA Philharmonic, Decca), the insistent snare drum that drives the rhythm was well back in the stage, with a real sense of air and space around it. The call-and-response lines of the tenor tuba and trumpet were well differentiated from each other and from the rest of the orchestra. The sense of size and scale was outstanding. Other hallmarks of the products were clarity and transparency—the sense of nothing between you and the music. The soundstage lacked the veiling that diminishes the sense of realism of instruments at the back of the stage.

With smaller-scale music, the Alchemy electronics showed that they were transparent enough to reflect a recording's spatial character. Intimate music, like Joni Mitchell's *Blue* (LP reissue), was rendered with the appropriate sense of presence and immediacy.

Perhaps the most salient characteristics of the DDP-1 and DPA-1M, however, were powerful rhythmic drive, wide dynamic expression, and rock-solid visceral grip in the bottom end. The timpani in "Mars" was taut, powerful, deep, and dynamic. Bass guitar had a solid feel that was simultaneously full and tight, combining timbral warmth and body with outstanding pitch definition and articulation. Kick-drum cut through the mix with a solid impact. Switching to the less powerful DPA-1 stereo amplifier, I heard no reduction in dynamic range, bass control, or bottom-end extension, at least driving the 94dB-sensitive Magico loudspeakers. (Less sensitive speakers may benefit from the monoblocks' greater output power.) Both the stereo and the mono versions of this amplifier sounded like indefatigable powerhouses, with plenty of dynamic headroom. I never heard the amplifier soften the bass, harden textures, or congeal the soundstage, no matter what the playback level or how demanding the music.

This powerful rhythmic expression wasn't just the result of terrific bass grip and definition. The DDP-1 and DPA-1 excelled at portraying transient information, such as drums and percussion. The Alchemy electronics were fast and dynamic, qualities that brought to the fore subtle rhythmic nuances by great drummers, allowing their kits to take on a lifelike quality. The contribution from the great Roy Haynes on the track "Windows" from the album *Like Minds* (Gary Burton, Chick Corea, Pat Metheny, Dave Holland, and Haynes) was highlighted by the Alchemy electronics. On the track "Helena" from Gary Burton's *Guided Tour,* drummer Antonio Sanchez (who, incidentally, composed and performed the soundtrack for the film *Birdman*, for which he won the Academy Award in 2015) lets loose with a *tour de force* solo that was well served by the Alchemy's outstanding speed and immediacy. Similarly, the timbales on the outstanding Mobile Fidelity reissue of Santana's *Abraxis* fairly jumped from the soundstage as though they were recorded yesterday.

When listening to LPs, I thought the overall sound was a bit laid-back in the midrange to the lower treble, with vocals slightly recessed in the mix. The DDP-1 and DPA-1Ms were at the other end of the sonic spectrum of electronics that are bright and forward in this region. This was a good sign, because I've selected for these qualities in my LP front end (Basis Inspiration turntable with Basis Superarm 9 and Air-Tight PC-1 Supreme cartridge), which leans toward a less incisive rendering than many vinyl playback systems. I'm no fan of moving-coil cartridges that are tipped up in the treble or that hype detail. In other words, the DDP-1's linestage section and the DPA-1M sounded like my LP front-end sounds; the Alchemy electronics managed to pass along the LP playback system's character with very little editorializing. This level of transparency to sources in a product of this price is remarkable, particularly when considering the quality of the LP front-end and the resolution of the Magico Q7 Mk.II speakers. These reference-grade components would have laid bare any added brightness, hardness, opacity, or reduction in dynamic expression.

When I switched to a digital source (the Aurender W20 via USB) and was listening to the DDP-1 as a DAC and preamplifier, all the virtues mentioned were present, but now the music had greater verve and illumination. The sound was a bit more immediate and upfront, reflecting the DAC's character compared with that of my turntable. It didn't take a lot of careful listening to realize that the DDP-1's DAC is spectacular—highly resolved, open, transparent, and extremely dynamic. The DAC is very lively and incisive, with a full measure of detail. As with the DPA-1 amplifier, the DDP-1's DAC excels at reproducing transient information, from the micro to the macro. The DAC's sound can be fine-tuned through filter selection; I opted for Filter 4, which has a more "gentle" sound than the other three.

The DAC's sound could be improved by engaging the resolution enhancement feature described earlier (and in the sidebar). Turning on resolution enhancement seemed to make the overall perspective a little less immediate and upfront, as though the entire stage moved back slightly. Put another way, engaging resolution enhancement was like moving from Row G to Row M. Resolution enhancement better resolved the space around individual instruments, and soundstage width and depth expanded. Reverberation tails were longer and better defined. On the 44.1kHz/16-bit recording *Aras* by the band Curandero, the first track begins with some sharp percussion work. Engaging resolution enhancement not only expanded the space around the percussion, but I could hear more detail and texture in the drumhead's decay, and more resonance of the

air within the bodies of the drums. On the track "Switchback" from Jesse Cook's *Free Fall*, the multiple rhythm acoustic guitars behind the lead guitar were more clearly distinguishable as individual instruments, and they had a more immersive sound. That is, the soundstage was more continuous horizontally, with less impression of sound coming from two loudspeakers. The background guitars were also farther back in the mix, increasing soundstage depth. The intricate horn and woodwind lines in the contemporary big-band music of Gordon Goodwin were more clearly resolved. Resolution enhancement also benefited the Alchemy's rendering of timbre, which was a little smoother, particularly in the upper midrange. Overall, resolution enhancement contributed significantly to my view that the DDP-1's DAC section is not only terrific in an absolute sense, but nothing short of amazing in a $1999 full-featured preamplifier.

Finally, I'll comment on the PS-5 power supply and the differences between the stereo and mono amplifiers. Compared with the stock power supply, the PS-5 vaults the DDP-1 into a different league. The sound with the PS-5 is more refined, spacious, and detailed. Instrumental textures are more liquid and natural. The upgraded supply also gives the sound much greater dimensionality, with a heightened sense of layering and depth, along with more air between instrumental images. I auditioned the DDP-1 only briefly with the stock supply because the sound was so much better with the PS-5. My description of the DDP-1's sound is with the PS-5. It's a worthwhile upgrade.

The DPA-1 stereo amp gives up nothing in sound quality to the monoblocks, except output power. The DPA-1's 200W into 4 ohms was plenty of power for the 94dB-sensitive Magico Q7 Mk.II. In fact, I never saw the clipping LEDs illuminate, even at high listening levels. Of course, if you're driving loudspeakers of lower sensitivity the additional power provided by the monoblocks will come in handy, but don't jump to the conclusion that you need the monoblocks. The cost difference between the complete package (a DDP-1 with its power supply) with the stereo and mono amps is $4600 vs. $6600—quite a jump. The best way to tell if the DPA-1's output power is enough for your loudspeakers, room size, and listening levels is to borrow one from your dealer and try it. There's simply no substitute for auditioning an amplifier in your own system.

Conclusion

These new products are a far cry from the Alchemy of yore, with much more advanced engineering, upscale casework, and a superb user interface. The DDP-1 and DPA-1 bring terrific sound and stunning value to the category. As a linestage, the DDP-1 is amazingly clean and transparent. Unlike most electronics of this price, the DDP-1 doesn't add a patina of electronic hardness over instrumental timbres. Nor does it add opacity to the soundstage or compress dynamics. The DDP-1's DAC section is simply sensational; this level of sound quality would be outstanding in a $4000 stand-alone DAC. Clarity, openness, detail, and exceptional dynamics define the DAC's performance.

The DPA-1 stereo amplifier and DPA-1M mono amplifiers are no less impressive. Their wide dynamics, terrific grip in the bass, and upbeat sonics made them a joy to listen to. Moreover, the amplifiers possess the same level of clarity and resolution as the DDP-1. Significantly, the amplifiers don't exhibit the shortcomings I've heard in previous Class D designs. Even in the context of reference-quality sources and loudspeakers, it was easy to forget that I was listening to electronics that aren't stratospherically priced.

The return of Audio Alchemy is welcome news for those seeking the highest possible price-to-performance ratio in electronics today. tas

DDP-1 Tech Tour

The DDP-1 incorporates a number of advanced technologies and circuit topologies that reveal its ambitions as a high-end product. First, the entire analog signal path is based on discrete Class A circuits rather than op-amps. On the digital side, the DDP-1 features dual AKM DAC chips in a proprietary configuration that reportedly increases dynamic range. The filtering and digital processing is performed on a pair of XMOS general-purpose DSP chips, followed by a field-programmable gate array. These DSPs perform the digital filtering and resolution enhancement.

The digital input stage is built around a dual phase-locked loop (PLL) architecture, a technique pioneered by Alchemy more than 20 years ago. The first PLL locks to the incoming data; the second PLL locks to the first PLL and generates the clock. This technique isolates jitter in the incoming data stream and creates a low-jitter clock that serves as the timing reference for the digital-to-analog converters.

One of the original Audio Alchemy's most ambitious and successful products in the mid-1990s was the DTI-Pro (and later, the DTI-Pro 32) that offered a "resolution enhancement" technology. The DTI-Pro was a purely digital device that was inserted between a CD transport and a DAC, allowing the user to selectively increase the DTI-Pro's output word length to 18 bits, 20 bits, or 24 bits to match your DAC's capability. When the DTI-Pro was introduced, digital-to-analog converters varied in how many bits they could handle. DACs with the Yamaha input receiver truncated incoming data to 16 bits, which introduces significant distortion. Those with the NPC digital filter truncated to 18 bits. DACs with the Pacific Microsonics PMD100 filter could handle up to 24 bits, but in some implementations, the DAC's architecture provided a data path of only 16 or 18 bits. The DTI-Pro thus allowed you to select the appropriate output word length for your particular DAC.

But in today's world, 24-bit (or wider) data paths and DACs are standard. The DDP-1's data path is 32 bits wide, and the AKM DAC can accept 32-bit input words (this doesn't mean that it has 32-bit resolution). The DDP-1's resolution enhancement algorithm knows this and redithers the data to 32 bits for input to the DACs no matter what the word length of the incoming data.

The resolution enhancement is most effective on data coming in on the USB input, and less so on the other digital inputs. Audio Alchemy is working on a software update that will apply resolution enhancement equally across all digital inputs.

Incidentally, the resolution enhancement in the DDP-1 was designed by Keith Allsop, who created the original resolution-enhancement algorithm for the DTI-Pro more than 20 years ago. He and Peter Madnick have worked together continuously since that time. Finally, it's worth noting that the DDP-1's DSP horsepower is greater than ten times that of the DTI-Pro.

SST Thoebe II and Son of Ampzilla II

Chips off the (Good) Ol' Blocks

Paul Seydor

Back in the day (and the day I'm talking about is close to forty years ago), the great designer James Bongiorno attracted a lot of attention with his crazily-named designs—not to mention his wacky hats, suits, press releases, and letters to audio journals. These designs also pricked up a lot of ears for just how good solid-state electronics could sound. I refer to his Ampzilla and Son of Ampzilla amplifiers, his Thaedra and Thoebe preamplifiers—surely only Bongiorno could link invocations of trashy Japanese disaster movies and ancient Greece—which he marketed via the company he founded, Great American Sound or GAS (I don't even want to speculate what was on his mind when he came up with this, but surely the scatological implications can't have been accidental). Bad health deprived him and high-end audio of a couple of decades of what would have been his prime as a designer. In the aughts he started up a new company, called Spread Spectrum Technologies, and 13 years before his death in 2013, he was able to introduce fully updated versions of Ampzilla, renamed Ampzilla 2000, and a new preamplifier he christened Ambrosia, named for the food of the gods in ancient Greece or, alternatively, a food that conferred immortality. True to himself to the end, the man was incapable of understatement. I was privileged to review—rave review, I should add—these two products in 2012 (Issue 219) and even more privileged to get to know James for a short while. Although we never met in person, we talked several times by phone. In my view those products are as good as anything you can buy—and fully worthy of becoming classics.

At that time, James had already begun new versions of the Son of Ampzilla and Thoebe preamplifier, both monikers retained only with "II" suffixes added. (*For more on James Bongiorno, see p. 31 of this issue.*) The name Thoebe brought back some wonderful memories, because it was my favorite of all the preamplifiers I owned prior to Dick Schoener's Nova. And I liked the Thoebe much better when it came to functionality because it wasn't minimalist. James believed control units should *control* and so included bass, treble, and balance controls, stereo/mono switching, and independent tape loops with cross-recording and full monitoring. The Thoebe II perpetuates this tradition, losing only the tape loops (does anybody actually tape anything any longer?).

But I'm getting ahead of myself. While the new products originated with Bongiorno, the cancer he'd battled for over two decades claimed him before the designs were in any sense functional. Bongiorno's company was acquired by Wyred4Sound, where E. J. Sarmento, the resident designer there, completed them. I choose the word carefully: *completed*, not finished. According to SST's Tony Holt, the products represent about seventy percent collaboration between Bongiorno and Sarmento and thirty percent Sarmento on this own. "Son of" is surely an apposite name for the new Ampzilla amplifier because it's a chip off the old block, beginning with a massive 20-pound toroidal power supply. The circuit is fully balanced, configured to be extremely quiet, and provides A/B switching between balanced and single-ended modes; all jacks are gold-plated. Speaker outputs are via heavy-duty binding posts. The amp is servo-controlled

with isolated and fully regulated front-end voltage supplies. There is a welcome turn-on surge delay, and thermal protection shuts the amp down if presented with any condition that might damage it (this never happened while I was using it). The power output is 220Wpc into eight ohms, 350Wpc into four. At no time during my use—mostly driving Quad 2805 electrostatics, but also Harbeth's Super HL5 Plus, and the new Falcon LS3/5a (review in the next issue)—did the amp exhibit any behavior that suggested less than consummate ease, composure, and stability. The base price is $3500.

As regular readers of mine know, I believe fervently in bass and treble controls. Bongiorno told me he liked them because "no room is perfect." I agree, but conventional tone controls are generally speaking much too broad in their effects to be of much help in correcting room modes. But when it comes to source material, broadband tonal correction really can make an excessively bright recording listenable—and let's face it, most recordings are a little bright owing to the proximity of the microphones—or warm up one that is bass-shy (e.g., most of the George Szell recordings for Epic and Columbia are both bright *and* bass-shy). Initially I wondered if the centers weren't too high in the bass—300Hz, the low-end of the midrange—and too low in the highs—3kHz, the low-end of the high range. But slopes are so cannily chosen I was completely won over. Used with care, these controls can transform any of number of tonally unmusical recordings into pleasing and listenable experiences.

The operation and display of the balance control were initially confusing to me. I'll explain: When the balance control is selected, on one side of the display an arrow appears and on the other side, you see a numerical indication of level. The arrow points in the direction of the channel being raised and is illuminated on that side of the display. Thus, if you're raising the volume in the left channel, the arrow will appear on the left side of the display pointing toward the left speaker, while the numerical setting appears on the right. This makes perfect sense except that the symbol does not look particularly arrow-like, so the first time I used the balance control, I assumed that the numeric display was on the same side as the affected channel. When the volume was raised in the opposite channel I rechecked all my connections; as they were correct, I was thoroughly perplexed until I realized that that symbol was supposed to be an arrow. This sort of misunderstanding could easily have been prevented if the manual had provided some explanation; as written, it's rather barebones for a unit of this sophistication.

On the plus side, every one of these features is accessible via the handset, which makes it my kind of remote. However, it's not stock, but rather an optional accessory costing $175. This seems to me rather steep, but I acknowledge that it's a *very* sophisticated device and

More Singing Transformers

`Son of Ampzilla II is a chip off papa Ampzilla 2000's block in another way: the physical humming, at 60Hz, of the large toroidal transformer. As I pointed out in my review of the latter component, I've had this happen from time to time with other amplifiers, so I know the fault is not in the equipment as such but with the power company. The humming is also entirely *physical*, i.e., you hear it with everything turned off except the amplifiers and the speakers disconnected, and it is neither part of nor does it affect the audio signal or circuitry. Three years ago, Bongiorno informed me that out of about a thousand Ampzilla 2000 amplifiers, fewer than ten owners experienced the problem. His feeling was that the many should not be required to fund a problem that only a few have. Fair enough. But it's also fair to add that the vast majority of amplifiers I've had in house do not exhibit this problem. In other words, I would recommend you audition the amp at home before you purchase it because only you can judge how annoying this will be in the—unlikely—chance that it occurs. *Chez moi*, the problem is sporadic, and occurs only during certain hours of the day, most of them, fortunately, hours that are not my peak listening times. And though the humming is very low in amplitude, it is audible enough that my wife found it annoying (not that I liked it either).

In one of the last conversations I had with Jim, he told me that users who are handy with electronics could write him and get a schematic for a simple circuit that would fix the problem. It is similar to the now-defunct PS Audio "Humbuster." I managed to borrow one of these for my review of the Ampzilla 2000 and it absolutely banished the "singing" with no unwanted sonic side effects apart from the elimination of the vibratory hum. Jim also suggested that his company might market a device for those users who have the problem. I hope SST/Wyred will address this issue that so these fine products can be recommended without qualification. —PS

SPECS & PRICING

Thoebe II stereo preamplifier

Inputs: Balanced on XLR jacks, unbalanced on RCA jacks (USB input for software updates)
Outputs: Balanced and unbalanced
Headphone amplifier: 338mW into 330 ohms
Gain: 11dB or 17dB (switchable)
Optional phono input: 42dB of gain
Optional DAC: Up to 384kHz/32-bit and DSD64 and DSD128 on USB, TosLink, coaxial
Dimensions: 17" x 4" x 14"
Weight: 25-28 lbs., depending on options
Price: $4250 as reviewed

Son of Ampzilla II stereo power amplifier

Power output: 220Wpc into 8 ohms; 350Wpc into 4 ohms
Inputs: Balanced and unbalanced
Outputs: Balanced and unbalanced
Dimensions: 17" x 5" x 9"
Weight: 40 lbs.
Price: $3500

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EQUIPMENT REVIEW - SST Thoebe II and Son of Ampzilla II

impressively constructed from what feels like a solid block of aluminum.

A Class A headphone amplifier comes standard in the Thoebe, with a pair of 'phone jacks accessible via the front panel. I don't much listen to headphones, but if you do, this should fill the bill about as well as anything you're likely to find out there. And one feature I really appreciated is that only one of the jacks automatically mutes the main outputs—a smart feature, as you don't necessarily always want the speakers muted when listening to headphones. Connectivity consists in three pairs of single-ended (RCA) and one pair of balanced (XLR) outputs, and four pairs of line-level RCA and one pair of XLR inputs.

The Thoebe II can also be purchased with a built-in phonostage and/or an internal DAC at an additional $500 each. The phonostage takes up one of the RCA inputs, while the DAC option adds USB, coaxial, and TosLink inputs. If purchased together, SST knocks $250 off the $1000 total. So a fully tricked-out Thoebe II with phonostage, DAC, and remote will set you back $4250. This seems to me to be very good value: like the amplifier, it worked absolutely flawlessly, was a joy to use, and in ergonomic terms struck me as about as close to perfection as you can get. If I did not already own a preamplifier that serves my needs perfectly well, the Thoebe II would be a very tempting purchase to consider (though if Sarmento is ever tempted to make a change, I would wish for a stereo/mono switch).

When it comes to the sound, these units remind me of the Ambrosia and Ampzilla 2000: the same quietness, smoothness, transparency, dynamic range, and that elusive impression of body, dimensionality, and solidity. It's been three years since I had their more expensive brethren in the house, but I suspect that in an exacting A/B comparison, considerable concentration would be required to distinguish one pair from the other. Given their lineage and the fact that they are fully contemporary solid-state designs of great competence and sophistication, describing the sound does not invite purple prose or any other sort of colorful language, which is to say that it is neutral, transparent to the source, and in any practical sense distortion and noise-free.

Because the review period was limited, I auditioned Thoebe and Son as a combination. As found with all exceptional equipment, there is on the best recordings a gratifying impression of lifelikeness and vitality, simultaneously relaxing yet wholly involving. There is nothing about the basic circuitry of these units that calls untoward attention to itself. If forced to the wall, as an initial impression I might say that I wondered if there weren't a very slight tilt toward the yin side of the spectrum, but I suspect this owes to the fact that I had just come off reviewing the Benchmark AHB2 amplifier, which is anything but. I am especially impressed, but not surprised, given the lineage, that the bass here is so powerful, deep, superbly defined, and absolutely unflappable. At the same time, there is none of that excessively tight, punchy bass beloved of some audiophiles but which has no real equivalent in live music, where bass in addition to being strong is also warm, rich, and full.

Moving to the midrange—vocals in particular—as it happened, the end of the review period coincided with an appearance by the Anonymous Four on their farewell tour. They sang a program of seasonal music in a Greek Orthodox church in Orange County that boasts splendid acoustics. The next day I played several of their albums that contained pieces I'd heard in their live concert program. Now, clearly, it would be absurd to state that the sound resembled what I'd heard at the concert since the recordings span over a quarter century and involve different venues and one change in personnel. However, in the strictly timbral sense, the voices in the group (as currently constituted) were truthfully reproduced, and that is as tough a tonal acid test as I know, at least with musical sources.

These electronics do not favor any type of music over another, but it being the holidays, I did play a lot of choral music from large and small ensembles, several of them recorded in churches or church-like venues, again large and small. These typically have rather "wet," that is, reverberant acoustics, and the best recordings—right now I'm listening to the Huddersfield Chorus singing Christmas music—capture plenty of ambience and hall sound. Thoebe and Son rendered these thrillingly, and quite spectacularly when large organ and brass were added, as in a program recorded in St. Paul's. Another such recording, not seasonal, but tremendously thrilling is Paul McCreesh's A *Venetian Coronation 1595*, which reconstructs the coronation ritual of a Doge in sixteenth-century Venice. The performing forces consist of a small choir with soloists, an organ, and a collection of period instruments, including natural trumpets and drums. At one point near the beginning, the drums and trumpets begin in the far distance and come forward, building in volume and intensity until they reach the front, where they perform a sensational toccata that is spread across the entire soundstage. These are compositions in which the deployment of the performers in the physical space is an essential part of the music's meaning and experience. It is also music rich in colorful instrumental timbres and complex contrapuntal textures. Thoebe and Son reproduced it an ideally mediated combination of organic blend and textural clarity. When you find the right playback level, the sense of being in a vast space with gloriously resonant acoustics is uncannily real—Peter Walker's "window" into the concert hall.

One characteristic of the phonostage that struck me right away was the sensational dynamic range, which is also a quality of the Ambrosia's phonostage. The presentation was equally free from glare or tonal anomalies and was superlatively *quiet*. At $500 it seems to me to punch far, far above what its price-point might suggest, fully competitive with units costing a couple of grand. With just 42dB of gain, the phonostage is suitable for high-output pickups only. As I currently have none of these on hand, my listening impressions were based on the Ortofon Windfeld through my Quicksilver transformer. I've been using the Quicksilver on and off for nearly thirty years now, so I think I can compensate for its contribution to the sound, which is exceedingly small apart from amplifying the signal: a very neutral device, mirroring Thoebe's phonostage, and the Windfeld has also been widely recognized for its neutrality. To anyone contemplating a Thoebe who is also deeply into vinyl, I recommend the optional phonostage without serious qualification as both an outstanding bargain and a fine performer without regard to price.

EQUIPMENT REVIEW - SST Thoebe II and Son of Ampzilla II

The DAC is built around the ESS Sabre (9018) 32-bit chip, and features (according to the specs) an "asynchronous, galvanically isolated USB input" that supports up to 32-bit 384kHz PCM and DSD64 + DSD128." I do not own a music server and am not yet into downloads, hi-res or otherwise, so I can't evaluate it in this regard. Reviews I've read from writers who are rate it very, very highly for these applications. I auditioned the DAC only via the transport section of my Marantz SA8004 CD player. It performed very well, to my ears its presentation ever so slightly brighter than the 8004 on its own, but Marantzes are famously smooth, natural, and musical sounding. On balance, I fractionally preferred the Marantz by itself, but that was strictly a matter of taste, not a judgment as such against Thoebe's DAC.

But if you buy a Thoebe, should you go for the DAC option? Well, if you already have a high-quality CD player that you enjoy, I seriously doubt the Thoebe's DAC will be an improvement, though it will be different (among other things, it doesn't reclock the signal, which would be unreasonable to expect as its price-point). Taking, for example, the Anonymous Four recordings I referred to earlier, my preferences fall in this order: the Marantz used as transport feeding my Benchmark DAC1, the Marantz standing alone, and the Marantz feeding Thoebe's DAC. The Marantz/Benchmark struck my ears as the most neutral, transparent, detailed yet natural reproduction; the Marantz alone was notably smooth, natural, and musical, with a bit of warmth yet without sacrificing detail; the Marantz/Thoebe DAC was a tad on the bright side, not at all warm, yet very listenable. In fact, all yielded excellent results that I could easily live with. But truth in reporting mandates I point out that several of these Anonymous Four recordings are also SACD, which was superior to all of the Red Book presentations. So if you're buying the Thoebe (with DAC option) solely to replace the DAC section of your current DVD player, you may get better sound or you may not. But if you're thinking of getting your feet wet by experimenting with a music server and downloads, it's hard to see how you can go wrong, especially in view of the $500 ticket price, which as mentioned becomes a mere $250 if you buy it in tandem with the phonostage—so you can hardly lose.

As for the place of Thoebe and Son in the current market, the one area where advances in technology and design have unquestionably benefited the consumer is electronics in the broad middle category from below a thousand up to a few thousand per unit, right where these new offerings land. Are they better than comparably priced and spec'd products from NAD, Marantz, Rotel, Paradigm, McIntosh, et al? The short answer is probably not, because the overall excellence in this sector of the market is outstandingly high. That said, however, there will be subtle differences between them, especially depending on the associated components, which means that letting your ears decide is, as always, the wisest course. This combination does have one cachet, though: the bragging rights of their lineage and, what's more important, reproduction of extremely high accuracy, resolution, and musical authority allied to build-quality that guarantees long and trouble-free performance for decades to come. tas

PREVIOUS PAGE NEXT PAGE

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NAD Masters Series M12 and M22

Sensible but Serious

Neil Gader

NAD electronics has been marching down audio's red carpet for years, picking up awards and accolades from high-end journalists and customers alike. Its classic BEE line—all buttons and knobs, and blue collar to the core—is still being turned out in sturdy but sensible, olive-gray stamped enclosures. Outward frills are kept to a minimum, and that's always been NAD's point. It's the sonic thrills rather than the visual bells and whistles that customers have come to expect, and that keep them coming back.

The Masters Series represents the more uptown side of NAD. Stylish and sophisticated, this is a company flexing its technical muscles while preserving the underlying value it is famous for.

In case your experience with NAD electronics ended with the original, circa-1978 3020—the modest integrated amp that addicted many a young audiophile to this hobby—you'll be in for a big surprise. The latest generation Masters Series (the originals were introduced in 2005), as embodied in the M12/22, is unreservedly gorgeous. The aluminum casework is elegantly crafted. Its shiny black, accented front panel and vented top plate are sumptuous to the eye and the touch. Both units are powered-up via a recessed top-mounted switch. The M12's large, readable touchscreen display easily handles functions normally left to a small army of buttons and toggles. The only vestige of a bygone era is the nicely weighted rotary volume knob. For that, let us all give thanks.

The M12 is a preamplifier/DAC—a high-end segment that has been growing in leaps and bounds. Like the M2 Direct Digital Amplifier, and more recently the C 390DD, the M12 employs its own "Direct Digital" 35-bit processing technology, thereby circumventing all analog stages in the signal path. Music remains in the digital domain through the preamp. By NAD's reckoning this eliminates the phase shift, noise, and distortion of many analog designs.

Before I describe back-panel connectivity, a word or two is needed about a unique feature of the M12 architecture. NAD calls it "Modular Design Construction" or MDC, and it looms large in the Masters Series. MDC uses replaceable cards that fit into slots on the M12's back panel, essentially making the unit future-proof as upgraded features become available. The M12 back panel has slots for three additional modules. Currently one such MDC option is the DD HDM-1 HDMI module with three inputs and one output (3D video pass-through). My M12 review sample, however, was outfitted with the optional DD BluOS network-audio module, which permits streaming of various music services like Tidal and TuneIn radio, plus high-resolution PCM files (no DSD yet) from a NAS device or local USB HDD/SSD. The NAD Controller App (from the iTunes App Store) manages a music library and can be controlled with an iOS or Android device. The card includes integrated WiFi/Ethernet and aptX Bluetooth connections for hi-res streaming from a smartphone or tablet. For Millennials this module is likely a must.

Even without the DD BluOS module, standard M12 connectivity is excellent. The back panel is densely populated with inputs, including AES/

EQUIPMENT REVIEW - NAD Masters Series M12 and M22

EBU, asynchronous 24-bit/192kHz USB Type B, coaxial digital, and optical digital, along with balanced and single-ended line-level. There are also front and rear USB-A inputs capable of 24-bit/48kHz resolution. Additionally there's a pure Class A buffer using the newest generation of "Super OP Amps" to provide low-impedance balanced and single-ended connections to power amplifiers or active loudspeakers. Also resident is an mc/mm phonostage module with settings for both moving-magnet (mm) and moving-coil (mc) cartridges. Gain is set automatically. Vinyl lovers should keep in mind that with Direct Digital processing a 24/192 ADC will convert the analog signal to digital, automatically setting the gain for the best resolution and lowest noise. The included remote control handles all functions quite capably.

Master Stroke

NAD describes the M22 as a hybrid digital amplifier. Output is rated at 250Wpc into 8 ohms, and >650W into 2 ohms. In NAD's words, the M22 "uses the latest nCore amp technology licensed from Hypex." Further refinement of the UcD concept (Bruno Putzeys was its inventor) has yielded distortion that in NAD's words is now "below measurement, [providing] an ultra-high damping factor and unconditional stability with any speaker." Additionally, the M22 is DC coupled throughout, from input to output. There is no capacitor in the signal path. The power supply is a custom switch-mode design, while secondary supplies are individually regulated and decoupled at each op-amp to maximize dynamic range and lower noise. The M22 employs NAD's latest generation of digital Power Drive, which automatically senses the speaker's impedance and adjusts and controls the amp's power envelope to more efficiently drive that particular load.

Getting Up and Running

The touchscreen menus are well-organized. The main screen lists the input and volume settings in large script, while smaller shaded boxes indicate current preferences. Settings include: Mode for polarity, reverse, and mono and stereo options; EQ for treble, bass, and balance; and a disable option. Setup is divided into four subsections: Source for renaming inputs; Digital Output for selectable sample rate; Control Setup for IR and auto-standby options; and Speaker for adding and optimizing a subwoofer in a 2.1-channel configuration (including a second-order high-pass and low-pass crossover with selectable frequency).

Activating the DD BluOS module was as simple as connecting an Ethernet wire to the LAN connection. The NAD Controller App instantly recognized my WiFi network from my iPad Air 2. Logging in to TuneIn was easy, but finding my Synology NAS was another matter.

Fortunately NAD is sympathetic to the plight of the computer-phobic, and aware of the fact that hooking up an existing NAS with a DAC/renderer can be a bit of a nail-biter. It offers a couple of helpful options if you get stuck (as I did). First there's online help at support.bluesound.com, where I searched for instructions and found (Eureka!) the document titled "Synology NAS and Network Discovery Configurations." Alternatively you can email (as I did) to support@bluesound.com. I got a swift response, and within about five minutes, was up and running. In my particular situation the fix was easy—I needed to enable "Guest Access" from the Synology in order for it to broadcast its shared folders to BluOS. Not a big deal, but NAD's help probably saved me hours of fruitless fiddling.

Sonically the M12/M22 system will remind NAD followers that there is a bloodline here. These components remain true to NAD values in the way they prize midrange neutrality and integrity, yet also throw hints of warmth and richness into the mix. However, the M12/22 begins to depart from NAD tradition in subtle but important areas. Particularly rewarding is its broader, more crisply defined sound at the frequency extremes, where earlier NAD amps often softened up just a little bit. As I listened to *Nojima Plays Lizst* [Reference Recordings], the greater extension and air that the Masters separates brought to this recording were striking. Harmonics seemed to radiate and rise into the soundspace without a ceiling hanging over them. There was a stronger bell-like quality to hard stabs of the keyboard, and greater fluidity to the lighter touch of Nojima's *arpeggios*. Importantly, the top-end and the midrange sounded seamlessly co-joined. There was no sense of treble information "kicking in" suddenly. This benefitted resolution in countless ways. Low-level details were conveyed with superior clarity, which enhanced my ability to locate instruments within the mix. The M12/M22 also provided a level of immediacy that further enlivened recordings. Familiar singers such as Holly Cole and Norah Jones were reproduced with an intimacy that made me feel like a fly on the wall of the recording studio. Perhaps because of the Masters Series' improved micro-dynamics, transient speed, distortion, or all three in combination, I found a jaunty playfulness in the 24-bit/96kHz version of Malcolm Arnold's *Sussex* Overture that I haven't always heard in the past. This well-known bon-bon, overflowing with orchestral humor, color, and contrast, needs a similarly acrobatic system to let it blossom.

While the NAD duo maintains a solid grip on the midrange, imaging and soundstaging have also firmed up. I've been listening a

SPECS & PRICING

M12 Preamp/DAC
Inputs: SPDIF (x2), TosLink (x2), AES/EBU; analog RCA, analog XLR; phono and BluOS optional
Outputs: Two digital, SPDIF/TosLink; analog RCA and XLR
Dimensions: 17.1" x 5.25" x 15.1"
Weight: 32 lbs.
Price: $3499

M22 Stereo Power Amp
Power output: 250Wpc into 8 ohms
Inputs: RCA and XLR
Dimensions: 17.1" x 4.1" x 14.9"
Weight: 33 lbs.
Price: $2999

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EQUIPMENT REVIEW - NAD Masters Series M12 and M22

lot to tracks from the LP *VHS* from the alternative band X-Ambassadors (including the hit "Renegades"—an alt chart-topper). The quartet is led by lead singer, co-writer, and multi-instrumentalist Sam Harris. His brother Casey adds keyboards. Fronted by Harris' full-throated baritone, which can leap between a rich, chesty timbre and an angelic falsetto, the band serves up jousting polyrhythmic tracks with chant-like backgrounds. Soundspace plays a large role in many of these arrangements. Like the negative space in a photograph, the songs live within their ambient minimalism, with low-level contrasts and pauses followed by strong, explosive, colorful hooks and choruses.

The Masters Series' bass response was startling. It's bold and extended with an iron-fisted grip that not only sounded deep during Copland's *Fanfare for the Common Man* [Reference Recordings], but which also provided superior pitch definition and tunefulness. In a large measure, this system represents the maturity of Class D bass. Many will remember that even in its earlier iterations, Class D bass response, though its key strength, produced textures and timbre that were often homogenized and overly controlled. The NAD system allowed me to hear more of the dynamic contrasts and harmonic complexities that define the timbre of a bass drum or a tympani or a tom-tom. A prime example of M12/22 capability was the seemingly infinite amount of expression and color that five-string double-bassist Renaud Garcia-Fons [*Solo: The Marcevol Concert*] manages to snap, pluck, or bow from his instrument—from rattling percussiveness to soothing, lullaby-like fluidity.

So how does the NAD duo stack up in the company of a couple of integrated amps from the "old guard," such as the Pass Labs INT-250 (review forthcoming) or my current reference, the MBL C51? An amp like the Pass will reproduce ambient and reverberant space just a bit more vividly. It edges the M12/22 in the specificity of individual images, too—chorus members achieved an added level of focus, for example, during Rutter's "Praise Ye the Lord." The MBL, on the other hand, is all about the sweetness of upper-octave piano and violin, and the air riding above the harmonics. During Peter Gabriel's "Don't Give Up," it has superior resolution of the delicate percussion accents, the ride cymbal, the Kate Bush vocal (of course), and the bouncing bass patterns and synth pads. The NAD often matched the Pass and MBL in bass performance, particularly in grip and pitch definition. The Pass had the darker, weightier signature; the MBL was a bit warmer overall. But all three integrated amps graced the music with convincing timbre and bloom. In sum, the NAD held its head high in this exalted company. Very high.

Once upon a time, NAD gear was thought to be great entry-level componentry but ultimately a stepping stone to something more fabulous and more refined from some other maker. Not so fast, and not this time. The NAD Masters Series M12/M22 combo proudly holds its own in pretty much any company. And it scores points at all levels—refinement of sound, classy execution, and cool, cutting-edge modularity that gives it attractive and sensible "have-it-your-way" appeal for the old guard and the network-savvy alike. Sensible, serious, masterful. tas

Constellation Audio Inspiration Series 1.0 Linestage, 1.0 Stereo, and Mono 1.0

Progeny

Robert Harley

I get more reader letters complaining about the prices of some of the products we review than on any other topic. Six-figure amplifiers are bound to offend many sensibilities. But I'm about to demonstrate how the development of those cost-no-object components can benefit music lovers of more modest means.

Exhibit A is the new and relatively affordable Inspiration Series electronics from Constellation Audio. You may recall that back in 2008 this newly formed company launched a no-holds-barred assault on the state of the art in solid-state amplification by assembling a team of the world's greatest electronics designers—a "constellation" of audio stars, if you will, that included Peter Madnick, Bascom King, the late James Bongiorno, John Curl, and Demian Martin. They were given a mandate to do the best work of their illustrious careers without regard for time or cost. No idea, design, or implementation, however expensive or exotic, was off the table.

The result of that effort was the $65,000 Altair preamplifier and $140,000-per-pair Hercules monoblock power amplifiers. The design and execution of these electronics were beyond heroic. To give you but a single example, the Altair's volume control attenuated the signal by inserting in the signal path a single resistor—without any mechanical connections or relays. This feat was achieved with an elaborate circuit that involved 48 pairs of light-dependent resistors, corresponding LEDs, and a DAC, all under software control. (I could have cited any number of additional cutting-edge circuits developed for the Reference Series—this was clearly a landmark effort.)

So how did the Reference Series sound? In my review in Issue 215, I concluded, "Constellation has established a benchmark against which all other linestages and power amplifiers can be compared."

Constellation followed that success with the Performance Series that included the $24,000 Virgo preamplifier and Centaur power amplifier ($24,000 stereo, $54,000 monoblocks). The Virgo and Centaur employed the same circuitry as the Altair and Hercules, but in less elaborate implementations. The Performance Series delivered a surprising degree of the Reference Series' magic at a still high, but less-than-stratospheric price. The Virgo II and Centaur monoblocks sound so good that I've used them in my system for most of the past year driving the Magico Q7s.

Looking back now, I can see that the development of the Altair and Hercules wasn't purely intended to sell $65,000 preamps and $140,000 power amps. Rather, Constellation wanted to create platforms for discovering optimum circuit topologies and to establish a performance benchmark. Once created, the reference-level products would inform more affordable implementations that would be accessible to a wider audience. In my view, the ultimate goal of the Altair and Hercules design project was the Inspiration Series reviewed here.

It sounds simple in theory, but creating a successful trickle-down model is easier said than done. It requires that the initial development effort produce components that are truly world-class—which is far from a given. Then the reference-level products must sell in sufficient numbers to sustain the company. Finally, the firm's founders must possess

EQUIPMENT REVIEW - Constellation Audio Inspiration Series

long-term vision, not to mention adequate capitalization. But when it works, trickle-down engineering can bring to mid-priced products the essential DNA of cost-no-object components.

The three products in the Inspiration Series are the Preamp 1.0 linestage ($9000), Stereo 1.0 stereo power amplifier (200Wpc, $10,000), and Mono 1.0 monoblock power amplifiers (400W, $20,000 per pair). Although not budget-priced by any stretch, Constellation products at these prices represent quite a breakthrough. This is particularly true when you consider that the Inspiration Series uses exactly the same audio circuits designed for the Altair and Hercules. The $9000 Preamp 1.0's schematic (and even the audio circuit-board layout) is identical to that of the $65,000 Altair (and to the Virgo). The Stereo 1.0 and Mono 1.0 amplifiers employ the identical topology as the Hercules, along with many of the same components, including the transistors in the input, driver, and output stages. The cost savings are realized with simpler implementations of the same fundamental platforms. The circuit design isn't what's expensive in an audio component (after the R&D has been amortized), so why not use the best topology at every price level? I don't think I've encountered an example of trickle-down engineering in which the progeny hews as closely to the parent as it does here (see sidebar for details).

Even the Inspiration's styling, build, and visual aesthetic come close to those of the Performance and Reference Series. I had the $24,000 Virgo II and $9000 Preamp 1.0 in my rack at the same time, and sometimes had to do a double-take to know which was which. A closer look, however, reveals some clever techniques for saving money on the casework without diluting the aesthetic. The Preamp 1.0's front panel, for example, is flat rather than sculpted, and the aluminum case is smooth instead of rippled. The same is true for the visual difference between the Centaur power amplifier and the Stereo 1.0. Yes, the Performance Series has a more upscale look, but if you didn't see the Inspiration side-by-side with it, you could easily believe that the Inspiration preamp and amplifier carried Performance Series price tags.

I'm in the fortunate position of having had Reference, Performance, and now Inspiration electronics in my home for extended auditions. Although the Reference Series was returned a long time ago, I still have the Virgo II preamp and Centaur monoblocks on-hand for direct comparison with Inspiration. It's been fascinating to hear how Constellation has taken that original groundbreaking design and translated it into products that cost a fraction of the originals. Consider that the Inspiration Stereo 1.0 is just 7% of the Hercules' price. But how much of what made the Reference Series so special ended up in Inspiration?

Quite a bit, it turns out. For starters, the fundamental "Constellation sound" survives intact down the line. By "Constellation sound" I don't mean a set of easily identifiable colorations. Rather, I'm referring to the brand's most salient and salubrious sonic qualities. First among these is the extraordinary transparency—the impression of hearing back through the playback and recording chains to the original musical event. The Constellation electronics have so little opacity that it's as though I could sense the air in the room in which the music was performed. The second defining character of Constellation electronics has been a treble presentation that's unique among amplifiers, in my experience—exceedingly highly resolved yet exceedingly delicate and refined.

This combination of transparency and resolution without etch that defines the brand was readily apparent in all three Inspiration products. I have so much experience with Constellation that there was no mistaking the Inspiration's crystalline transparency and openness for anything else. This see-through quality didn't just allow me to hear instruments in the back of the hall or deep into a multitrack mix; it also conveyed an impression of immediacy, of the air in which the instruments exist being "charged" with the life and vitality of the hall or studio. Many otherwise excellent electronics overlay the presentation with a kind of electronic haze that dilutes this impression of "aliveness," but the Preamp 1.0 and both Inspiration power amplifiers produced a sound that made me feel as though I were in the presence of the original music-makers. This quality goes a long way toward promoting deep immersion in the music.

The Inspiration's resolution was far beyond what I expected at this price. The treble, in particular, had that unmistakable delicacy and inner detail that most electronics smear. Think brushes on snares, hi-hat, tambourine, and other percussion instruments with very fine micro-dynamic structures. Many electronics

SPECS & PRICING

Preamp 1.0
Inputs: Four balanced, four unbalanced (USB input for control)
Outputs: Two balanced, two unbalanced, 12V trigger
Input impedance: 20k ohms balanced, 10k ohms unbalanced
Output impedance: <50 ohms
Weight: 25 lbs.
Dimensions: 17" x 5.25" x 15"
Price: $9000

Stereo 1.0
Power output: 200Wpc into 8 ohms, 400Wpc into 4 ohms (1kHz, 0.1% THD)
Inputs: Balanced, Constellation Direct (balanced), unbalanced
Input impedance: 20k ohms (balanced, Constellation Direct), 10k ohms (unbalanced)
Output impedance: 0.1 ohm
Gain: 14dB unbalanced, 26dB balanced
Weight: 55 lbs.
Dimensions: 8.5" x 17" x 19"
Price: $10,000

Mono 1.0
Power output: 400Wpc into 8 ohms, 800Wpc into 4 ohms (1kHz, 0.2% THD)
Inputs: Balanced, Constellation Direct (balanced), unbalanced
Input impedance: 20k ohms (balanced, Constellation Direct), 10k ohms (unbalanced)
Output impedance: 0.1 ohm
Gain: 14dB unbalanced, 26dB balanced
Weight: 55 lbs each
Dimensions: 8.5" x 17" x 19"
Price: $20,000 per pair

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are resolving, but not in the same way as Constellation's products are. What makes this brand special is the subtlety and refinement with which treble detail is presented. This isn't detail for the sake of detail, but rather an understated sophistication that provides all the cues that make instruments sound lifelike. Consequently, the top end is silky smooth and perfectly integrated into the musical fabric without any metallic edge. The Virgo and Centaur are, not unexpectedly, smoother in the top end than the Inspiration electronics, but that doesn't take anything away from the Inspiration's achievement.

There's another Constellation quality that the Inspiration preamp and amp embody, and that's a lack of tonal and spatial homogenization. Even compared with mega-buck amplifiers, the Inspiration is superb at defining individual instruments within an ensemble. The Inspiration's ability to differentiate tonal color, even among the individual brass and woodwind instruments in a big band playing unison phrases, is up there with the best amplifiers I've heard. Speaking of tone color, the Inspiration comes very close to maintaining the richness and saturation I've heard in the Performance and Reference Series. The Preamp 1.0, however, doesn't have quite the textural density and timbral warmth of the Virgo II. Timbres are more richly portrayed through the Virgo II—more "meat on the bone." The Preamp 1.0 is a little leaner by contrast with less apparent density in the lower mids. Nonetheless, we're talking about reference-level tonal quality in the Virgo II, a level to which the Preamp 1.0 comes very close. In fact, the Inspiration's tonal beauty may be unprecedented at this price.

Incidentally, I found the "preamp bypass test" a useful tool in hearing exactly how each preamplifier affected the signal passing through it. I first drove the Stereo 1.0 with the output from the Berkeley Alpha DAC Reference with no preamp in the signal path. I then inserted into the signal path the Virgo II set at unity gain (the input level was the same as the output level). I repeated this comparison, this time with the Preamp 1.0 in the signal path. The bypass test allows you to compare the preamplifier under evaluation with no preamplifier.

Soundstaging is outstanding for a preamplifier and amplifier of any price. Inspiration has a huge, open, and airy presentation that easily makes the loudspeakers disappear. Soundstage dimensionality is also sensational, and among the best of the amplifiers I've heard. Just like its antecedents, the Inspiration excels at portraying the bloom around instrumental outlines. The Virgo II and Centaur monoblocks are a touch wider and deeper, but this essential characteristic remains intact.

There's one area in which the Inspiration power amplifiers depart from the sound of the original Reference Series and of the Centaur amplifiers—the bass performance. In my previous reviews of Reference and Performance I've noted that both tend toward a more polite, rather than visceral, bottom end. In my Reference Series review I wrote that the bass "favored articulation and pitch definition rather than weight and warmth." In my Centaur review I noted: "The Centaur's bottom end is full and satisfying, but not the last word in weight and heft." You bought Constellation for qualities other than bottom-end slam.

I'm happy to report that with the Inspiration Series, bass performance is no longer a caveat. In fact, the Stereo 1.0's bass is outstanding, combining weight and authority with dynamic agility and a wonderful tunefulness. For example, Ray Brown's incomparable playing on the high-res download of *Soular Energy* has plenty of weight, along with the ability to convey the instrument's dynamics and tone color. The Mono 1.0s are even better, offering greater dynamic impact and effortlessness. Compared with the Centaur monoblocks, the Inspiration's fuller bottom gave the entire presentation a bolder, more forceful character. The Centaur (and Hercules) fosters an impression of elegance, grace, and refinement, not one of raw, primal power. The Stereo 1.0 and Mono 1.0 largely retain the midrange and treble refinement of the Centaur while giving the presentation a more muscular quality. It isn't just power music that benefits; even on a record like Duke Ellington's *Duke's Big Four* the Inspiration's fuller bass better conveys the swing and drive of this terrific band. Incidentally, the circuit changes that improved the bass were developed for the new Hercules II, and have been incorporated first into the Inspiration amplifiers.

Several years ago a visiting loudspeaker designer had just finished setting up a pair of reference-quality speakers in my room, and asked to hear the various amplifiers I had on-hand. After the auditioning, he pointed to a non-Constellation amp and said, "I want the bass extension and power of *that* amplifier," and then pointing to the Constellation continued "with the midrange and treble of *that* amplifier." If he were to visit again, he would wish for no such chimera; the Inspiration leaves nothing to be desired in bass weight and tonal balance. This is particularly true with the Mono 1.0 monoblocks, which have greater bass authority, wider dynamic contrasts, and sound more composed during complex passages than the Stereo 1.0, as you'd expect from twice-the-power monoblocks. Nonetheless, the Stereo 1.0's bottom end is fully satisfying.

If you're getting the idea that these electronics are spectacular values, you're right. It seems almost churlish to point out the Inspiration's shortcomings relative to the world-class Performance Series, but since I've heard them all I would be remiss not to share my experience. I must reiterate, however, that if you didn't hear the two Series side by side, you wouldn't miss anything in the Inspiration. You'd still get the essential quality of Constellation electronics, which as I mentioned earlier is an extraordinary transparency, high resolution, gorgeous tone color, and tremendous soundstage dimensionality. The differences in sound between Performance and Inspiration are more quantitative rather than qualitative. Moreover, the Performance Series, despite its not insignificant price, is still a terrific value, delivering close to the benchmark established by the Altair and Hercules in the Reference Series. I should mention that I've heard the Inspiration Series at three shows driving a variety of loudspeakers, and thought (along with many other showgoers) that the sound was superb on each occasion.

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After I'd finished auditioning the Preamp 1.0 and Mono 1.0 I returned to the $55k Soulution 725 preamplifier and $165k-per-pair 701 monoblock amplifiers. One would think that this juxtaposition would only highlight the limitations of the one-eighth-the-price Inspiration pair. Instead, the comparison threw into sharp relief just how extraordinary the Inspiration electronics are. Not surprisingly, the Soulution was decidedly better (see Jonathan Valin's review this issue and my comments). But the Inspiration had some exceptional qualities that drove home what a great achievement and value these electronics represent.

Conclusion

The Inspiration Series brings more than a taste of world-class performance to electronics within reach of music lovers for whom six-figure amplifiers are out of the question. Although not budget-priced, the Inspiration Series delivers much more than a taste of the musical virtues of the Altair and Hercules. The sonic differences between the Reference, Performance, and Inspiration Series are a matter of degree, not of fundamental character.

The Preamp 1.0, mated to the Stereo 1.0 or a pair of Mono 1.0s, bring a level of transparency, resolution, refinement, and soundstaging to this price segment once reserved for much more expensive electronics. Coupled with these traditional Constellation qualities is a newfound bass performance that adds a welcome authority, bottom-end dynamics, and tonal richness that were not the strong suits of the Reference and Performance Series.

It's unlikely that the Inspiration's combination of performance and value could have been realized from a clean sheet of paper. By taking the long view and investing in developing cost-no-object electronics, Constellation is able to offer the identical circuit topologies, and many of the design tricks, of those cutting-edge products in the relatively affordable Inspirations.

For those of you who find $65k preamps and $140k amps morally objectionable, take heart knowing that the existence of those products made it possible for music lovers of more modest means to own very close to the best for a fraction of the price. That's something we can all celebrate. tas

"The return of Audio Alchemy is welcome news for those seeking the highest possible price-to-performance ratio in electronics today." –Robert Harley, *The Absolute Sound*, April 2016

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NuPrime DAC-10H and ST-10

True High Performance For Less

Steven Stone

In 2014, NuForce's cofounder, Jason Lim, with backing from the OEM factory, bought the assets of NuForce's high-end division, obtained the rights to NuForce technologies, and formed NuPrime Audio, Inc. Shortly afterward the NuForce company was sold to Optoma.

NuPrime's first offering, the IDA-16 integrated amplifier, was reviewed by Vade Forrester (Issue 252). He concluded that, "I wouldn't be ashamed to put it on a shelf next to the fanciest component." NuPrime's latest, the $1795 DAC-10H DAC/Pre and the $1595 ST-10 basic power amplifier, are slightly more expensive than the $2600 IDA-16 integrated amplifier, but promise an even greater level of sonic refinement and flexibility. How do they stack up in this highly competitive price range? Let's see.

The DAC-10H

Although the DAC-10H is only 2.4" high by 8" wide by 14" deep, which corresponds to roughly half the width of a "full-sized" component, it packs a lot of features and performance into a small package. The DAC section is built around the ESS Sabre Reference ES9018 32-bit DAC chip. According to NuPrime this DAC chip can deliver 135dB signal-to-noise with -120dB total harmonic distortion levels. To reduce time-domain errors the DAC 10H utilizes symmetrical signal processing combined with asynchronous data transfer. It supports PCM up to 384/32 and DSD up to 256.

On the analog side, the DAC-10H has borrowed from the NuForce P-20 preamplifier the stepped, thin-film switched-resistor ladder network for controlling volume. This device uses a MUSES chip combined with a proprietary look-up table to ensure that only a single resistor is in the signal path at any given volume setting. The volume adjustment is in 0.5dB increments and is displayed via a 0-to-99-numbered system on the front panel. Comparing different sources using these precise and repeatable volume adjustments was a pleasure.

In addition to the 99-step volume control, the DAC-10H also has dual gain settings for its outputs. The single-ended RCA output can have a maximum voltage of either 2 or 4 volts, while the balanced XLR outputs have 4 and 8 volt levels. The headphone amp also has two levels for its balanced and unbalanced output to allow for different headphone sensitivities and impedances.

In its input stages the DAC-10H uses ultra-low-noise JFETS with independent left and right power supplies that come from a multi-rail toroidal transformer coupled to a linear power supply. This helps achieve a crosstalk attenuation specification of at least 93dB at 1kHz.

The DAC-10H has two headphone outputs: a single-ended and a balanced connection. Both have the same output impedance of less than 10 ohms. The balanced headphone circuit uses an OPA2134 op-amp as a buffer for the pair of NuPrime-branded IC chips used to drive the output.

Setup and Ergonomics

The DAC-10H front panel has some stylistic similarity with earlier NuForce designs that lean toward a modernist aesthetic of understated minimalism. On the upper left side of the front panel, you will find a single-ended headphone connection; the balanced connection is on the right. Between them is a discrete set of LEDs that display the source and the bit-rate (if any) being generated by that source. Under the display and headphone connections is a single row of rectangular buttons. From right to left, they include the low/high output switch, down volume, power on/off, volume up, mute, and

SPECS & PRICING

DAC-10H DAC/Pre
Inputs: One USB digital, two coaxial digital SPDIF, two optical digital SPDIF, two analog stereo RCA
Outputs: Optical (up to 24-bit/192kHz), stereo RCA (line out), stereo balanced (XLR-3 socket pre-out), balanced headphone amplifier (XLR-4 socket), unbalanced headphone amplifier (6.3mm jack socket)
USB sampling rates: 44.1kHz–384kHz and DSD 2.8MHz, 5.6MHz, 11.2MHz
Max. output power: 680mW @ 1kHz and 600-ohm load at the XLR-4 output
Dimensions: 8" x 2.4" x 15"
Weight: 10.5 lbs. (4.8 kg)
Price: $1795

ST-10 Power Amplifier
Input: Two RCA
Output: Five-way binding posts
Power output: 150Wpc at 8 ohms
Gain: 28dB
Input impedance: 23.5k ohms
Sensitivity: 0.89V to rated power
S/N ratio: 110dB at 1W, 10W, 100W
Dimensions: 215.4mm x 59mm x 394mm
Weight: 13.4 lbs. (6 kg)
Price: $1595

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EQUIPMENT REVIEW - NuPrime DAC-10H and ST-10

headphone volume selector. The only labeling on these buttons are small graphic symbols.

On the back panel of the DAC-10H, you'll find two pairs (one single-ended RCA and one balanced XLR) of variable-output analog connections, two pairs of single-ended analog inputs, two coaxial SPDIF inputs, two TosLink digital inputs, one USB 2.0 input, and an IEC AC power connection. While that sounds like a lot of connections to fit into a relatively tight space, the layout on the DAC-10H allows for easy access to all I/O's.

The overall fit and finish of the DAC-10H is commensurate with its technical specifications. All surfaces are impeccably finished. The little flourishes, such as the thin chrome bands around the two headphone outputs, give the DAC-10 an unmistakable touch of panache.

For most of the review the DAC-10H's balanced outputs were tethered to the NuPrime ST-10 power amplifier. The unbalanced outputs were split, one leg routed to a Velodyne DD10+ subwoofer, the other connected to an outboard headphone amplifier.

The DAC-10H comes with a unique-looking remote that is eight inches long and hexagonally sided. It's the same remote that NuPrime uses with its IDA-16 integrated amplifier. It duplicates all the controls on the DAC-10H, which is fortunate because if the DAC-10 is located beneath your desk—as it usually is in my nearfield system—it's very difficult to operate it "by feel" since all the buttons feel the same. To ensure that you are pushing the correct button requires counting across from right or left. Ninety-nine percent of the time I used the remote. I found its angle of acceptance to be quite wide, even more so than most units I've used. My only complaint is that all the buttons rattle; in fact, they rattled so much that the DAC-10 remote is suitable for use as a percussion instrument.

During the review period I tried all manner of digital sources, from lowly 128kbs MP3s to 128x DSD and 192/24 PCM. In every case, the DAC-10H played the files without incident. I'm also happy to report that during the review period the DAC-10 proved to be an extremely trouble-free component. Unlike many devices, the DAC-10H was absolutely silent during turn-on and turn-off with no thumps, clicks, or buzzes. Also, when you change inputs or un-mute the DAC-10H, it does a gradual volume ramp-up instead of giving you the full volume setting immediately; this allows a user time to lower the volume if it was set too high from the previous input.

Considering its plethora of input options, I see no reason why, despite its diminutive footprint, the DAC-10H would not be up to the task of serving as the control center of a highly evolved audio system—it even has a home-theater-bypass mode so you can use it in conjunction with a multichannel AV processor.

I tried a wide variety of headphones with the DAC-10H. With my most sensitive custom in-ears, the Westone ES-5, there was a slight amount of low-level hiss. On the other extreme, using the single-ended outputs, the DAC-10H had no trouble driving a pair of Beyer Dynamic DT-990 600-ohm headphones well past satisfying levels. The balanced outputs worked splendidly with both the Mr. Speakers Alpha Prime and HiFiMan HE-560 headphones. My original Grado RS1 headphones also had excellent bass extension and drive when connected to the DAC-10H's balanced output.

The Sound of the DAC-10H

For me, the most outstanding aspect of the DAC-10H's sonic performance was its silence. Even with DAC/preamps that have almost the same signal-to-noise specs, I can usually hear differences between the "silences" at full output compared with fully attenuated outputs (bear in mind that in my nearfield system the speakers are only three feet away from my listening position and my room is very quiet). With the DAC-10H/ST-10 combination I could hear only the very faintest added hiss at full levels when I moved my ears within a few inches of a tweeter, but at the listening position I heard nothing. And why should this be such a good thing? Because the DAC-10H's excellent signal-to-noise ratio lets the music emerge from silence with a level of delicacy and subtlety that more closely approaches what I hear from a live musical event than noisier DAC/preamps which don't have the same signal-to-noise capabilities.

Inner detail and low-level resolution through the DAC-10 are as good as I've heard through any DAC including the Antelope Audio Platinum DSD DAC. The differences in depth recreation and soundstaging precision between my original 128x DSD recordings and 44.1 down-sampled versions were immediately obvious when comparing them through the DAC-10H.

Depending on the recording, the sense of three-dimensionality portrayed through the DAC-10 can be nothing short of remarkable. Listening to B. B. King's classic album *Live at the Regal* over the TIDAL app, combined with the latest Amarra SQ+ 2.1 on my Mac Mini connected to the PS Audio DSD DAC, it was easy to hear how the audience sound comes from a point well behind the lateral plane of the band. Also, the clarity and tightness of the electric bass were exemplary.

Since I also have an early stereo LP pressing of the same recording as well as a CD version, I was able to do some A/B/C listening, comparing the Tidal stream with the ripped CD played back through Amarra Symphony, and then the LP played back via my VPI TNT III turntable with Graham 1.5 tonearm, Clearaudio Victory II cartridge, and Vendetta 2B phono preamp.

While the differences in soundstaging, depth, and frequency extension were essentially non-existent between the CD and the Tidal stream, the LP had noticeably superior dimensionality—instead of a wall of audience there was an individualization of each voice within that audience. Also B.B.'s vocals on the LP had more immediacy and dynamic energy. A friend who was present during the comparisons said to me, "I wish I could have the top end, midrange, and spatial characteristics of the LP in the digital copy, and the low-frequency clarity and punch of the digital on the LP." Yes, the DAC-10H's analog section and stepped volume control are capable of passing through even the subtlest of audible information in both the analog and digital domains.

Using the DAC-10H's headphone output I was impressed by the solidity of the image, the delicacy of upper frequencies, and the control of lower frequencies. Compared with

EQUIPMENT REVIEW - NuPrime DAC-10H and ST-10

the built-in amplifier in the Oppo HA-1, which was the DAC/pre I had in the system previously, the DAC-10H was a step up, both in its ability to drive difficult headphones via its balanced connections, and in its portrayal of low-level detail. I also compared the DAC-10H's headphone outputs with a dedicated single-ended tube headphone amplifier. The DAC-10 was its equal for midrange purity and upper frequency extension. In the bass, the DAC-10H was more controlled with better inner detail and dynamic punch. My conclusion: The DAC-10H's headphone outputs are good enough to make the need for an external, dedicated headphone amplifier optional.

The NuPrime ST-10 Power Amplifier

The NuPrime ST-10 amplifier is what NuPrime calls "near-reference class." Why only near-reference? As far as I can tell it's thus named because this stereo amplifier only puts out 150 watts per side into an 8-ohm load. The ST-10 utilizes NuPrime's proprietary, fourth-generation V4 amplifier module. According to NuPrime, this latest version offers substantial improvements including a 20dB reduction in the noise floor, a shortened circuit pathway, increased output current, and a 600kHz switching frequency. Other improvements over earlier designs include a new linear power supply that employs a high-efficiency toroidal transformer; superior reliability when not under a load, and an enhanced even-order harmonic circuitry that according to NuPrime, "resembles the most attractive features of tube-amp sound."

Although the ST-10 has a switching output stage, it is not a standard Class D switching amplifier. According to NuPrime's owner's manual, "Instead of the conventional saw-tooth configuration, NuPrime's patented circuit design uses an analog-modulating signal that adds neither noise nor jitter. Rather than reverting to off-the-shelf solutions, NuPrime's in-house advances have further unlocked the switching amp's potential without the difficulties pure switching amplifiers simply cannot avoid." The cliché that should follow would be, of course, "Not your father's Class D amplifier."

Among its technical advantages, the ST-10 has a damping factor of 400, which means it should be able to control any excess diaphragm movement better than an amplifier with a lower damping factor. The ST-10 also has far lower amounts of phase shift than most amplifiers, due to its unique closed-loop circuit.

The front panel of the ST-10 closely resembles that of the DAC-10H except it has fewer buttons and lights. Actually the ST-10 front panel has exactly one button, on the left side of the faceplate, and one light on the right side of the faceplate. That's it, apart from the NuPrime logo in the center.

Setup and Ergonomics

Although the ST-10 provides 28dB of gain rather than the standard 26dB, for most systems this won't be an issue, and many systems will benefit from that extra 2dB of gain. The ST-10's rear panel has all the connections that you would expect on a basic power amplifier: one pair of balanced XLR inputs, one pair of single-ended RCA inputs, one set of stereo outputs using five-way binding posts, a 12-volt trigger connector, an IEC AC connector, and a toggle switch for balanced or unbalanced input selection. However, unlike many stereo power amplifiers, the ST-10 doesn't have provisions for bridging it into a mono mode.

When you push the on/off button on the front panel you will hear a soft click from the amp's relays after a second, and then it's good to go. When you turn the ST-10 off, it has a delay of approximately ten seconds before it shuts down completely.

The Sound of an ST-10

Over the years I've reviewed and used plenty of swtiching power amplifiers from Bel Canto, Wyred 4 Sound, April Music, and others, and I appreciate what a well-designed model can bring to a system. And it happens that the ST-10 is the best switching power amplifier I've heard to date.

As you might have gathered from its specifications, the ST-10 is a very quiet,

EQUIPMENT REVIEW - NuPrime DAC-10H and ST-10

extremely low-noise power amplifier that, as long as it isn't pushed into clipping, sounds exceedingly neutral and uncolored. I tried the ST-10 with a variety of speakers from the 84dB-sensitivity Aerial Acoustics 5B to the 95dB-sensitivity Audience 1+1, as well as the ATC SC7 II, Dunlavy SC-1AV, and Mirage OM3. In every case the amplifier did a superb job of driving the speakers with authority and control.

I was especially impressed by the ST-10's performance at the top and bottom of its range. The bass was taut and tuneful. Conversely, the upper midrange and treble were airy yet accurate. On recordings with exaggerated upper midrange or treble energy I was aware of the additional musical information, but it was never emphasized to the point of harshness. After living with the ST-10 for a while I can understand why NuPrime draws attention in its sales literature to the ST-10's "tube-like" upper-frequency characteristics. While the ST-10 certainly doesn't soften or roll those off in the manner of classic tube designs, it brings to its upper frequencies the kind of ease and sweetness that are usually found in power amplifiers that employ tubes somewhere in their circuitry.

Depth recreation, dimensionality, and image specificity were also exemplary through the ST-10. On my live 128x DSD recordings of the Boulder Philharmonic, the soundstage was accurately portrayed with the spaces between the instruments elucidated with a level of specificity that was equal to the best I've heard from any amplifier.

Final Thoughts

Within their product categories the DAC-10H DAC/preamp and ST-10 basic power amplifier are priced at the lower mid-level, yet they both deliver performance that could be considered exemplary regardless of cost. The DAC-10H has the capabilities, sound, and feature set that should keep it current for years, while the ST-10 offers sonic quality that, unless you absolutely must have more power output, will make "upgrading" to anything but a far pricier amp more of a sideways proposition than an upward one.

As it is a relatively new firm, NuPrime has yet to develop the reputation of more venerable audio companies. But given the quality of its first three products, the IDA-16, DAC-10H, and ST-10, it's hard not to predict that NuPrime will be a force to be reckoned with now and in the future. Even if you have far more in your equipment budget than what the DAC-10H and ST-10 cost, I recommend giving these NuPrime products a listen, if you can. They deliver true high performance for far less money than you might expect. tas

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OUR TOP PICKS PREAMPLIFIER AND POWER AMPLIFIER COMBINATIONS

Audio Alchemy DDP-1 and DPA-1M
$1995/$3990/pr.

The Audio Alchemy that produced a series of no-frills, bargain-priced electronics in the 1990s is back, but this time with a more upscale vibe. Now under Alchemy's former designer, Peter Madnick, the new Alchemy's first products are the DDP-1 preamp/DAC/headphone amp, and a pair of power amplifiers, the 325W monoblock DPA-1M and 125W DPA-1 stereo models. The DDP-1 offers some sophisticated technology for extracting the best sound from digital sources, including a "resolution enhancement" algorithm. The amplifiers are based on a switching output stage. The chassis work and the DDP-1's user interface are outstanding. The Alchemy combination has terrific dynamics, bottom-end grip, and control in the bass. The overall presentation, particularly when listening to the DDP-1's DAC, is immediate, incisive, and lively. A lot of performance for the price.

SST Theobe II and Ampzilla II
$4250 (as reviewed)/$3500

Designer James Bongiorno was working on the Theobe II preamplifier and Ampzilla II power amplifier when he passed away, but E.J. Sarmento of Wyred 4 Sound, the company that acquired Bongiorno's company SST, collaborated with Bongiorno and then completed the designs. The result is a pair of products worthy of their legendary names and their iconic creator. The Theobe II is feature-laden, offering tone controls, a Class A headphone amplifier, and a variety of customization options including a DAC and phonostage ($500 each or $750 for both when bought together). Unlike the tone controls on many preamps, the Theobe II's adjustments are useful in improving the sound of certain recordings. The phonostage is particularly quiet, with wide dynamic contrasts. The Ampzilla II's power output is 220Wpc into 8 ohms, 350Wpc into 4 ohms. The fully balanced circuit features overload protection and a soft turn-on circuit. Sonically, the pair is very quiet and delivers smoothness, transparency, wide dynamic range, and that elusive impression of body, dimensionality, and solidity. The Ampzilla II is unflappable, even on the most demanding music played at high levels.

Constellation Audio Inspiration Preamp 1.0, Stereo 1.0, and Mono 1.0
$9000, $11,000, and $22,000/pr.

As with Constellation's other Inspiration Series components, the Preamp 1.0 offers Constellation-grade sound quality in what is essentially breakthrough pricing for this maker of cost-no-object components. The Preamp 1.0 sports the same circuitry, chassis build-techniques, remote control, and display as the $24k Virgo 2. The sound is similar as well, with the trademark Constellation combination of resolution with ease, tremendous clarity and transparency to sources, and wonderful rendering of timbre.

The 200Wpc Inspiration Stereo 1.0 brings the same circuit design and some parts from Constellation's $140k Hercules monoblocks to a more accessible price point. Constellation has done an amazing job of maintaining many of the qualities that made the Hercules such a standout, including a highly resolved treble that never crosses over into the analytical. Transparency and timbres are also first-rate. The icing on the cake is that the Stereo 1.0 incorporates new circuit refinements that improve bass performance beyond that of its predecessors.

The Mono 1.0 amp in the Inspiration series brings plenty of power to the table (400W into 8 ohms, 800W into 4) along with the circuit design of the much more expensive Reference and Performance Series amp. Compared with the half-the-price stereo version, the Mono 1.0 offers even wider dynamics, a more solid bottom-end, and an effortlessness on musical peaks (which are already excellent with the Stereo 1.0). This monoblock shares Constellation's signature sound of tremendous transparency, a finely detailed treble, gorgeous midrange textures, and a sense of refinement and sophistication.

NAD Masters Series M12 and M22
$2999 and $3499

The latest generation in NAD's Masters Series is unreservedly eye-catching, dressed in its elegantly crafted aluminum casework. The M12 preamp/DAC offers high connectivity via MDC Modular Design construction that allows enthusiasts to add the excellent optional network audio module called DD BluOS. Partnered with the M22 amplifier, a 250Wpc hybrid Class D design, sonics remain true to NAD values in the way it prizes midrange neutrality and integrity, yet also throws hints of richness into the mix that stir the warmer side of the musical spectrum. The M12 amp is a paradigm of power and touch, and its bass response is startling in its boldness and iron-fisted grip. A serious and masterful effort with sensible "have-it-your-way" appeal for the old guard and the network-savvy alike.

Preamplifiers & Power Amplifiers

Rogue Audio RP-5

An Old Soul

Neil Gader

Equipped with remote control, phonostage, four unbalanced RCA inputs, microprocessor control, and even a trendy front-panel headphone output, the Rogue Audio RP-5 is a handsome, full-featured preamplifier that's thoroughly modern in every sense of the word. You won't find any grass growing beneath its anti-resonant footers. But it's also brimming with classic vacuum-tube virtues that brought back personal memories of an earlier era in the high end. Specifically, from the 1970s, when owning a high-power solid-state amp was the strongest incentive to purchase a tube preamp. Anyone who came of age during that period knows what I'm talking about. Solid-state output devices and topology were still in their relative infancy, and while these beasts were powerful, stable, and even sonically praiseworthy in some areas, they had already developed a bad-boy reputation for a dry top-end, as well as an off-putting graininess of texture in the treble region. On the other hand, tube electronics, the established old guard, while relatively low-powered in comparison (and often encumbered with colorations of their own), still possessed a fluidity and warmth that solid-state couldn't approach. Audiophiles seeking to take advantage of solid-state power without giving up the sonic qualities of tubes often resorted to a hybrid solution—a tube preamp placed in front of a transistor amp could ameliorate the more offensive behavior, smooth over the grain, and add the bloom and warmth that solid-state so sorely lacked. Clearly as the years passed the attributes of tubes and solid-state began to converge until the sonic differences today are of a lower magnitude. But for many of us a tube/solid-state electronics chain remains a very compelling solution.

No doubt about it, the RP-5 is one good-looking hunk of electronics. A central oval display is centered on its brushed-aluminum front panel with a large aluminum volume knob on the right side, microprocessor-controlled input buttons along the bottom, and a balance knob on the left. The bright VFD display provides volume, balance, and source info in large, readable characters. The volume control is a stepped-attenuator with 60 steps in 1dB increments. There are no op-amps in its signal path. Adjusting balance over 66 steps is as easy as giving the knob a spin, but Rogue has also added a return button beneath the balance knob that when pushed will automatically rebalance the two channels. Very clever, and an example of what good software engineering can accomplish.

The headphone amplifier is fed from the outputs of the tube gain stage. The RP-5's headphone amplifier is a tube/solid-state hybrid that offers sufficient power for more-difficult-to-drive higher-impedance headphones. Other features include home-theater inputs, a processor loop, and a mono button. The ten-button remote allows access to volume, balance, selector, mute, mono, and on/off from your listening position. The RP-5 also features a "slow-start" turn-on sequence and automatic muting when powering on or off. Every RP-5 is fully tested, burned-in, and auditioned prior to shipment.

Internally the tube complement is four 12AU7/ECC82. Rogue employs a mu-follower—a high-gain, low-output-impedance inverting stage known for low noise and very low distortion. Classic old-school tube stuff. But on the modern end it's also the first preamplifier to be based on Rogue's RP-X platform—a formula of hardware and software that will be the basis for the brand's future preamps. The software has been developed in-house and will allow the company to bring more functionality to its designs. "Top" Rogue and President Mark O'Brien stated that "the goal was to create vacuum tube preamps that not only sound extraordinarily good but included the modern feature-set that our customers are looking for. The tube circuitry is now computer-optimized for extreme accuracy, ultra-quiet operation, and long-term reliability. The RP-5 also has features such as a vacuum-fluorescent display and the ten-button remote, which would not

EQUIPMENT REVIEW - Rogue Audio RP-5

be possible without the new hardware and software package."

Turning to sonic performance, the RP-5 did not immediately strike me as a tube preamp in any Old World sense. To begin with it was very quiet—solid-state quiet. No valve whoosh, chug, or hiss. Even as it idled and I applied increasing amounts of gain, the sonic result was the same silent, inky-black background. Tonally, the RP-5 was predominantly neutral with just a very subtle hint of a rose-blush complexion to warm the mids. The treble was nicely extended, quick, detailed, and replete with harmonic information. Bass performance was authoritative, very nicely controlled and musical, yet also adding small amounts of bloom to bass violin, timpani, and cello. Transient behavior was quick off the mark but naturally so—firmly struck notes from a piano, a flatpick, a rimshot, a trumpet presented a complete picture of the initial transient, the sustain of the note, and its trailing decay.

The RP-5 especially brings its magic to bear in the areas of color saturation and tonal liquidity. A prime example would be how vividly the RP-5 reproduced the contrasts in the intricate vocal harmonies and acoustic arrangements of neo-bluegrass band Nickel Creek [*This Side*]. The RP-5 had the ability to balance the competing images in much the way we experience them in life—individual and apart in space, yet at the same time locked together in performance. In the instance of Nickel Creek, mandolin, acoustic flattop, and vocals resided unwaveringly in their own pockets of ambient air—utterly stable, with no smearing. And they did so effortlessly, without sounding clinical or over-articulated. The RP-5 simply presented a natural acoustic clarity that rang truthful. The preamp had an inner resolving power that established a sense of dimension and space so specific to each image that I was almost able to isolate each player visually, as if I were attending a live concert.

Since Rogue outfitted the RP-5 with a phonostage as standard equipment, I wasn't going to let the opportunity pass me by to put my Sota Cosmos/SME V rig through its paces. Optimizing the phonostage for the Sumiko Palo Santos Celebration was an easy task. It required removing ten cover screws, and lifting away the aluminum top plate. Once inside there was easy access to a pair of red slide switches for capacitance, plus DIP switches for eight settings of resistive loading and four gain settings between 40 and 60dB. Total work time was about five minutes, and I was being *very* careful. I can understand those who consider the effort an imposition, but consider the fact that, one, it's not something you do every day, and two, in contrast with the convenience of front-panel phono adjustments, placing the phono switching so close to the phono circuitry reduces the distance that the signal has to travel and thus potentially reduces noise. As an aside, opening the cover made it easy to appreciate how neatly laid out the RP-5 interior was, including the expensive Mundorf caps, and the relative isolation of the sensitive phonostage nestled in a corner well away from the rest of the circuitry.

Turning to the phonostage performance, overall imaging was stable and transients retained their spontaneity. There was solid underlying continuousness across the soundstage, as well. However, I heard a lighter energy and cooler cast in familiar recordings. The sound wasn't quite as richly varnished compared with other sources I'd input through the RP-5. One instance would be the new Impex LP remastering of Jennifer Warnes' *Famous Blue Raincoat*. During "Song For Bernadette," Warnes' vocals seemed a little less rich and colorful, and the airy buoyancy of her head-tone was a dash drier. I have to confess the phonostage was a little bit disappointing given the overwhelmingly positive nature of the experience up until that point. However, to be fair, I was running the phono at maximum gain for the benefit of the Palo Santos Celebration moving coil (0.5mV), and though it was reasonably quiet for this class the RP-5 phono section couldn't match the seriously quiet Parasound JC3+, proving once again that I'm spoiled, and that it's hard to beat a premium *outboard* phonostage for isolation. For a built-in phono with this level of optimization, it still represents good value.

Rogue Audio is an instance of an American high-end company whose name may not instantly ring bells of recognition, at least compared with the zoom factor of more costly headliners like ARC, VAC, CJ, or Pass Labs. Nonetheless, a reasonably priced, high-performance preamp like the RP-5 is a prime example of what the high end is all about—music reproduced accurately and beautifully. With a nod to the past and footers firmly planted in the now, the RP-5 is a component that should tempt a lot of people to go Rogue. tas

SPECS & PRICING

Inputs: Four RCA, one phono
Outputs: Two variable RCA, one fixed
Dimensions: 18.5" x 4.5 " x 14.5"
Weight: 30 lbs.
Price: $3495

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D'Agostino Classic Stereo

Classic Indeed

Jacob Hellbrunn

For such a big amplifier—and the Classic Stereo weighs in at 108 pounds—there isn't much to it in the way of fancy doodads. Quite the contrary. A pair of XLR inputs on back, plus speaker connections. Push one green backlit button on the faceplate and you're off and running. This is truly a plug 'n' play amplifier. But my word, how it does play!

Dan D'Agostino's latest creation is a throwback in looks (can you say industrial design?) but not in performance. No, it's not as bruising as the famous Krell amplifiers of yore that D'Agostino used to build before he exited to start his new company. I have seen grown men's knees turn to jelly as they whimper about their memories of a particular Krell amp they once owned. Those days are long over, particularly in an era when more than a few manufacturers are concerned with producing diminutive amps that fit into home décor rather than questing for the absolute.

To his credit, D'Agostino has ventured back to his origins. Go heavy or go home, so the weightlifters like to say. Mr. D. has done the former. The fully balanced Classic Stereo, which D'Agostino constructs at his factory in Arizona, has real cojones. It is a brawny and manly amplifier, one that D'Agostino is proud enough of to emboss his name on the faceplate. The amplifier is part of his new Master Power Series.

The Master Power Series offerings are all one amplifier in different configurations. The Classic Stereo amp reviewed here is the basic stereo amp, the Master Power 2+ has a crossover and can be bridged to become a 1000W mono amp, the Master Power 3+ has crossover on two of its three channels for daisy-chaining, home-theater use, etc. All amps have RS232 control.

The Classic Stereo is, to use an old-fangled term, a gas to use. It had me pulling out the big stuff, whether orchestral or soul music, to remind myself of what the Wilson Audio XLF loudspeakers can deliver in the nether regions, especially when mated to an amplifier that delivers a hefty amount of current like the Classic Stereo. Power may corrupt, as they saying goes, but I didn't hear much corruption here. What I heard was the abundant plusses that a powerful amplifier can offer—unflappability, smoothness, and dynamics. The days of abrasive solid-state, folks, are over.

And if you're into power, check out the ratings on this amp. Naturally, it has a very high damping factor and, unlike some amplifiers that don't double up power from 8 ohms to 4

SPECS & PRICING

Inputs: Two balanced XLR
(XLR to RCA adapters supplied)
Power rating: 300Wpc into 8 ohms, 600Wpc into 4 ohms, 1200Wpc into 2 ohms
Frequency response: 1Hz–200kHz, -1dB
Signal-to-noise ratio: 100dB
Input impedance: 100k ohms
Output impedance: 0.12 ohm
Dimensions: 11.5" x 19" x 20"
Weight: 108 lbs.
Price: $12,000

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Associated Equipment
Continuum Caliburn with Swedish Analog Technology and Cobra tonearms, Lyra Atlas and Miyajima Zero mono cartridges, dCS Vivaldi digital playback system, Ypsilon (silver) PST 100 Mk. 2 preamp, VPS 100 phonostage and SET 100 Ultimate Mk 2 monoblocks, Wilson XLF and Hammer of Thor subwoofers, Nordost Odin 2 and Transparent Opus Gen 5 cabling, Stillpoints Ultra 6 isolation feet

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EQUIPMENT REVIEW - D'Agostino Classic Stereo

ohms to 2 ohms, this one does. It goes from 300 watts to 600 watts to 1200 watts. Short of an Apogee Scintilla, I doubt there are many speakers extant that this amp can't drive with aplomb.

As D'Agostino himself emphasizes, the aim of the Classic Stereo is to deliver a lot of performance for a reasonable (by, I hasten to add, high-end standards) price. This amplifier contains as many of the parts and as much of the sound of his top-drawer Momentum Series as possible. One area he hasn't skimped on, for example, is build-quality. The amplifier features what is known as through-hole construction. This means that the leads on the capacitors, resistors and other parts extend through the circuit board rather than being surface-mounted—for better sound and reliability.

From the very first CD that I played—I ran the amp in balanced mode both directly from the dCS Vivaldi four-piece stack and from my Ypsilon PST-100 Mk II preamp—it was clear that this amplifier doesn't waste time getting down to cases.

Take the CD *This Time For Real* [VizzTone], which features the southern soul singers Otis Clay and Billy Price. On track after track, I was both impressed (and seduced) by the command of the Classic Stereo. From bass to treble, it was as though the sonic tapestry were cut from a single cloth, partly because of the alacrity of the amplifier, partly because of its grip in the bass region. TAS Editor Robert Harley has written previously about the sensation of bass being a half-step behind the rest of the musical presentation. It creates a slightly vertiginous sensation, as though you want to physically push the music forward. There was none of that time lag here. On the Warner Classics reissue of the trumpeter Maurice André's recordings, for instance, the precision of the bass accompaniment on Benedetto Marcello's "Adagio" meant that there was no overhang—André's trumpet simply soared over the bass line, which clearly demarcated the pulse of the music.

Worthy of note, too, was the verisimilitude with which the Classic Stereo conveyed the nuances of Clay's and Price's singing—crooning sighs, bellowing, and so on seemed to be palpably realistic. Much of this can be ascribed to the interstitial silence created by the amp's ability to start and stop on time. What separates the pros from the amateurs in amplifiers, the men from the boys, is their sense of timing, regardless of musical genre. This is one area that D'Agostino has nailed.

Another thing that D'Agostino's amp does very well indeed is to set up a cavernous soundstage. On the album Philadelphia Beat [Sunnyside Records], it presents the trio of Albert "Tootie" Heath on drums, Ethan Iverson on piano, and Ben Street on bass with a remarkable presence and sense of space. The tautness of Street's bass is beautifully delineated, a real thud on the deepest notes, not to mention a warm, deep, and rich sound to the piano, particularly in the bass area, where it resounds thunderingly. This amp pushes a loudspeaker to move gobs of air.

So much, in fact, that some listeners may initially be taken aback by how much energy the Classic Stereo delivers in the 60–200Hz region, where most of the sense of bass performance really resides. On Leonard Cohen's *Old Ideas* [Sony], it offered the richest and gruffest rendition of his voice that I've ever heard. Some may find this a little over the top, but I think D'Agostino's amp is fleshing out what's already present in the recording without supplying much of an additive flavor. All of this is a way of saying that this isn't a sterile and bleached-sounding amplifier. Rather, it lands on the warm and full side but without sacrificing detail or transparency. It's not necessary to play it loud, for the Classic Stereo will reproduce fine detail at lower volumes, once again as a function of its power.

So what separates it from the truly megabuck amplifiers? It lacks the last degree of tactility, finesse, and depth that a more refined amplifier would convey. On a Harmonia Mundi recording of Bach's violin concertos by the Freiburg Baroque Orchestra, the amp's control was readily apparent but so was a slight glaze over the original instruments that the ensemble deploys for its performances. If this amp has a weak spot, it's the treble where it can harden slightly on very complex and dynamic passages. Obviously, some compromises had to be made to get to this price point. I seriously doubt, however, that an amplifier built a decade ago for ten times the price would sound as good as D'Agostino's Classic.

In that regard, perhaps the most striking aspect is how easily the Classic Stereo delivers the sense of an ensemble playing in unison. There is always what the U.S. Army likes to call unit cohesion when listening to the Classic Stereo. Put otherwise, there is no smearing, no bloat, or any of the other sonic nasties that can mar the suspension of disbelief that audiophiles crave when attempting to replicate live music; rather, the amplifier conveyed a lissome sense of ease and flow to the music. In sum, the Classic Stereo offers amazing imaging and clout. If you're looking for an amp that can handle difficult loads with ease and provide excellent performance without costing you a packet, this is it. tas

Pass Labs XA160.8

A Classic Updated

Greg Weaver

It is hard to imagine anyone who has been in or around this industry for any length of time not being familiar with Nelson Pass. I first became aware of his remarkable talents in the mid-1980s. When moving to manage an audio salon in central Pennsylvania, I was delighted to learn that I would be representing the entire Threshold lineup, including the then-current SA Series monoblocks, the S Series stereo amps, and the FET Series preamps.

Over the years, I've lived with a number of Nelson's creations, starting with the Threshold FET-9 preamp and SA/4e stereo amp in the 1980s. By the late 1990s, after Nelson had sold Threshold and begun Pass Labs, I ended up with the simply enchanting Pass Labs Aleph 3 stereo amplifier, which is one of the few pieces of gear I've let slip through my fingers that I truly regret having given up.

When I learned that the Point 8 Series was on the horizon, I was eager to put the review process in motion. However, with the Pass Labs manufacturing facility move of just a few miles from Forrest Hill, California, to a plant nearly three times larger in Auburn, California, and the production disruptions that move created, there were inevitable delays. During my wait, and while interviewing "Papa," as Nelson is known in Internet circles, for the forthcoming *Volume Two: Electronics of The Absolute Sound's Illustrated History of High-End Audio*, I had the opportunity to discuss the primary differences that define the Point 8 Series.

Starting with the smaller amplifiers in the XA lineup (the XA30.5, XA60.5, and XA100.5), dramatically larger output-stage heatsinking has been added, allowing for the use of more bias current. Coupled with the largely square-law character of the XAs' output stage, this permits a more generous Class A envelope. The physical change is apparent in a quick visual comparison, and is especially obvious to anyone who tries to lift one of the amplifiers. Additionally, there has been an increase in power-supply capacitance for most models, while the entire lineup has received beefed-up secondary filtering for the front-end circuits.

Enhancements have been made to the layout configuration of the supply and channels, too, producing dramatically better noise figures than previous models—now about 50 microFarads V unweighted, which is something on the order of a 10dB improvement. Changes to the thermal tracking and DC offset of the output stage have allowed for higher levels of biasing of the second stage of the amplifier, thereby improving linearity and speed.

From a circuit topology standpoint, though the basic structure of the X Series has been retained, there are several differences. First, input impedance has been raised. Nelson claims that the amplifiers can now be driven by *anything*. Pass Labs has also implemented low-impedance "current" feedback in all models and selectively employed a new form of local feedback it calls "cascode feedback." (Further information on this circuit remains proprietary.)

In addition, and contrary to "accepted principles," Pass employs resistive loading of the second stage to ground. The resultant stability of the circuitry is now such that there are no capacitors or inductors in series with the signal, and no frequency compensation (including output Zobel networks) anywhere. The only capacitors used are in the power supply and DC reference voltage circuits.

While still using single-ended Class A bias current in the output stage, as with the Point 5 Series, bias has been increased, creating a second-harmonic tonal character that holds to much higher power levels than previous models. Now the bias current figures are adjusted specifically *in each model* to control the relative amount and timing of the second and third harmonics of the output. While there is a general template for this sort of bias adjustment, the final values for each model are determined strictly through listening tests.

Introducing the use of a soft-start TRIAC circuit (subsequently bypassed by a 30-amp relay) for power switching, the Point 8 Series now complies with the world standard of less than 1W draw in standby mode.

Finally, while not an alteration *per se*, having previously assembled a large inventory of NOS Toshiba parts, Pass

EQUIPMENT REVIEW - Pass Labs XA160.8

uses 2SK170/2SJ74 JFETs in the input stage and 2SK2013 and 2SJ313 MOSFETs in the second (voltage gain) stage, all measured and matched within 2 percent. Nelson feels quite strongly that these devices still have no equal in the marketplace. The result, as we will soon see, yields a new product that virtually basks in sonic innovation and improvement.

Mass

With a curb weight of 141 pounds, the XA160.8 is roughly 10 pounds heavier than the Point 5 iteration, although it is still considerably lighter than the closer-to-200-pound original XA160. Even with the handles on the back panel, the XA has a form factor (19" wide, 11" tall, and 21.5" deep) that makes the amp tough to schlep around all by yourself. It took a hand truck and all the strength I could muster to cart these behemoths downstairs and carefully drop them onto my amplifier isolation racks.

As visually stunning as it is massive, the Pass design is both exclusive and distinctive, created by Desmond Harrington who joined Pass Labs in 1996. A cyclopean, blue backlit meter, some 6-plus inches in diameter and centered horizontally, dominates the front panel. The round push-on power-switch is immediately beneath the meter, centered in a space between two milled grooves near the bottom of the massive, 1"-thick, sleekly beveled faceplate.

Two large, black heatsinks, one attached to each side of this robust chassis, are mounted to facilitate cooling. Under duty, these sinks get quite warm, nearly 130 degrees Fahrenheit.

Moving to the rear, we find a pair of handles and two sets of enormous Furutech binding posts, each vertically offset stereo pair set to the left and right of center and connected in parallel to allow for bi-wiring. When using single wires, speaker cables may be attached to whichever binding posts are closest to the speakers. These Furutech posts will take any speaker cable termination known and their hand-tighten-only (no post wrenches here) ratcheting system prevents enthusiastic audiophiles from over-tightening and breaking them.

Centered vertically about an inch down from the top, is an RCA jack for single-ended connections (50k ohms impedance). Immediately below it is an XLR jack for balanced connections (100k ohms impedance), with a shorting pin between the (–) input and the ground (pins 1 and 3) that must be left in place with single-ended cables and removed with balanced ones. The XA160.8 is a fully balanced design, and as such, Pass recommends using XLR connections. (I used a balanced set of Audience Au24 SE's for this entire evaluation.)

Flanking the inputs to left and right are two small holes, one labeled M and the other L. They respectively allow for the adjustment of the meter-wand position and LED brightness control. Finally, also centered at the bottom of the rear chassis is the IEC socket for the power cord. Immediately to its left is a rocker switch that houses a thermal magnetic circuit breaker. There are no fuses.

Class

The XA160.8s readily respond to the use of proven after-market power cords. I paired them with a variety, but soon discovered the best balance of ease, tonal color, and spatial accuracy was provided by the superb Audience Au24 SE powerChord HP, which stayed in play for the entire audition.

Over the first two weeks of break-in, before I even started to take serious notes, one of the things that became quite apparent was the near-complete silence of these amps. These monoblocks have what may only be described as a vanishingly low noise floor. While this

SPECS & PRICING

Power output: 160W Class A
Inputs: One each RCA and XLR
Dimensions: 19" x 11" x 21.5"
Weight: 141 lbs.
Price: $27,300

PASS LABORATORIES
13395 New Airport Rd, Suite G
Auburn, CA 95602
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EQUIPMENT REVIEW - Pass Labs XA160.8

should come as no surprise with Pass gear, it is a feat not readily equaled by *all* solid-state (and far fewer tube) amplifiers. The welcome result is that all music emerges from virtual blackness.

Over their initial run-in period, small yet musically significant changes occurred, most notably progressive refinements in the rendering of textures and the bloom of instrumental body. At just past the two-week mark, I was satisfied that the XA160.8s were showing their true voice and I could seriously begin the audition.

Like all high-fidelity electronics, the amps benefit from a brief warm-up period. After running for some 40 to 50 minutes, a very slight lower midrange recession and an even slighter general "fog" dissipate. This slight "haze" burns off steadily as the amps reach thermal stability, allowing them to reveal their outstanding transparency and openness even more fully.

Let's start with something that can present obstacles for lesser amplifiers: control. Right out of the shipping containers, totally factory-fresh, before their intoxicating texture and tone color fully developed, they exhibited unswerving control over my Von Schweikert VR-55 Aktives. Their ability to convey the transient speed of dynamic events (of all scale) and their steadfast control of both soundstage and image sizes served to foreshadow just how remarkable they would turn out to be.

Pitch definition in the lowest three octaves is every bit as good (or better) than I have heard from any amp, with nearly unmatched detail and ferociously explosive power, reconstructing instruments with convincingly proper weight, no unnatural bloat, and pants-leg-flapping punch! Melvin Lee Davis' propulsive bass line from "Lay It Down," the opening cut of Lee Ritenour's 2010 release *6 String Theory* [Concord Records], has rarely been so clearly defined and easy to follow, while also being reproduced with authoritative weight and power. The XA160.8 elevated the entire cut to a new level of dynamic expressiveness. Lesser amplifiers may have the drive *or* the pitch delineation, but the XA160.8 captures both with notable conviction.

Once the amp was run in and thermally stable, I was treated to some of the most tonally and texturally convincing lower midrange to mid-treble performance I've experienced. Mids were extraordinary, possessing a purity, texture, and bloom that reminded me of the best valve designs. Not that the XA160.8s came off as tube-like in overall character; rather, their palpability, "big" tone vibrancy of instrumental color, abundance of texture, and genuineness of bloom were exceptional.

The uppermost octaves were delicately recreated, with an extremely refined and natural sense of air and exquisitely rich and shimmering timbre. (The harmonic richness and completeness of these upper registers is one of this amplifiers most relevant and rewarding gifts.) Listening to the diversity of cymbal work by Duncan Moore on Dmitri Matheny's 2014 *Sagebrush Rebellion* [Papillion/Blueport], bordered on revelatory. Moore's touch is masterful, and the XA160.8s revealed it with nearly unsurpassed resolution and accurate spatial and tonal characteristics, making for an exceptionally lifelike impression.

Two closely aligned attributes of reproduced sound of extreme importance to me are honest instrumental bloom and body; a cello should sound like a cello in tone and size, not an instrument the size of a violin with a more sonorous voice. Here, the new XA160.8s really deliver, rendering individual instrument bodies and voices with an exceptionally realistic sense of scale, timbre, and size.

Just as remarkable as their truthful tonality is their impressive and incisive dynamic scale. With astonishing transient speed and unflappable control, they convey slam and impact with a graceful ease that is positively exhilarating. They have no difficulty making you jump when the music calls for it. Moreover, microdynamic accents are rendered so clearly, so discernibly, so palpably, especially for a pure Class A design, that I was inescapably drawn into any good recording. Their dynamic expressiveness is seemingly dauntless, affording subtle degrees of shading, with no apparent limit to their ability to unravel, resolve, and express delicate details.

Speaking of which, one of their paramount strengths is their engaging resolution and transparency, with no vestige of glare or the faintest hint of edge. While not offering quite the same disarming see-through lucidity of something like the Soulution or Constellation monoblocks, they afford an enthrallingly relaxed and exceedingly clear presentation. They are, at the same time, full of both musical *and* sonic detail. This is one of their most charismatic and captivating traits.

When it comes to staging and imaging, be prepared for them to set a new bar. Their ability to portray the size, placement, and contours of instruments is exceptional.

EQUIPMENT REVIEW - Pass Labs XA160.8

By way of comparison to other recent Pass Labs designs, it would seem logical to contrast them to the earlier Point 5 model. While I never had a Point 5 Series device in-house, I've heard many of them at shows and in several private installations, and the Point 8 is obviously more transparent than the earlier series, and presents swifter transients. While the Point 5 was lusher in overall tonal character, the Point 8 is more accurate, in part due to its enhanced transparency. The Point 8 offers more control, augmented bass (both in definition and character), and enriched microdynamic involvement, yet still retains to an abundant degree the liquidity and ease that so many found to be seductive in the Point 5 Series.

Panache

I'll be the first to admit that the Pass Laboratories stated design goals make perfect sense to me. While I can acknowledge that the bench measurements these devices deliver are exceptional, I'm also firmly in the camp that could care *less* about such graphs and scope traces if the resultant voicing is sterile, lifeless, and cold. (The original Halcro dm58 Super Fidelity monoblocks come to mind.)

Luckily for the music lovers among us, Nelson Pass feels the same way. Unlike many others in his field, his longstanding public position has been that listening tests remain invaluable to advancing the art of amplifier design, and that electrical measurements alone can never *fully* characterize the sound of an amplifier.

While each of the individual sonic characteristics noted above is meaningful in its own right and would serve to raise the XA160.8s above many of their competitors, what makes them extraordinary is the seductive and striking voice created by the synergy of all their individual parts. With an almost imperceptible favoring of upper midbass to lower midrange energy, erring only slightly to the warmer side of neutral, the Pass Labs XA160.8s are exceptional creations.

With their sublime amalgam of control, neutrality, vibrancy, and transparency, they are able to sing with one of the most musical souls I've encountered, regardless of price. They embody that all-too-elusive ability to satisfy both the intellect and the heart; they make you want to dance!

Pass has stated that it took seven years to realize the Point 8 Series of amplifiers. In this listener's opinion, that time was very well spent. While I've not heard the new X's dual-chassis flagship models, I can say that the XA Point 8 Series is a new performance pinnacle for Pass Labs. It is yet another inspiring and indisputable success from the mind of a man who for the past four decades (his first commercial product was released in 1975) has consistently risen—and continues to rise—to the challenge of besting himself. And as good as the XA160.8s are, frankly, I'll take even money that Nelson Pass tas

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PS Audio BHK Signature 300

A Superb New Entry at the Top

Anthony H. Cordesman

Over time, reviewing the high end's best power amplifiers has become increasingly more difficult, particularly those with solid-state output stages, high power and high current, and damping factors sufficient to help control a speaker—in other words, the kind that have become the norm for most audiophiles. Amplifiers seldom sound alike, but more and more, they differ only in more subtle nuances rather than in dramatic sonic differences.

In many cases, the nuances an audiophile actually hears also depend heavily on how revealing all the other elements—active and passive—in his or her system are. The sonic nuances of a whole high-end system are inevitably shaped largely by that system's most colored components, as well as the interactions between a particular speaker and a particular listening room. As a result, these colorations and interactions will often mask many of the more subtle nuances in power amps.

What's more, I find A/B listening tests to be an uncertain way (at best) to audition components. The colorations caused by other components, variable room interactions, and often the noise from other people, create too many masking effects and problems—as do short listening periods and any form of blind testing.

Understanding the nuances in given components takes time and patient listening to a wide variety of recordings and music. It is all too easy to become confused by switching too rapidly, hearing differences caused by unfamiliar recordings, and by minor shifts in loudness. (This is a reason why I strongly recommend working with the kind of dealer who will really let you listen, and possibly offer the loan of a really expensive amplifier so you can hear it in your system.) While some people talk about A/B testing as if it were a simple exercise, it is subject to all the problems that affect every aspect of any operations research that involves human testing—factors such as primacy and regency, focusing on the wrong variable, etc.

There also is no one right answer to choosing the best amplifiers; rather, it involves the sonic preferences that suit you and your particular system and room best. Today's top designers and design teams—from legends like Nelson Pass, John Curl, and Bascom H. King to young Turks and collective design efforts—are producing a wide range of amplifiers that can present as musically realistic a sound as the recording and the rest of the components will permit.

Additionally, one must consider the specific variable qualities of music reproduced through a high-end system, including timbre, soundstaging and imaging, dynamics, and musical contrasts. Your listening position also impacts what you hear. Similarly, these same sonic aspects differ across various positions within a concert hall. No two venues or collections of instruments sound exactly alike, and every known brand of microphone and every other stage in the recording process has colored the music to some degree even before you begin the playback process. Ultimately, the key question is never, "What is truth?" It is rather, "What is the most satisfying and seeming realistic illusion of music?"

Enter the PS Audio BHK Signature 300

And yet, some amplifiers really are distinctive successes, and the PS Audio BHK Signature 300 monoblock is definitely one of them. Its BHK namesake references the amp's designer—one of the audio legends I mentioned above—Bascom H. King's initials. The BHK Signature 300 also reflects the deep involvement of PS Audio founder Paul McGowan and Arnie Nudell, who headed Infinity when it was one of top speaker firms in the world, and here served as a key listener.

This amplifier isn't cheap, although it represents a bargain in sound quality compared to all too many of its higher-priced competitors. A pair of BHK Signature 300 monoblocks costs $14,998, and a BHK Signature 250 stereo amplifier costs $7499. Top-of-the-line prices should mean exceptional sound, and any amps that are not truly exceptional at any comparable or higher prices are simply a rip-off.

You do, however, get your money's worth with the BHK Signature 300s. They have truly exceptional imaging, depth, and natural soundstage width, and they really can get the best out of the naturally miked and produced recordings that have a real-world soundstage. Once they are broken in, they have very little sound character of their own, but to the extent they do, they have a rich, natural musical timbre without any loss of highs or air.

The 300s' dynamics are extraordinary, particularly in the lower octaves that seem to be in even more demand for audio reproduction today than the upper octaves (higher levels)

EQUIPMENT REVIEW - PS Audio BHK Signature 300

that had previously been the key design challenge—until great performance at high powers became the rule, rather than the exception. Bass goes as deep as your speakers will permit. The amp's control with difficult speaker loads is excellent, while the upper bass and lower midrange—which dominate most actual musical sound—have no touch of leanness or lack of natural warmth.

This performance is not simply a matter of power or "watts," although the BHK Signature 300s are scarcely shy in this regard. They provide 300 watts minimum into 8 ohms, 600 watts minimum into 4 ohms, and 1000 watts into 2 ohms. They can drive a friend's early Apogee speakers—candidates for most demanding speaker ever made. They handled both my Wilson Alexias and Spendor BC-1s with ease—both loads that aren't that easy by any standard. In fact, the Signature 300s did better with demanding dynamic passages and sudden sharp musical contrasts than an amp rated at 600 watts.

The Circuit Design and Topology

There are no special features like meters, special switches, or filters. These are, after all, power amplifiers. They do have the usual triggers for remote off-on switching from a preamp, XLR and RCA inputs, and twin sets of speaker binding posts for bi-wiring. They also have exceptional fusing for power protection.

The only really different feature is a small removable grille panel in the rear through which you can see the two vacuum tubes in the driver stage glow (if for some weird reason you don't like the distinctive form-follows-function design of the front panel and you feel you absolutely must place the amplifier back to front).

What BHK Signature 300s do have that really matters is unique circuit topology that reflects Bascom H. King's years of design experience. PS Audio's literature explains the amplifier's superior performance by focusing on two key design features. First, it's a hybrid design that uses a vacuum tube input stage. The text states, "A tube's high voltage, empty space, rich numbers of electrons, and connection through unattached fields preserve details lost in the solidity of silicon. Tubes are the perfect interface between sources and power stages."

Second, the BHK Signature 300 uses a different type of MOSFET output stage. PS Audio states: "MOSFETs handle power without the additional circuitry needed by tube power amplifiers, and they sound better than tubes or their solid-state alternatives, bipolar transistors. Field effect transistors were first invented by Julius Edgar Lilienfeld in 1925, and because they require very little current and operate with an invisible field, their sound is more closely related to vacuum tubes than transistors, without suffering any of the issues driving loudspeakers typical of vacuum tube power amplifiers.

"Not all MOSFETs are the same, their differences characterized by their relationship with the input signal and the power supply driving them: N-types for the positive going signals, P-types for negative. Years of design, measurement, research, and listening experience convinced King that N-type MOSFETs have lower distortion and perform better than P-types. Despite this anomaly, most power amplifier designs use both types of transistor in a configuration known as complementary symmetry. The BHK takes a different approach, one that avoids the problem of uneven performance between N and P devices altogether. Using only N-channel MOSFETs in its output stage, the BHK Signature produces a near-perfect balanced waveform without the degradation inherent in a complementary design."

I have mixed feeling about such statements. Designers do make choices based on their hard-won experience and beliefs, but I've reviewed truly excellent amplifiers over the years that have had radically different technology mixes, as well as ones that sounded very different even though they had the same basic topologies and component elements and the same basic design technology. Just as I do not believe that there is one right amplifier or right set of sonic nuances, I don't believe there is one right circuit.

In fact, Bascom King's long career as a top designer proves this. He has been developing and refining different circuits for decades, and when I asked Paul McGowan to describe the Signature 300's design process, he made it clear that amplifier design *evolves* rather than ends. He says, "In 2014, Bascom H. King set out to put his half-century of design experience to work in the creation of a statement amplifier that would bear his name. King had designed superb amplifiers for many major manufacturers, but had never seen his name affixed to his work.

"Reaching back to the Infinity HCA (Hybrid Class A) he had designed in 1979, King chose a hybrid architecture with vacuum tubes in the input stage, and transistors in the output stage. Of the HCA in 1979, *Stereophile's* founder J. Gordon Holt had written, 'It is the best-sounding amplifier I have ever heard.' King felt that with the technology now available to him and a free hand in its design, his new amplifier could be far better than the HCA—and even his more recent designs, some of which sell for six figures.

"King realized what many do not: Power amplifiers play a critical role in preserving the minute details and subtle nuances of music. Overtones from plucked instruments, subtle cues defining placement, depth, soundstage width, transient decays—all are often lost within the power amplifier. From his decades of research, he had identified three major elements within a power amplifier that, if poorly designed, severely compromise reproduction of music: the connection between the preamplifier and power amplifier; the input voltage amplification stage; and the output current amplifier/speaker interface.

"Of those three elements, King felt that the input stage was the area most critical for preserving musical nuances. If an input stage is badly designed, it is impossible for the rest of the amplifier to repair the losses incurred in the input.

"The input stage has the seemingly impossible task of passing both delicate and powerful musical information, sometimes simultaneously, without loss. To preserve both micro- and macro-details, King chose a vacuum tube as interface between preamp and power

EQUIPMENT REVIEW - PS Audio BHK Signature 300

amp. Vacuum tubes are true voltage amplifiers with extremely high input impedance, and demand less of devices that send signals to them than any other type of interface.

"The BHK Signature features a classic dual-triode vacuum tube in a modern configuration. Hand-matched pairs of Russian Gold Lion 6922s are self-biased with constant current and high voltage, through a MOSFET current source and MOSFET-regulated plate supplies. The input stage zero negative feedback design achieves low timing and phase distortion errors, allied with fast step response. The balanced-input vacuum tube stage runs in Class A configuration, and is coupled to the following balanced-configuration current amplifier stage by way of REL film capacitors.

"Hybrid amplifiers are not new (as evidenced by the 36-year-old Infinity HCA), and most incorporate a low-loss input interface, voltage amplification through vacuum tubes, and high power/low-distortion current amplification and delivery through MOSFET outputs. While these basic elements are present in the BHK Signature Amplifiers, it is King's utilization of a new topology of MOSFET amplification that makes the BHK Signature Amplifiers not just possible, but far superior to ordinary designs.

"To maximize the benefits of the two different amplification devices (vacuum tube and MOSFET) inside the amplifier, King felt the amplifier should be built as if it contained two separate, independent systems, each with a power supply tailored to fit. Thus, the BHK Signature has two power transformers, one for the vacuum tube input stage, the other for the MOSFET power output stage.

"Regulation of the power supply for the input stage is important. Separate and discrete MOSFET regulators are used throughout to preserve details found in the music and keep noise levels to a minimum. The path music takes through the amplifier must be pure and without a polluting sonic signature. Each passive component is hand-selected to provide the cleanest path possible. PRP resistors, film and foil Rel caps, and the finest-sounding parts possible are hand-soldered onto BHKs circuit boards. King insisted that no surface-mount parts be used in the signal path; assembly is by classical through-hole means."

You don't produce a superb-sounding amplifier by choosing the wrong circuit. At the same time, I believe Paul's comments do more to reflect how much a search for the best possible sound, the experience of the design team, and a deep commitment to creating the best product contribute to an amplifier's success. The way products evolve are a critical part of its design, and often a part that explains a great deal more about their character and performance than any technical data.

In practice, high-end audio is not shaped by finding a singular solution. It is the result of the work of dedicated audiophiles who make what they listen to, and who become the equivalent of *auteurs* in sound.

The Music and Sound Quality

In any case, the end result is outstanding, so I think you will quickly find that this is a superb-sounding amplifier, and one with some unique sonic qualities. I've already provided a summary description of its merits, but when it comes down to the details, as I've stated, the BHK Signature 300 provides exceptional imaging and depth. You will need equally good components, wires, and speaker placement to hear this. You will also need source recordings that are recorded naturally and simply enough so you can get a real-world soundstage.

These are scarcely demanding conditions for any real audiophile system, however, and once they are met, the BHK Signature 300 makes the soundstage come truly alive. The sound presentation is somewhat more forward in character than many of the BHK Signature 300's best rivals. For example, the Pass Labs 160.8 monoblocks I use as one of my references provide an excellent soundstage with the same degree of realism, but one whose sonic perspective is more mid-hall.

But both types of soundstage are musically realistic, and I have not heard another power amp that does as well in providing the same kind of detail in a musically natural, concert-hall way, or one that provides the same kind of slightly forward imaging and soundstage width and depth without slightly exaggerating the upper octaves.

The Signature 300's soundstage performance is particularly striking with some older recordings such as the best of those from RCA Red Seal label and Mercury, chamber music made on the Accent label, and the top Smithsonian Jazz pressings. These were produced at a time when the focus was on providing a natural soundstage with minimal analog or digital editing, extra mikes, or other production tweaks.

Some of the current focus on the sound quality of LPs and analog tape almost certainly comes from the fact that they were originally recorded at a time when the processes were more natural; there was less emphasis on close miking and on detail over natural timbre, and it was far harder to "assemble" the music by joining different parts of multiple takes into a single performance. Better small human flaws than robotic, post-performance production perfection.

The Signature 300s were equally excellent with the best modern digital recordings that place similar emphasis on musical life and a natural soundstage, such as those by experts like Peter McGrath or ones that you find on the 4L and Channel Classics Labels. These were exceptional in providing depth with chamber music and choral performances that I'd heard live while the digital recording was being actually being made. As for natural image size and placement, centerfill, and soundstage width, the BHK Signature 300s do as well as any amplifiers I've heard at any price. As stated earlier, the limits are not set by the power amplifier; they are set by the way the recording was miked and produced, by the need to use only two speakers, and by the other components.

Moreover, this soundstage excellence is consistent on both solo instruments and voice, and small chamber and jazz groups. Indeed, these amps test the soundstage limits of the best large jazz band, symphonic, and operatic recordings. No recording in a high-end system in a real-world home is going to sound exactly like a live performance of a full jazz band, grand opera, or Mahler symphonic spectacular in a real hall. The BHK Signature 300s do, however, come as close to putting you in Row D to Row K

EQUIPMENT REVIEW - PS Audio BHK Signature 300

as the recording will allow. Once again, I've only heard a handful of power amps do as well—and all put you more in Row L to Row P.

Once the BHK Signature 300s are broken in, they also have an exceptionally natural timbre at any dynamic level throughout the entire frequency range. Some otherwise excellent amps lack the ultimate in "grunt" and power in the deep bass. Others seem to be voiced to slightly emphasize musical detail with either a bit too much energy in the upper midrange, or a bit too little energy in the upper bass and lower midrange. The BHK Signature 300 gets it as right as the rest of your components will permit, and has by far the most natural timbre of any PS Audio amplifier I have ever heard.

I can't speak to the degree to which having Paul McGowan and Arnie Nudell working with Bascom H. King in the listening phase led to this excellence, but Paul's sudden conversion to vacuum-tube drive stages does seem to have come in part from this collective effort. It has really made a difference. Just listen to a really great recording that emphasizes the violin, the full range of the grand piano, percussion detail, or mixes of male and female voice (especially soprano). Timbre may not be king in voicing high-end gear, but it is absolutely critical.

The same excellence applies to musical dynamics and contrasts, air, and fine musical detail. One aspect of power amplifiers that has always puzzled me is the number of high-power amplifiers that can produce very high dynamic peaks, but lack the dynamic life and natural energy of better amps with far less rated power. Part of this difference almost certainly comes from the fact that most acoustic music depends on low-level detail, dynamics, and air, but this clearly is only part of the story. Being able to handle high SPLs doesn't prevent some amplifiers from lacking life and natural musical realism—even in the parts of the music that are really loud.

You won't have any such problems with the BHK Signature 300s. Like other truly excellent power amplifiers, they seem to perform almost effortlessly, and often transparently. You hear the compromises in the recording rather than the limits of the amplifier—whether you are listening to a song cycle, solo instrument, or the most demanding passages in music such as Saint-Saëns' Third Symphony. One of my friends who plays bass guitar loves the BHK Signature 300s, and so does another friend who is an opera buff, and both stress the natural life they bring to the sound.

Interface and System Compatibility

The BHK Signature 300 should be an outstanding performer in virtually any system I can think of, with the possible exception of extremely efficient horn systems with limited tolerance for power. These amps are truly powerful.

They certainly are not particularly sensitive to speaker load, or to a particular brand or model of speaker cable or interconnect. You will, however, hear the colorations and nuances of your speaker cable and interconnects more clearly simply because this amplifier—like all of its best competitors—is more revealing. One of the key tests of a great component is that it reveals the rest of your system's colorations. This was not a problem with my best AudioQuest, Kimber, and Transparent Audio cables, but I could hear the differences between them in ways that only emerge with really good amps.

The only caution I would give you about setup is that the BHK Signature 300s deserve good AC power input and power cables, and that you may have to change some of your other components to fully hear how superb this amplifier really is. You are going to want your other components to be worthy of such illustrious company.

Summing Up

A truly excellent amplifier. Scarcely cheap, but less expensive than most of the amps that challenge it in quality—and the stereo version is half the price of the monoblocks. I'm not giving up the Pass Labs 160.8s, but I am putting a second reference system together, and I'm keeping the BHK Signature 300s. Two of the best power amplifiers around can be better than one. tas

SPECS & PRICING

Output power: 300W into 8 ohms, 600W into 4 ohms, 1000W into 2 ohms
Inputs: RCA (unbalanced), XLR (balanced)
Outputs: Two pairs of gold-plated copper binding posts
Gain: 30.5dB +/-0.5dB
Sensitivity: 1.2V
Noise: <-85dBV, 100Hz-20kHz
Input impedance: Unbalanced 100k ohms; balanced 200k ohms
Output impedance: <0.1 ohms
Frequency response: 10Hz-20kHz +/- 0.1dB; 10Hz-200kHz +0.1/-3.0dB
Dimensions: 17.1" x 8.7" x 14" chassis only; 15" deep including connectors
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Combining classic vacuum-tube heritage with microprocessor control is Rogue's recipe for one satisfying and affordable preamp. The RP-5 brings its magic to bear in color saturation and tonal liquidity, providing an authentic sense of dimension and spaciousness to each image. The treble is nicely extended, quick, detailed, and replete with harmonics. Bass performance is also authoritative and controlled, with a hint of added warmth and bloom. The RP5 is a prime example of what the culture of the high end is all about—music reproduced accurately and beautifully. The RP5 is a component that should tempt a lot of people into going Rogue.

Aesthetix Calypso and Janus Signature
Calypso, $5000; Calypso Signature, $7000; Janus, $7000; Janus Signature, $10,000

The stalwart Calypso and new Janus Signature (which includes a Rhea Signature phonostage) share numerous qualities: speed and detail; highs without a glint of shrillness; a low noise floor; precise rhythms; dynamics that are only a skosh less lively than reference-caliber; and a laid-back perspective. The quiet background and smooth treble add up to long hours of glorious, fatigue-free listening. As for differences, the normal Calypso/Janus soundstage is big, but not huge, while the Signature soundstage is fully realized. The Signature also delivers a richer portfolio of instrumental timbres, more air, longer decays, and better-defined bass. However, these are accompanied by an upper-bass bump that adds a warmth and thickness that affects both timing and timbre. The choice between the Signature and non-Signature model will come down to personal preference, though, at $5000, the original Calypso remains a steal.

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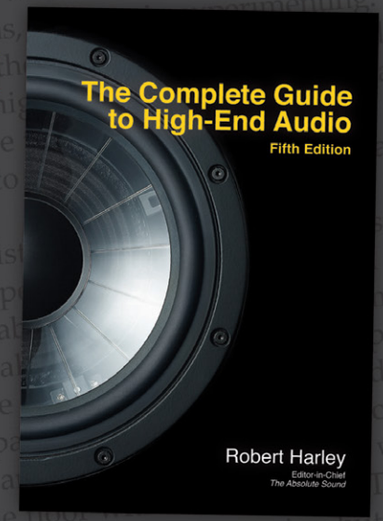

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OUR TOP PICKS POWER AMPLIFIERS

Odyssey Audio Khartago stereo/ monoblock
$995/$1975

Although the 130Wpc Odyssey Khartago solid-state stereo amp has been around for better than a decade, it was new to JV until amp-connoisseur Alon Wolf (of Magico) told him he used it in his shop and it was excellent. Wolf was right. Although the Khartago doesn't have all the articulation and transparency of the standard-setting Soulution 711 stereo amplifier, it has a surprisingly similar balance, no discernible grain, high resolution, and a deep, wide soundstage. Positively, the best budget amp JV has heard, not counting the Odyssey Khartago monoblocks, which have the same power rating as the Khartago but a stiffer power supply and wider bandwidth, giving them the same basic sound as the two-channel unit with slightly more resolution, dynamic oomph, top-end air, and channel separation. Like the Khartago stereo, this is a budget monoblock for the connoisseur.

Audio by Van Alstine FET Valve 600R
$3299

Frank Van Alstine's 300Wpc hybrid amp is based on AVA's patented forward-transimpedance design. A 12AT7 triode front end is coupled to a fully complementary power MOSFET output stage. The stock JJ Electronic tubes are quite musical, so there's no compelling reason to tube roll. No, it doesn't sound like a tube amplifier, but what sets it apart from a host of solid-state designs is its soulful midrange and ability to retrieve music's drama and tension. Tack on decent spatial delineation and you have the making of a successful hybrid design. It's a complete package featuring low distortion, superior speed, killer bass, and superb dynamics. The treble is somewhat closed in, and tonally, harmonic colors are on the dark side of reality, requiring careful system matching. At its best, the 600R can sound much like a $20k power amplifier. World-class power amplification at an affordable price.

NuPrime ST-10
$1595

The NuPrime ST-10 amplifier is what NuPrime calls "near reference class." Why only "near" reference? As far as reviewer SS can tell it's because this stereo amplifier only puts out 150 watts per side into an eight-ohm load. The ST-10 is a very quiet, extremely low-noise power amplifier that, as long as it isn't pushed into clipping, sounds exceedingly neutral and uncolored. The ST-10 did a superb job of driving a variety of speakers with authority and control.

Zesto Audio Bia 120
$12,500

Zesto's new Bia 60Wpc, Class A, all-tube power amplifier—with styling to match the company's Zeto linestage and Andros phonostage—brings the designers the trifecta. As with the preamps, Bia's personality consists in a completely seductive musicality free from all the usual sorts of electronic colorations and artifacts, for a presentation that never, ever sounds electro-mechanical, instead always wholly natural. Broadly neutral but not completely accurate, the sound here is more beautiful than real—luscious, velvety, silken, gorgeous.

Hegel H30 Reference
$15,000

This Norwegian powerhouse of an amplifier (375Wpc into 8 ohms) combines the brute-force bass control and dynamic impact of a dreadnought design with a midrange and treble refinement, delicacy, and sweetness that are reminiscent of a single-ended triode amplifier. The midrange, in particular, is highly vivid and present without sounding the least bit pushy or forward, infusing the presentation with a palpability and directness of expression previously unheard in any amplifier near the H30's price. Perhaps the H30's outstanding sonics and high value can be traced to Hegel's SoundEngine technology,
in which dynamic crossover distortion is greatly reduced through a patented circuit, coupled with a rigorous transistor-matching protocol. The H30 can be operated in bridged mode for 1000W (requiring two H30's for stereo operation), but some of the midrange magic disappears and resolution slightly diminishes. A great bargain in high-powered amplifiers.

Pass Labs XA160.8
$27,300/pr.

The 160W, Class A XA160.8 monoblock is yet another inspiring and indisputable success from the mind of Nelson Pass—a man who for the past four decades (his first commercial product was released in 1975) consistently rises to the challenge of besting himself. At the frequency extremes, the XA160.8's transient speed and pitch definition are superb, while its mids are simply extraordinary, possessing a purity, texture, and bloom that reminded reviewer GW of the best tube designs. Its paramount strengths are engaging resolution and transparency, with no vestige of glare or the faintest hint of edge. A genuine triumph that earned GW's highest recommendation.

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Balanced Audio Technology Rex II Preamplifier and Rex II Power Amplifier

Mellifluous

Jacob Heilbrunn

About a decade ago at the Hilton Hotel in Manhattan, Balanced Audio Technology demonstrated its electronics in a magnificent surround-sound configuration with Avantgarde Trio loudspeakers and Bass Horns subwoofers that were parked in each corner of the capacious room. A line formed outside to wait to hear it. One of the demo cuts featured the Catalan tenor Jose Carreras performing with a choir. You could almost pick out each voice in the chorus. Carreras' voice sounded utterly ethereal. It was one of those audio experiences that you tuck away in your mental sonic album and return to with a sense of nostalgia. [The same system at a San Francisco show elicited a standing ovation with wild applause at the conclusion of Pink Floyd's The Wall—the only instance of such a reaction to a show demo in memory. —RH]

Ever since that event I've followed the progress of BAT, as it is known, with more than casual interest. A few years ago I visited the factory in Delaware where the equipment is built, and became acquainted with the very intriguing and variegated trio—Victor Khomenko, Steve Bednarski, and Geoff Poor—that runs the company. All three are passionate music lovers and Khomenko's design knowledge is not be trifled with. The guy, to put it bluntly, is brilliantly innovative. Consistent with Russian engineering, which makes the most out of basic parts (think AK-47), BAT equipment appears quite impregnable when it comes to reliability.

Since I saw the factory, however, BAT has undergone a change in ownership. The original team remains intact, but the company itself was purchased by Music Direct owner Jim Davis in 2013, who has provided it with vital financial backing.

When Khomenko, Bednarski, and Poor visited me to deliver the company's new 160-watt Rex II monoblock amplifiers and preamplifier, I was thus curious to listen to the equipment for several reasons. For one thing, I wanted to see if the company had been able to build upon its new resources to improve its equipment. I was also simply avid to audition another tube amplifier, a pursuit that I've been following with some assiduity in the past year. Tube amplifiers that I've listened to at some length in recent months include the VTL Siegfried monoblocks, the Audio Research Reference 75 stereo amplifier, the Octave MRE 220 monoblocks, and the Doshi V 3.0 monoblocks. The Siegfried had a mesmerizing fullness of sound and stygian bass and the ARC a pellucid treble. The Octaves had a very transparent sound and the Doshis a winsome musicality. What would BAT bring to the table?

Quite a lot, as it turned out. Apart from superlative reliability, chief designer Khomenko focuses on a low noise floor, purity of power, and a mellifluous sound. He's gone to heroic lengths in designing the Rex preamplifier, which boasts no fewer than 18 tubes. Upgrades from its first incarnation include replacing the Six-Pak of capacitors with amorphous-core output transformers. The Rex has only one gain stage for signal purity and uses no global feedback. Its ability to drive low-impedance loads is also superb, deploying for high-current delivery no fewer than eight 6H30 tubes, which hail from Russia. The outboard Power Module, housed in a full-sized chassis, contains what BAT terms a low-impedance local power supply. The Power

EQUIPMENT REVIEW - Balanced Audio Technology Rex II Preamplifier and Rex II Monoblock Power Amplifiers

SPECS & PRICING

Rex II Preamp

Tube complement, control module: 8x 6H30
Tube complement, power module: 2x 5AR4, 4x 6C19, 2x 6H30, 2x 6C45
Frequency response: 2Hz–200kHz
Maximum gain: 18dB
Inputs: Five balanced on XLR jacks
Input impedance (minimum): 100k ohms
Outputs main: Two balanced on XLR jacks
Outputs tape: One balanced on XLR jacks
Output impedance: 200 ohms

Dimensions (each module): 19" x 5.75" x 15.5"
Weight: 76 lbs. (control and power module)
Price: $25,000

Rex II Power Amplifier

Tube complement: 4x 6H30, 6x 6SN7, 2x 6V6, 4x 6C33C-B
Power output: 80W in 8 ohms or 4 ohms (3% THD)
Frequency response: 5Hz–200kHz
Input impedance: 108k ohms
Dimensions: 17" x 9" x 24"
Weight: 100 lbs. each
Price: $19,900 each

ASSOCIATED EQUIPMENT
Continuum Caliburn Turntable with two Cobra tonearms, Lyra Atlas and Myajima mono Zero cartridges, dCS Vivaldi CD/SACD system, Wilson Audio XLF and Magenpan 3.7i loudspeakers and Wilson Hammer of Thor subwoofers, Nordost Valhalla II and Transparent Opus cabling, Stillpoints Ultra 5 and Ultra SS footers

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Module is a true dual-mono design that eschews silicon diodes in favor of vacuum-tube rectifiers. The AC shunt regulators are also built from vacuum tubes, for a total of ten tubes in the Power Module.

Meanwhile, the Rex II amplifier is hardly less impressive: it features a fully symmetrical triode circuit, employs auto-bias, and is monitored by an electronic protection circuit. It looks almost impossible to damage these big boys, a big change from the days when turning a tube amp on and watching whether it would perform or emit a shower of sparks was a big question mark.

Perhaps most startling, BAT doesn't rest content with the possibility of powering your speakers with just a pair of its monoblocks. Instead, there was literally a colossal amount of BAT amplification in my listening room—four power amplifiers to be precise. The way BAT has designed its amplifiers, which are each based around two pairs of the extremely robust 6C33C tube, it's possible to daisy-chain them—pretty much infinitely, depending on your tolerance for heat and your willingness to countenance a whirling electric meter that might even take off like a flying saucer. Essentially, if I have it right, the second amp, which was tied to the first amp, functions as an extra source of reserve power. Specifically, adding the second amplifier in parallel doubles the voltage, doubles the current, halves the output impedance, and increases the signal-to-noise ratio by 6dB. The idea is that it will provide an increase in soundstage size and musical control.

This is the mode in which I first listened. As a result, the immense power and grip of the BAT amplifiers when coupled with the Rex II preamplifier instantly came to the fore. One of the things that most impressed me in listening to baroque and early classical music was the iron grip that the amps exercised on the bottom end. It wasn't that the amps had the opportunity to deliver pounding bass. On the contrary, it was the way they brought out the hitherto barely audible and subtle details of the basso continuo, thereby perceptibly enhancing the sense of the room in which the recording originally took place.

As enjoyable as it was to listen to two pairs of tube amplifiers, I have to admit that I cracked pretty soon. The heat, even in my fairly large room, was simply too overwhelming. But I also couldn't help wondering if the additional complexity of the quad-amplification system might also not carry some sonic penalties as well as assets. For example, I couldn't avoid the sense that a very slight muddying of sound was taking place with extra sets of speaker cables and interconnects linking the amps. Thanks to the generosity of the Nordost Corporation, I had oodles of its superlative Valhalla II cabling on hand for the review. But perhaps four amps were too much of a good thing: with a single pair of monoblocks the musical presentation took another notch up in alacrity and spontaneity and coherence.

Which is a somewhat roundabout way of saying that the tandem of Rex II preamplifier and amplifiers sounded utterly beguiling. One of the most conspicuous strengths of this duo is the tautness of the bass. There was not a smidgen of the bloat that sometimes afflicts tube amplifiers. It doesn't explore shifting tectonic plates the way Boulder amplifiers do. But this is no muffin-top amplifier. It's lean and mean in the nether regions. The depth, explosiveness, and clarity were phenomenal. It's not like you had to strain to hear it. Consider Leonard Cohen's new album *Popular Problems* [Columbia Records]. On the cut "Almost Like the Blues," the propulsive quality of the bass line comes through beautifully and makes for a riveting performance. It's easy to scant the importance of bass, but make no mistake: There is no substitute for the stygian frequencies, once you've heard them authentically reproduced. True bass sets up so much of the ambience of a concert hall or recording studio. On the Cohen album, for instance, it not only endows all the instruments with remarkable weight and authority but also allows his gruff, hoarse voice to project from a black space. This sense of gravity extends to instruments such as the violin on the cut "Samson In New Orleans," which sounded supple and plangent. Often instruments such as violin on pop recordings can sound thin and etched. Not with the Rex II gear. On a Teldec recording of Gidon Kremer performing the Schumann violin concerto, the very marrow of the violin emerged with great fidelity, producing a rich palette of overtones that lingered on long after the initial note had been sounded.

At the same time, the sheer scale of the soundstage was quite riveting as well. On a Telarc recording of the trumpet virtuoso

EQUIPMENT REVIEW - Balanced Audio Technology Rex II Preamplifier and Rex II Monoblock Power Amplifiers

Rolf Smedvig, the Rex provided a sumptuous and wide soundstage. It was possible to identify accurately, or about as accurately as it can get with excellent stereo, Smedvig's position relative to the Scottish Chamber Orchestra. Seldom, if ever, have I heard so much of the acoustic envelope as the BAT supplied. But this is not to say that the BAT equipment poked into every nook and cranny of the orchestra. It didn't. Rather, it gives you the whole gestalt, the sweep of an orchestra without getting lost in the details. Something occurred in listening to Pinchas Zukerman and Marc Neikrug performing Beethoven's "Kreutzer" Sonata—the BAT superbly conveyed both their hair-raisingly audacious playing in the presto movement. It pretty much had me sitting on the edge of my chair. Here the Rex II winningly rendered the emotional energy that both Zukerman and Neikrug invested in the sonata—imaging was impeccable as were the uncompressed fortissimos. Accordingly, the dynamic impact was off the charts.

Overall, the Rex II amplifiers delivered, when appropriate, a tremendous wallop—not a sledgehammer assault but a true sense of the scale and sweep of the music. One track alone sufficed to demonstrate for all and sundry who were at my house for a party that the amplifiers can deliver a prodigious amount of current—on Monty Alexander's mind-blowingly good performance of "Night Mist Blues" at the Montreux Festival, the palpability, speed, and body of the piano as he slams the keys were staggering, enough to bowl over even non-jazz aficionados. The piano seemed to resound in the very space in front of us.

Much of this can be ascribed to the Rex II's ability to render realistic decays. I recall being instructed at the Oberlin Conservatory that music is all about death and decay: once a note been sounded it immediately begins to die. Sure, a piano pedal can allow it to resound longer but no matter the instrument, once a note has been produced it's headed for the exits. The Rex duo excels at providing the full value of notes, allowing them to decay into the ether.

Part of its ability to accomplish this so persuasively is linked to its iron rhythmic precision. The preamp and amp never rush the notes, never overemphasize any part of the frequency spectrum. Instead, they have a kind of hypnotic ability to deliver a realistic sense of pacing, something that tube amplifiers can have difficulty accomplishing. No, the Rex is not quite as clean as the Boulder 2050 monoblocks that resided in my basement for a few months, but then again, I'm not sure anything can match that standard, at least for now. But there is a sense of ease—not, mind you, to be confused with complacency!—and steadiness that the BAT gear appears to offer.

If the BAT equipment has continued to make great strides toward what some more audacious than myself term the absolute, it also retained some of the qualities that have characterized its performance in previous generations. The timbral reproduction of both the preamplifier and amplifier, it must be said, continued to hew to the darker sound of the spectrum. This has both pluses and minuses. The upside is that the overall presentation is rich and organic without a trace of treble rebarbativeness. The downside is that the treble is not as extended as that of a variety of other amplifiers. A certain rounding of the treble means that even hand claps or whistles simply sound lower on the frequency spectrum than I have heard with other gear. There is absolutely no shrillness that can be associated with the Rex, but it's also the case that the somewhat velvety treble impinges ever so slightly on the micro-dynamic performance of the Rex II.

Designing a preamp or amplifier consists of making choices, and as near I can tell, BAT has chosen to err on the side of a musical and seductive presentation. The great merit of the Rex twins is that they offer the sterling virtues of tube gear absent many of the shortcomings that have traditionally plagued the genre. The marvelous midrange and bass of BAT's latest designs is almost impossible to listen to without wanting to listen to one recording after another, even as the glowing tubes exert an almost equally tantalizing visual appeal. Anyone seeking a tube amplifier with great clarity, indefatigable drive, and exquisite midrange magic need look no further than the BAT Rex II. tas

CH Precision M1 and L1

Can You Hear Me Now?

Jonathan Valin

In Issue 239, our Alan Taffel rave-reviewed a 100W monoblock amplifier (the A1) and a DAC/preamp (the C1) from CH Precision, a Lausanne-based Swiss engineering firm founded by former Goldmund engineers Florian Cossy and Thierry Heeb, the "C" and the "H" of CH. (Not coincidentally, CH also happens to be the abbreviation, used on mail, the Internet, and license plates, for Switzerland—"Confoederatio Helvetica" being the country's Latin moniker.) Comes now CH Precision's M1 amplifier and L1 linestage preamplifier, both of which bear strong family resemblances to the products Alan reviewed. (Indeed, the M1 is rather like a doubled-up A1, with twice the power supply and, at 200W, twice the power.)

Like the A1, the M1 is what CH calls a modular amp in that it houses two identical amplifiers in a single chassis. The two amps inside a single M1 can be used together or apart. In monaural mode, which is how I ran my pair of M1s, one channel acts as a monoblock. Alternatively, both channels can be used to passively or actively bi-amplify a signal, or be bridged for a substantial increase in monoblock power, or (when an M1 is equipped with a second analog input board) be configured to function independently, turning the amp into a stereo unit. (Alan tried a single A1, which offers precisely the same configurability as the M1, as a stereo amp and wrote that it gave him 95% of what two A1s offered when operated as monoblocks.)

Once again as with the A1, the M1 incorporates certain technologies that Cossy and Heeb first pioneered at Goldmund, most prominently high-speed/high-bandwidth circuitry and elaborate mass and constrained-layer damping of chassis and boards.

I've discussed high-speed/high-bandwidth circuits in re the world-class offerings of another Swiss company, Soulution. To refresh your memories, and to clear up a common misunderstanding, this speed or bandwidth (the two are essentially the same) has nothing to do with the megahertz frequencies that some of these amps and preamps can theoretically reproduce. To quote Cyrill Hammer, CEO of Soulution, "The [speed or] bandwidth is required solely to make the 'feedback loops' of solid-state designs work properly."

"Feedback loops," global and local (about which more in a moment), compare the amplified music signal at the output to the signal at the input, in order to correct any errors that may have crept in as the music made its way through the circuit. Since the music signal at the input is constantly changing, the time delay (called "propagation delay") of the amplifier or preamplifier's feedback loop must be zero or close to it; otherwise, the feedback loop will be comparing musical apples at the output to musical oranges at the input.

The way to achieve very low propagation delay times in solid-state amplifiers is via ultra-fast (i.e., ultra-high-bandwidth) circuits. In the Soulution amplifiers, for example, propagation delay in the voltage-amplification stage—where local negative feedback is highest and bandwidth is 200MHz (!)—is one to two nanoseconds (billionths of a second), a literal order of magnitude faster than the circuits of many big solid-state amps, where propagation delay is typically one to five microseconds (millionths of a second).

While Soulution amplifiers use considerable "local" negative feedback (as in the voltage-amplification stage I just mentioned) and very little (less than 3dB) global negative feedback, the amount of each is fixed. CH Precision's amps, both the M1 and the A1, give users the option of adjusting the ratio of local-to-global negative feedback in ten-percent increments through a range that extends from 0% global feedback (the default position) to 100% global feedback. Gain is also adjustable in 0.5dB steps in a range up to 24dB, allowing users to better match the amplifiers to the sensitivity of their loudspeakers (and the size of their rooms).

Other novel technologies in the M1 include a circuit designed to keep bias current to the power transistors as constant and

EQUIPMENT REVIEW - CH Precision M1 and L1

SPECS & PRICING

M1 Amplifer

Type: User-configurable two-channel solid-state power amplifier

Inputs: One balanced (XLR); two single-ended (RCA and BNC)

Input impedance: Balanced, 94k ohms; single-ended, 47k ohms or 300 ohms

Input stage: JFET, 24dB-range adjustable gain in 0.5dB steps

Amplification stage: Ultra-low noise, full discrete Class AB design with 6 pairs of complementary output transistors

Bias: Patent-pending bias circuitry for constant bias operation

Feedback: User-adjustable local vs. global feedback ratio, from 0% to 100% in 10% steps

Bandwidth: DC to 450kHz (-3dB) at 1W into an 8-ohm resistive load

Signal-to-noise ratio:Better than 115dB in stereo and bi-amp modes; better than 118dB in bridge mode

THD + noise: Less than 0.1% with 0% global feedback; less than 0.01% with 100% global feedback

Analog outputs: Two pairs of Argento binding posts for loudspeakers connection

Protections: Non-intrusive DSP-based protection of the amplifier and connected loudspeakers; short-circuit protected; disconnected loudspeaker detected; over-temperature of the heatsink; over-temperature of the output transistors

Transformer: 2200VA toroidal transformer for output stages; 100VA separate toroidal transformer for input stages

Power supply capacitors: Two sets of 100,000uF/100V 4-pole capacitors

Regulators: Non-regulated symmetrical power supply for the power stages; eight local regulation stages for input/driver stages; seven local regulation stages for the logic/display

Display: 480x272 pixels, 24-bit, color AMOLED

Dimensions: 17.3" x 10.5" x 17.3"

Weight: 165.35 lbs. (each)

Price: $94,750/pr.

L1 Preamplifier

Type: Dual-monaural, user-configurable, mono or stereo linestage preamplifier

Inputs: Eight stereo; eight or sixteen monaural

Outputs: Four Neutrik balanced XLR connectors, two WBT single-ended RCA connectors, two high-bandwidth coaxial BNC connectors

Volume control: 20-bit R-2R ladder network with 118dB range in 0.5dB steps from -100dB to +18dB

Analog signal path: Pure Class A, fully symmetrical, discrete-transistor-based circuit with phase inversion and mono modes

Input impedance: Balanced, 100k ohms; RCA and BNC, 50k ohms

Maximum input level: Balanced (XLR), 16V RMS; single-ended (RCA and BNC), 8V RMS

Frequency response: DC to 1MHz

THD + Noise: <0.001%, 1kHz, unity gain

Display: 480x272 pixel, 24-bit AMOLED

Dimensions: 17.3" x 5.2" x 17.3"

Weight: 44 lbs.

Price: $32,975 (X-1 power supply, $14,975)

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, JL Audio Gotham subs

Linestage preamps: VAC Statement Line, Soulution 725, Audio Research Reference 10, Siltech SAGA System C1, Zanden 3100

Phonostage preamps: VAC Statement Phono, Audio Research Corporation Reference Phono 10, Constellation Audio Perseus, Innovative Cohesion Engineering Raptor, Soulution 725, Zanden 120, Audio Consulting Silver Rock Toroidal

Power amplifiers: VAC Statement 450iQ, Soulution 711, Siltech SAGA System V1/P1, Lamm ML2.2, Zanden 8120, Odyssey Audio Stratos

Analog sources: Walker Audio Proscenium Black Diamond Mk V, TW Acustic Black Knight, AMG Viella 12, Acoustic Signature Invictus

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

Phono cartridges: Clearaudio Goldfinger Statement, Air Tight Opus, Ortofon MC Anna, Ortofon MC A90, Benz LP S-MR

Digital source: Berkeley Alpha DAC 2

Cables and interconnects: 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: 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

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stable as possible. As I pointed out in my review of the superb Technical Brain TBP-Zero EX monoblock power amplifier, power-transistor bias current is highly dependent on the internal temperature of the output stage. CH Precision amps use a device called ThermalTrak (from OnSemiconductor) to precisely map this temperature. According to the company's literature, "a very special circuit [is] built around the output stage which [takes] into account both the temperatures of the heatsink and the transistors' dies, [allowing] the amplifier's output stage to keep its bias constant independently of the musical program and the room temperature." CH claims that this patent-pending circuit allows the M-1's Class AB circuit to "outperform a pure Class A design with usual bias compensation."

The M1's companion piece, the L1 linestage preamplifier, also uses high-speed, high-bandwidth circuitry, although the preamp's circuit runs in Class A rather than Class AB. Designed for ultimate transparency, the fully balanced L1 analog linestage (the C1 preamp that Alan reviewed incorporated a DAC) is said to employ the shortest possible signal paths between input and output, ensuring very low noise and very high slew rates. Volume is controlled by a 20-bit R-2R ladder network, using tight tolerance, high-grade metal-film resistors that allow a 118dB range in 0.5dB steps.

Once again like the M1, the L1 is a modular design, comprising two identical preamp circuits in a single chassis. Like the M1, it can be used as a stereo preamp with eight inputs or, with the addition of a second L1 (and a set of

EQUIPMENT REVIEW - CH Precision M1 and L1

monaural analog preamplifier boards for both units), as a mono preamp with 16 inputs. My L1 arrived with the optional, outboard X1 "ultra-low-noise" regulated power supply, which is said to increase transparency, speed, and musicality.

The L1 comes with one of the smallest remote controls I've seen—a metal block about the size of a Heath bar with five tiny, closely spaced buttons on it for on/off, volume up/down, and input forward/back. All other adjustments to the amp and preamp have to be made via the little pushbuttons on the faceplates of the amp and preamp chassis. Happily, both the M1 and L1 are equipped with large AMOLED displays, for reading out the menus and submenus you navigate via these tiny buttons.

Though Alan said, in his review of the A1/C1, that in his system he preferred using the amp with 40% global feedback (an adjustment that must be made via the display and pushbuttons just described), in my system (Magico M Projects/JL Audio Gotham subwoofers) I much preferred the default setting of zero negative feedback, although I did increase the gain of the amplifier by 6dB to better accommodate the sensitivity of the M Pros.

So what does an M1/L1 sound like? In a word, realistic—with the right speakers and the right program material, sensationally so.

Seeing that I just got done anointing the Soulution Series 7 amps and preamps the new transistor champs, you're probably wondering how the two marques compare. Well, to be honest, they don't sound much alike in spite of their many technological similarities (ultra-high-bandwidth circuits, user-adjustable modular dual-monaural construction, mass and constrained-layer damping).

The new Series 7 Soulution amps and preamps are all about power, solidity, and dark, rich tone color. Pleasingly soft on top, realistically big on the bottom, they have (almost uniquely for transistor gear) a tube-like ability to reproduce the three-dimensional body and bloom of instruments and vocalists (this tube-like bloom has always been one of Soulution's calling cards), while at the same time delivering all the traditional solid-state virtues (speed, definition, slam) in spades, hearts, diamonds, and clubs.

The M1/L1 combo does not have this lifelike three-dimensional body and bloom. In imaging the CH Precision amp and preamp are more typically solid-state, meaning instruments are a bit flattened in depth and a bit constrained in bloom (rather, dare I say it, like instruments on digital recordings). Nor does the CH combo deliver quite the same slam and dense color in the bass and power range that the sui generis Soulution gear does, though it's certainly no slacker in the bottom end. (I'm guessing that the Soulution's seemingly inexhaustible switch-mode power supply and one million microfarads of capacitance are the reasons for this—the M1 uses a stout 2200VA linear power supply and a mere 200,000 microfarads of capacitance.)

On the other hand, the M1/L1 bests the Soulution in resolution, treble extension, and overall neutrality—by enough of a margin to make a marked sonic difference. Indeed, in these three respects the CH combo is highly reminiscent of Technical Brain's incredible amp and preamp, which were the highest resolution, highest transparency, and (once again with the right speakers and the right source material) most realistic-sounding electronics I'd had in my system prior to Soulution. (CH's patent-pending bias-stabilization circuit—similar in principle to what TB does with its duplex temperature-compensation bias circuit—may be the reason for this sonic similarity.)

Indeed, the CH gear very nearly equals Technical Brain electronics in transparency and resolution thanks to a tonal balance that comes as close to colorlessly neutral as anything I've heard, tube or solid-state. Neither slightly darkish like Soulution nor slightly lightish like Technical Brain, the M1 and L1 open a window on the music (at least with vinyl sources, the Audio Consulting Silver Rock Toroidal phonostage, and the Magico M Project/JL Audio Gotham loudspeakers) that seems to take in...everything—simply incredible amounts of blur-free low-level (and high-level) detail.

For example, I must have heard Kind of Blue a thousand times, but I've never before heard the "wet" reeds buzzing in Trane's tenor and "Cannonball" Adderley's alto saxophone (on the sotto voce passages of "So What") with the startling realism that the M1/L1 (and, to be fair, the Audio Consulting phonostage) bring to the transients, timbre, and articulation of these instruments. Ditto, in realism, for Dean Martin's voice, particularly on a closely miked, low-reverb number like "If You Were the Only Girl in the World" off Dreaming with Dean, where every little detail—from the breaths he takes to the spit in his mouth to the way he modulates or bends notes (or simply drifts off-key)—is reproduced with the clarity of a large-format-camera contact print. Double ditto for the individual voices of the strings, winds, brasses, and percussion of the Covent Garden orchestra in the wild climax of Rossini's Semiramide Overture from Venice. Triple ditto for the crack of Omar Hakim's snare and the literally subterranean pulse of Guy Fletcher's Yamaha DX-1 on Brothers in Arms.

Not only can you hear all these musical and instrumental details with utter clarity, you can hear engineering ones just as plainly. For instance, on the last-mentioned album, Dire Straits' Brothers in Arms, it was obvious from the wafer-thin flatness, dark timbre, and recession of Knopfler's voice that this was a digital recording—actually one of the first to be recorded on Sony's 24-track digital machine. (You can hear precisely the same flatness and recession on the vocals of Ry Cooder's great LP Bop till You Drop, the first digitally recorded pop album, taped five years earlier on a 32-track 3M machine.)

Whether some folks on our staff want to admit it or not, recovering this level of timbral and transient detail has a direct bearing on creating the illusion of the real thing. And the CH Precision electronics are superb at it. Of course, every album I just mentioned—Mobile Fidelity's 45rpm reissue of Kind of Blue, Analogue Productions' 45rpm reissue of Dreaming with Dean, Analogue Productions' yet-to-be-released reissue of Venice, and Mobile Fidelity's 45rpm reissue of Brothers in Arms, even Warner's original issue of Bop till You Drop—is a superb recording that will sound just as real (albeit in slightly different ways) on Soulution's new Series 7 gear or

EQUIPMENT REVIEW - CH Precision M1 and L1

(from what Robert has told me) Constellation's latest Reference line. With less phenomenal recordings, results may vary. You see, the trouble with neutral is that it's, well, neutral. Though not cool and analytical (or anything like that, actually), the CH Precision duo in combination with the Magico M Pros won't sweeten up the strings and winds on Witches' Brew in quite the same way Soulution Series 7 gear in combination with the Raidho D-5s does, or slam through the floor on the bass/kickdrum of Michael Jackson's "Black and White" (from a 15ips dub of the mastertape of Dangerous) with the pile-driver solidity of the Soulution/D-5 combo. In other words, this is not a quintessentially "as you like it" sound. If drama and beauty are your things—and I know they are—then the CH Precision electronics will deliver them, but not as consistently or as spectacularly as Soulution gear does.

On the other hand, if you want to hear Dean Martin or the Juilliard Quartet or the Chicago Symphony Orchestra or Ry Cooder and his crew sound so "there" they'll make you blink—if you want to hear what's on recordings (and how those recordings were miked, engineered, and mastered) reproduced with virtually no editorialization—then you really ought to listen to the M1 and the L1.

So what are my caveats? Well, I've already mentioned a couple. The Soulution 711/725 may not be as colorlessly neutral or as finely detailed as the M1/L1/Audio Consulting (this last could change, BTW, with the advent of Soulution's stand-alone 755 phonostage), but it's richer in tone color, more powerful in the mid-to-upper bass, every bit as fast and hard-hitting on transients, and a whole lot more bloomy and three-dimensional. Nor is the Soulution gear as iron-fistedly controlled as the CH Precision/Audio Consulting.

Alan, I think, liked this sense of precise control, in part because it clarifies rhythms. And so it does (along with everything else). But there is something to be said for the looser, freer-flowing energy of the Soulution (and of tube gear), which doesn't give you the vague sense that the brakes are being applied with a little too much pedal. There is no slop in the CH Precision presentation, but there's not a whole lot of give, either. And the sense of one note flowing into, rather than discretely following another is also a valid representation of the sound of music.

I don't want to hit this point too hard. The CH Precision M1 and L1 are world-class electronics—and, alongside the Soulution Series 7 components, reference-level solid-state electronics. Each marque offers a different set of virtues, just as the Magico M Pro and the Raidho D-5 do. On certain days I prefer one to the other, and vice versa. But the bottom line is I wouldn't want to be without either. Happily, I don't have to be. You, on the other hand—or at least those of you with this kind of money, a coma-tose spouse, and no sense of shame when it comes to buying yourself toys—do. As this is not a decision I can make for you, you'll just have to make it for yourself. Sally forth, listen, and decide. The truth is you can't go wrong either way. tas

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M·ONE

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Constellation Audio Altair II and Hercules II

Robert Harley

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Constellation Audio Altair II and Hercules II

No other electronics manufacturer in recent memory has risen from start-up to major global brand as quickly or as decisively as Constellation Audio. The company appeared on the scene in late 2010 with the ultra-tweaky (and ultra-expensive) Altair linestage and Hercules monoblock power amplifiers. In my review of those electronics in Issue 215 (September, 2011), I concluded "the Altair and Hercules set new standards in transparency, resolution, absence of grain, and sheer realism, in my experience."

Constellation leveraged this early success by creating a full line of components based on the same circuits found in the Reference Series Altair and Hercules. (The Performance and Inspiration Series are simply less elaborate implementations of the topologies developed for the cost-no-object Reference.) As we enter 2016, Constellation is armed with the $12,500 Inspiration Integrated amplifier at one end of its line, and the newly revised and updated Altair II linestage and Hercules II monoblocks at the other. The Altair II's price of $70,000, and the Hercules' tag of $170,000 per pair position them at the top end of the price scale. Are the revised components better-sounding than the originals? Do they still hold their status as the state of the art in solid-state amplification?

Before tackling those questions, let's look at the key differences between the new products and the originals. The most obvious change is the Altair's more traditional user interface. The first Altair was housed in a monolithic chassis with no display or readily apparent controls. Despite the exceptional two-handed touchscreen that controlled the Altair, the lack of controls or of a display on the Altair was a bit unnerving. Customers apparently agreed that that approach was a bit too avant-garde; the new Altair features a touchscreen similar to that of the old remote, but now integrated into the front panel. The new remote, a slim wand beautifully machined from aluminum, is much easier to use. Overall, the move to the front-panel display and a more conventional remote control is welcome.

Inside, the Altair's volume control is now a monolithic stepped-attenuator under digital control rather than the elaborate light-dependent-resistor circuit of the original. The light-dependent-resistor volume control took a long time to stabilize and sound its best, leading to the decision to implement the new attenuator. Other changes include additional power-supply buffers around the volume control as well as another regulation stage in the supply powering the audio circuit. The result is reportedly wider dynamics and lower noise. The floating "raft" on which the audio circuitry is suspended has had its suspension retuned, with a heavier weight to the raft and optimized mechanical damping. Apart from a few component swaps, the circuit is unchanged.

The Altair's power supply is still housed in a separate enclosure, and connects to the main chassis via three umbilical cords. Constellation Audio offers a product called a DC Filter that looks identical to the power supply. It fits in line between the power supply and the Altair's main chassis, and provides additional filtering of the DC supply voltages before they get to

Constellation Audio Altair II and Hercules II

the preamplifier. The optional DC filter can be added at any time, and is priced at $9000. In a typical configuration, the Altair linestage sits atop the power supply and DC filter. When viewed this way, the Altair's extraordinary industrial design and chassis-work are on full display. The three chassis together almost look like sculpture.

The Altair offers eight inputs, four unbalanced on RCA jacks and four balanced on XLR connectors. You can scroll through the inputs from a button on the remote, but that's tedious if you want to go from Input 2 to Input 1. A better method is to press a small button concealed beneath the Altair's front-panel display, which brings up the eight inputs on the touchscreen. The touchscreen also shows you the volume setting, selected input, and balance control (which, incidentally, is adjustable in 0.1dB steps). I missed the ability to select any input directly from the remote, which was possible with the original Altair. On the plus side, the new wand remote is easier to hold and use than the two-handed Pyxis remote.

The Hercules II has undergone more extensive revisions. For starters, the original's vertical form factor has been replaced by a more traditional chassis. The power rating has increased from 1000W to 1100W. Although the output stage and heatsink area of the two amplifiers are identical, the Series 2 features more robust Plitron power transformers that can deliver higher current.

One of my criticisms of the original Hercules was a bass response that was polite rather than visceral. The bottom end lacked the weight, extension, and authority one would expect from a "super-amp." That shortcoming has been addressed in the Hercules II by tripling the power-supply filter capacitance and adding another regulation stage in the supply for the front-end audio circuitry. Interestingly, according to Constellation, making either one of these changes without the other rendered only a marginal improvement in bass and dynamics. But together the two changes reportedly resulted in significantly wider dynamics and more robust bass.

Hercules has two sets of inputs, one of them marked "Constellation Direct." This input is designed for connection to a Constellation preamp; it simply bypasses the amplifier's input buffer for one less gain stage in the signal path. The output binding posts are big and robust, but the slots in the posts for inserting spade lugs are oddly positioned to face toward the outside of the chassis in opposite directions, making it tricky to connect certain speaker cables. The AC input jack is a 20A connector rather than the typical 15A type. (See the sidebar for a recap of the two products' technical features.)

Listening

I've had extensive experience with the Constellation line, from the Inspiration Series (Issue 249) all the way to the flagship Altair and Hercules in the Reference Series (Issue 215). The family shares many common sonic attributes, which isn't surprising since all the linestages and power amplifiers feature the same circuit topologies, and in some cases the same parts (the output transistors, for example). The differences are in the level of execution, parts-quality, chassis work, and power-supply sophistication.

I'll refer you to my review of the Altair and Hercules in Issue 215 for a detailed sonic description of the originals. The new Mk.2 versions sound very similar, with one notable exception, which I'll describe later.

The common thread in all Constellation products, which reaches its zenith in the Altair II and Hercules II, is truly astonishing transparency to sources. These electronics are as colorless as you're likely to find. The word "crystalline" comes to mind when I think of the Altair II and Hercules II, like a perfectly colorless and flawless diamond. They impose

SPECS & PRICING

Altair II Linestage
Inputs: Four balanced on XLR jacks, four unbalanced on RCA jacks
Outputs: Two balanced on XLR jacks, two unbalanced on RCA jacks (both main outputs); one record output on XLR jacks, one record output on RCA jacks
Input impedance: 200k ohms balanced, 400k ohms unbalanced
Output impedance: <50 ohms
Volume control resolution: 0.1dB, 0.5dB, 1dB (level-dependent)
Weight: 84 lbs. (linestage), 26.2 lbs. (power supply)
Dimensions: 17.5" x 5.53" x 14.82" (linestage); 17.5" x 2.82" x 14.5" (power supply)
Price: $80,000

DC Filter for Altair II
Dimensions: 17.5" x 2.82" x 14.5"
Price: $9000

Hercules II Power Amplifier
Output power: 1100W into 8 ohms, 1500W into 4 ohms, 2000W into 2 ohms (1kHz, 1%THD)
Gain: 32dB
Input impedance: 100k ohms unbalanced, 200k ohms balanced
Output impedance: 0.05 ohms
Inputs: Two balanced on XLR, one unbalanced on RCA
Dimensions: 19" x 13" x 32"
Weight: 220 lbs. each, net
Price: $180,000/pr.

CONSTELLATION AUDIO
3533 Old Conejo Road
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Newbury Park, CA 91320
(805) 201-2610
constellationaudio.com

ASSOCIATED EQUIPMENT
Digital front end: Aurender W20 music server, Berkeley Alpha Reference DAC, Berkeley Alpha USB converter
Analog front end: Basis Inspiration turntable with Basis Vector IV and Superarm 9 tonearms, Air Tight PC-1 Supreme cartridge, Moon by Simaudio 810LP phonostage
Support: Critical Mass Systems Maxxum equipment racks (x2), Maxxum amplifier stands (x2)
Cables: MIT Oracle MA-X and Oracle SHD, AudioQuest Wild Digital AES/EBU, WireWorld Platinum Starlight USB
AC: Four dedicated 20A AC lines; Shunyata Triton 2, Triton DP, Typhon (x3) conditioners, Shunyata Sigma power cords
Acoustics: ASC 16" Full-Round Tube Traps, ASC Tower Trap, Stillpoints Aperture Panels
Accessories: Klaudio ultrasonic record cleaner; Shunyata cable lifters, Critical Mass Systems Rize isolation

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Constellation Audio Altair II and Hercules II

so little of their own character on the music that listening to them is like hearing directly through the amplification to the music-making. With an outstanding source like the Basis Inspiration and Superarm 9, and highly resolving loudspeakers such as the Magico Q7 Mk.II or MartinLogan Neolith, the effect is quite startling. The system produces a *frisson* of lifelike immediacy and vividness. Some listeners may prefer a bit of added midrange warmth, or a slight softening of transient detail, or a subtle darkening of timbres. Although, amplifiers that sound richer and more voluptuous can have a certain appeal, ultimately I think that they are less musically engaging and rewarding than electronics that tell you everything that's on a recording.

In addition to this transparency to sources, the Altair II and Hercules II exhibit two other qualities that vault them into state-of-the-art territory. The first is resolution, and the second is their treble performance. These qualities are directly related, working together in a synergy that is truly extraordinary.

In this issue's From The Editor I posit that a hi-fi system can never have too much resolution of detail. Those who argue that past a certain point resolution becomes amusical clinical analysis, or isn't important to musical communication, haven't heard the kind of resolution delivered by the Constellation electronics driving a first-rate loudspeaker. The Altair II and Hercules II are stunningly dense in the amount of information presented to the listener. The finest microstructures of how sounds are created are gloriously revealed. Take a simple instrument such as wood blocks. How hard could they be to reproduce? Through the vast majority of amplifiers, wood blocks and similar percussion instruments sound like transient pops without much texture or inner detail. Through the Constellation electronics, they unmistakably become two pieces of wood striking each other. I'll give you another example: On the wonderful Analogue Productions 45rpm reissue of Phoebe Snow's 1974 self-titled album, the track "Poetry Man" includes maracas played very gently underneath other instruments. Through the Constellation electronics, I could clearly hear beads moving within hollow wooden spheres. The maracas add an almost hypnotic quality to the track.

I use these examples not because I listen to music with an ear to how natural wood blocks or maracas sound, but to convey the realism with which these electronics reproduce the timbre and transient detail of all instruments. Greater realism in tone color and dynamic shading translates directly into a more lifelike rendering of the sound and deeper musical involvement. This resolution isn't limited to the micro-level; the Altair II and Hercules II allow me, to an unprecedented extent, to hear individual instruments and voices even within dense musical passages with startling clarity.

The second quality that sets the Constellation electronics apart is their reproduction of the treble. If the level of resolution I've just described is accompanied by the slightest bit of glare, etch, grain, hardness, emphasized transient zip, or forwardness, the sound quickly becomes annoying and fatiguing. Rather than fostering musical intimacy, such brightness precludes it. And here's where the resolution of the Altair II and Hercules II becomes so magical; all that wonderful detail is presented in a supremely subtle, refined, suave, and sophisticated way that never calls attention to itself. There's no need to soften the presentation of the Altair II and Hercules II to mitigate an electronic patina because there is no electronic patina. Moreover, the treble has a delicate filigreed quality that is unique in my experience. Although the top end has a full measure of energy and life, it's also rendered with a sweetness and grace that are departures from the stereotype of a big solid-state amplifier. The combination of resolution with ease is, in my view, what distinguishes a really great hi-fi system from one that becomes transcendental. That quality is also what makes the Mk.II upgrade to the Magico Q7 such a triumph; it delivers more information *and* a more relaxed sound. One quality isn't sacrificed to advance the other. In both the Q7 Mk.II and the Constellation electronics, resolution combines synergistically with ease to foster total musical involvement. The presentation is musically vivid without being sonically vivid.

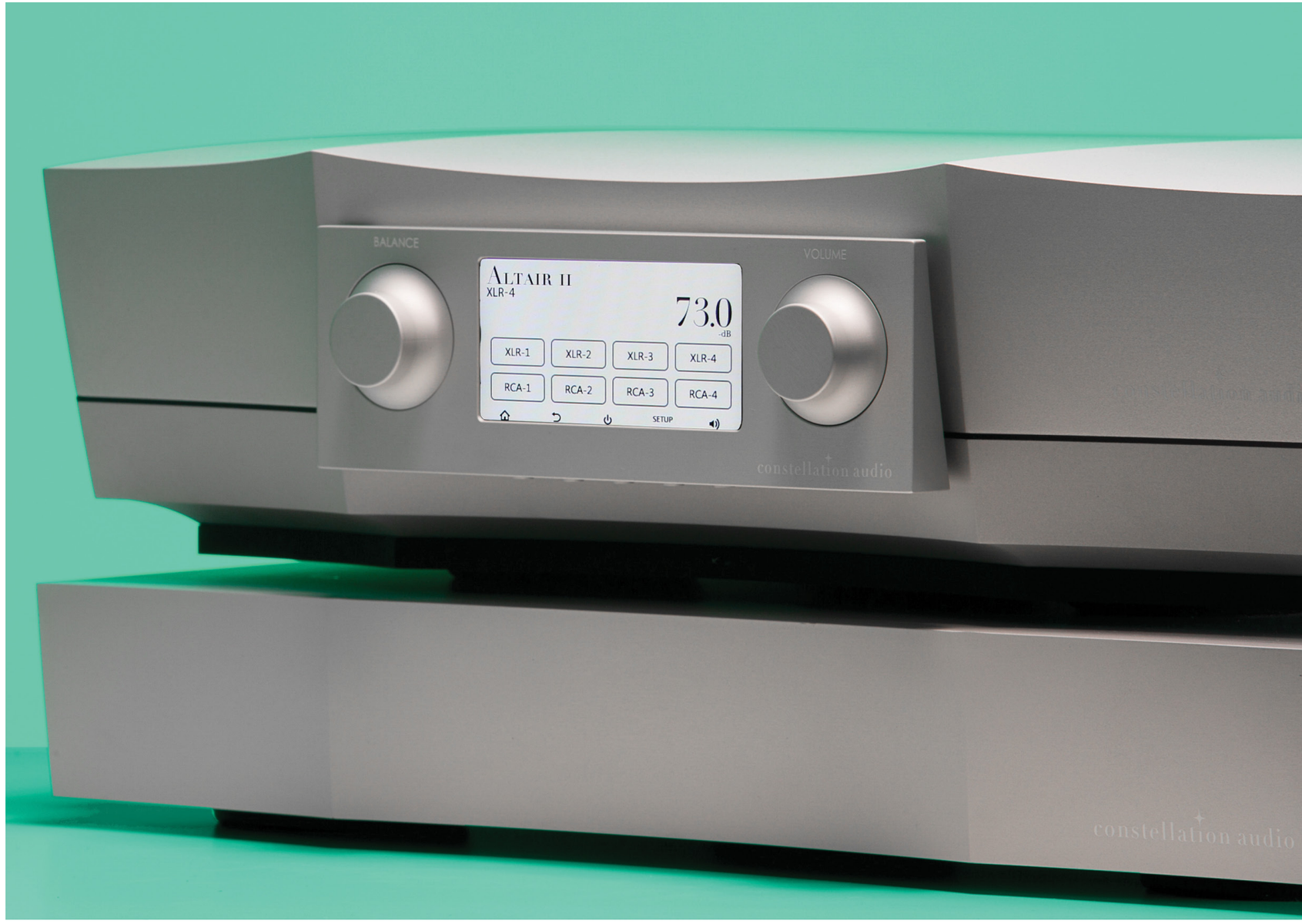
The Altair II and Hercules II's overall character is one of lightness, illumination, clarity, and transparency. Many years ago, before I worked in the industry, I read in *The Absolute Sound* a description of a component as having a "deep chocolate midrange." I thought it humorous at the time, but the phrase comes to mind here because the Altair II and Hercules II do *not* have a "deep chocolate midrange." Rather, they have a lighter, fresher, and more radiant quality that is at the other end of the spectrum from "deep chocolate." The Constellation pair is harmonically rich and dense, but not in a way that dilutes realism by rendering textures as slightly darker than life. In fact, their reproduction of instrumental timbre has a kind of effervescence that is simply sensational. Listening to ensembles with woodwinds and brass, I can hear each instrument's individual timbre with vivid clarity, and the combinations of those instruments' tone colors take on a new

Constellation Audio Altair II and Hercules II

sense of organic wholeness.

My only reservation about the original Hercules was a slight lack of weight and authority in the bottom end. Constellation has addressed this issue with the Hercules II, tripling the power-supply filter capacitance and adding additional power-supply regulation in the amplifier's front end. (These techniques have now been implemented throughout the Constellation line.) I'm pleased to report that the Hercules II's bass now has much more weight, power, and dynamic authority. The improved low end gives the music a more solid tonal and rhythmic foundation. The sense of lightness and illumination described above is still a hallmark of the design, but in the new amplifier that character is supported by richer and fuller bottom octaves.

I mentioned this in my original review, but it bears further discussion here. The Hercules II doesn't sound like an 1100W amplifier. It's not that it doesn't sound powerful or has trouble driving loudspeakers. The Hercules II is a powerhouse, reproducing the most demanding bass dynamics with completely effortless grace and authority. When I say that the Hercules II doesn't sound like an 1100W amplifier, I mean that as a compliment. Many high-power "dreadnought" amplifiers can sound hard and artificial, a character perhaps introduced because the transistors in the output stage all exhibit slightly different operating characteristics. The more transistors in the output stage, the greater the potential for the individual transistors not to work together in unison. There are many examples of an amplifier line in which the amplifiers are



Constellation Audio Altair II and Hercules II

identical to each other except for the number of output transistors (along with the size of the power supply and heatsinks). The lower-powered amplifiers always sound better, the most famous example being the Adcom GFA-535 (60Wpc), GFA-545 (100Wpc), and GFA-555 (200Wpc). Cognoscenti knew that the GFA-535 was the sweetest-sounding of the line. Despite an output stage of 64 MOSFETs, the Hercules II is capable of the delicacy and finesse of a low-powered unit, yet can deliver seemingly unrestricted dynamics with grace and ease.

Finally, I should note that the Hercules II takes a very long time to sound its best. The treble purity and resolution are apparent within half an hour or so, but after about four hours the amplifier really opens up, with a greater sense of space and an overall increase in ease and relaxation.

Conclusion

The Constellation Audio Altair linestage and Hercules monoblock amplifiers in their updated version maintain their status as world-class references. They are a convergence of beautiful design and build-quality, practically unlimited power delivery, and, most importantly, state-of-the-art sound. Yes, these electronics are priced in the stratosphere—better than a quarter of a million dollars. That number is breathtaking, but then again so is the performance. If there are electronics that are more resolving and transparent, or that have a cleaner and more filigreed treble, I haven't heard them.

I concluded my review of the original Altair and Hercules by writing that these electronics have "established a benchmark against which all other linestages and power amplifiers can be compared." Nearly five years and one update later, along with extensive experience with reference-grade associated equipment under my belt, that conclusion still holds true.

Inside Cost-No-Object Design and Execution

As I reported in my original review in Issue 215, the Altair's chassis is made from a two-piece clamshell structure, with each block machined from solid aluminum billet. Within this 60-pound framework is a shielded sub-enclosure that hangs inside the main chassis on an elastomeric suspension. The sub-enclosure is made from two non-magnetic steel plates laminated with a polymer sheet between them. This sub-enclosure is then divided into two more sub-sub-enclosures, with the top half containing the audio signal electronics and the bottom half housing power-supply regulation. This entire "raft" structure "floats" within the massive 8.2mm-thick outer chassis. In addition, the mass-loaded, vault-like, solid-aluminum outer chassis is airtight. The anti-resonance engineering of this system was designed in conjunction with Michael Latvis of Harmonic Resolution Systems, maker of state-of-the-art equipment racks and vibration-control products. HRS feet are also featured underneath the Altair's chassis.

The audio circuit is fully balanced and built from FETs that are hand-selected for low noise and matched gain. When Constellation found this FET they bought out the manufacturer's entire stock and the manufacturer discontinued the device.

The outboard power supply features three separate R-core transformers, one each for left channel audio, right channel audio, and control circuitry. Three umbilical cords connect the power supply to the linestage. The power supply's output is unregulated; all regulation occurs next to the audio circuits. The Altair features cascaded discrete regulation, with the regulated voltages supplying the audio circuits through solid-copper bus bars. ("Cascaded" means that the output of one regulator feeds another regulator for even greater isolation of the DC supply from the AC source. "Discrete" means that the regulators are built from separate transistors rather than integrated circuits.) The result of this heroic power-supply design and execution is DC so pure than any noise is down more than 140dB, the limits of the Audio Precision analyzer. (Constellation shared with me the noise plots.)

All of these techniques, from the massive aluminum chassis with sub-enclosures, the floating raft, and the extensive power supply design are all designed to isolate the audio circuitry from vibration and noise.

Hercules Power Amplifier

Just as the Altair incorporates innovative, cost-no-object design and execution, so does the Hercules power amplifier. For starters, when driving the Hercules through the Constellation Direct input, the power amplifier's input buffer is bypassed. (Removing this active stage can be done because the Altair outputs a signal that doesn't need buffering.) A second XLR input is available for driving the Hercules with another brand of preamplifier. This input adds an input buffer, which is based on the same topology as the Altair's gain module. Selecting between these inputs is done via a rear-panel control. This system removes an entire active gain stage from the signal path compared with a conventional preamplifier and power amplifier system.

The Hercules' output stage is highly unusual. Virtually all push-pull output stages employ complementary pairs of P-channel and N-channel transistors that work together. These designations refer to the transistors' polarity. The P-channel transistor amplifies the positive-going half of the waveform, and the N-channel amplifies the waveform's negative-going half. Unfortunately, P-channel and N-channel transistors exhibit different operational characteristics, specifically the amount of time they take to turn on and to turn off. This disparity results in a waveform discontinuity at the zero-crossing point. Single-ended amplifiers sound so good in part because one device (tube or transistor) amplifies the entire waveform, and thus cannot exhibit zero-crossing distortion.

Constellation has attempted to merge the purity of a single-ended output stage with the high power of a Class AB gain stage. The output stage is built entirely of N-channel MOSFETs, and split into two completely separate amplifiers per monoblock. One amplifier is fed the positive phase of the balanced signal, and the other amplifier receives the negative phase. The two amplifiers in each monoblock "float" (are not referenced to ground) and are connected to each other by the loudspeaker load. This configuration is identical to using two separate amplifiers in bridged mode.

Constellation Audio Altair II and Hercules II

It's well known that low-power models within an amplifier manufacturer's line often sound sweeter and more refined than their more powerful efforts. Constellation wanted to build an amplifier with massive power that exhibited the delicacy of low-powered designs. It therefore started by developing the best-sounding 125W amplifier it could, and once satisfied with the results, grouped many of these 125W single-ended modules together to achieve the Hercules' 1100W rating. The design is reportedly scalable with no change in sound quality. In fact, the Centaur amplifier, rated at 250Wpc, uses two of these modules per channel rather than the Hercules' eight. Each module is based on eight output transistors, giving the Hercules a mind-blowing 64 MOSFET output transistors per monoblock. Unlike most power amplifiers Hercules requires no stabilizing inductor on the output; the output transistors are connected directly to the speaker binding posts via solid-copper bus bars.

As you might imagine, this gargantuan output stage requires a big power supply and lots of heat sinking. The power supply features dual 3kW transformers with multiple secondary windings. Each transformer supplies one "side" of the output stage. These transformers account for much of the Hercules' 270-pound heft. The heat sinking is readily apparent just by glancing at the Hercules' side panels, which are perforated with hundreds of ventilation holes.

The level of design and execution in the Altair and Hercules is unprecedented, in my experience. The truly cost-no-object realization provides an interesting insight into how the world's best audio designers apply ingenious solutions to advance the audio art. tas

VAC Statement Electronics

The Bloom on the Rose

Jonathan Valin

Used to be that if electronics stood in a police lineup, the solid-state stuff would be the shifty-eyed speed freak with the finger-in-the-socket hairdo, and the tube gear would be the Caspar-Gutman-looking fat guy with the gold watch fob stretched across the pinstripes of his bulging vest.

My, how times—and the usual suspects—have changed.

I'm not alone in thinking that semiconductors and conductors (as William Zane Johnson once famously denominated tube circuits) have come to sound a lot more alike. The received wisdom that solid-state has the sole patent on neutrality, bandwidth, low noise, instrumental attack, overall resolution, midbass slam, and bottom-octave grip, while tubes own the exclusive rights to air, three-dimensional body and bloom, soundstage width, depth, and height, steady-state tone and decay, and low-level dynamics, textures, and timbres, is less demonstrably the case than it once was. Which is not to say that the old ways of thinking about silicon and glass audio have been utterly invalidated. It's the "sole" and "exclusive" parts of each circuit's traditional claim to sonic distinction that are no longer quite as indisputable.

Which brings me to the subject of this review: Kevin Hayes' remarkable VAC Statement electronics.

To describe all the technology that has gone into making these superbly engineered, handcrafted, ultra-expensive tube components would take pages. So, before delving into a few technical highlights, let's just say (in Kevin's

EQUIPMENT REVIEW - VAC Statement Electronics

SPECS & PRICING

Statement Line
Tubes: Two 8416, 7308, 6922, E88CC, ECC88, 6DJ8 (or 12DJ8 twin triodes)
Gain: 11dB
Inputs: Two RCA; three balanced/RCA selectable; /RCA cinema-bypass
Outputs: Two RCA; two XLR (EIA "pin 2 hot" studio standard)
Frequency response: 4Hz–250kHz –3dB
THD: < 0.007% @1kHz/1V RMS
Maximum input: Infinite signal (attenuation precedes the gain circuitry)
Maximum output: > 8V RMS
Output impedance: < 150 ohms, 20Hz –20kHz, static (i.e., not dependent upon feedback)
Recommended output load: > 300 ohms
Absolute phase: Correct from all inputs to all outputs
Power: External power supply, detachable umbilical cables
Dimensions: Audio chassis (not including knobs and connectors), 17.7" x 7" x 16.15"; power supply (not including connectors), 17.7" x 5.8" x 16.15"
Weight: Linestage chassis, 56 lbs.; power supply, 64 lbs.
Price: $75,000

Statement Phono
Tubes: Six 12AX7, two E88CC/6922, ECC88/6DJ8, or 7308
Gain: 52dB moving magnet (low gain); 70dB moving coil (medium gain); 76dB moving coil (high gain)—up to 6dB greater gain available on special order
Frequency response: RIAA standard +/- 0.2dB (20Hz–20kHz)
Bandwidth: 10Hz–80 kHz -3 dB
Channel separation: >84dB @1kHz
Maximum input: >130mV @1kHz, moving magnet; >500mV @10kHz, >16mV @1kHz, moving coil (medium gain); >8mV @1kHz, moving coil (high gain)
Load impedance: Moving magnet, 47k ohms; moving coil (medium gain), selectable 400, 300, 200, 150, 100, or 50 ohms; moving coil (high gain), selectable 100, 75, 50, 38, 25, or 13 ohms
Load capacitance: 1, 100, 120, 150, 180, or 220pf
Residual noise: Less than 3mV at output (SNR >74dB)
Absolute phase: Does not invert absolute phase
Maximum output: >8V RMS
Output impedance: < 150 ohms, 20Hz–20kHz, static (i.e., not dependent upon feedback)
Recommended output load: >300 ohms
Power: External power supply, dual detachable umbilical cable (dual mono design), detachable IEC power cord
Dimensions: Audio chassis (not including knobs and connectors), 17.7" x 7" x 16.15"; power supply (not including connectors), 17.7" x 5.8" x 16.15"
Weight: Phonostage chassis, 56 lbs.; power supply, 64 lbs.
Price: $80,000

Statement 450 iQ
Tubes: Eight KT88; six 6SN7
Wattage: 450
Gain: 39dB, single-ended; 33dB, balanced
Frequency response: 4Hz to 75kHz
Power bandwidth: 20Hz to 70kHz
Inputs: Single-ended via RCA jack, non-inverting; balanced via XLR jack, non-inverting
Outputs: Connections to precisely match loudspeaker loads of 2, 4, and 8 ohms
Residual noise: Typically, 700 microvolts at the speaker terminals
Dimensions: Audio chassis (not including knobs and connectors), 17.8" x 9.75" x 18.25"; power supply (not including connectors), 17.8" x 5.5" x 18.25"
Weight: Audio chassis, 130 lbs.; power supply, 85 lbs.
Price: $120,000

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1911 North East Ave.
Sarasota, FL 34234
(941) 952-9695
vac-amps.com

JV'S REFERENCE SYSTEM
Loudspeakers: Magico M Project, Raidho D-5.1, 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: Soulution 725, CH Precision L1, Audio Research Reference 10, Siltech SAGA System C1, VAC Statement
Phonostage preamps: Audio Consulting Silver Rock Toroidal, Soulution 755, VAC Statement Phono, Constellation Audio Perseus, Audio Research Reference Phono, Innovative Cohesion Engineering Raptor
Power amplifiers: Soulution 711, CH Precision M1, VAC 450iQ, Siltech SAGA System V1/P1, Odyssey Audio Stratos
Analog sources: Acoustic Signature Invictus/T-9000, Walker Audio Proscenium Black Diamond Mk V, TW Acustic 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
Cables and interconnects: 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 H2a 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

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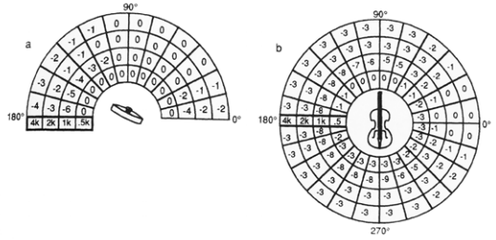
own words) that the Valve Amplification Company's Statement gear is Hayes' answer to the question of what "audio instruments [would] be like if there were no constraints with respect to expense, time, or difficulty of manufacture."

Though each component in the Statement line—the $75,000 line preamplifier, the $80,000 phono preamplifier, and the $120,000 450 iQ monoblock amplifiers (for those of you not keeping a box score, that's more than a quarter of a million dollars total)—has unique attributes, each shares certain key design features.

The first of these is what VAC calls "architectural layout," by which Hayes means the "passive control of radiated fields" through painstaking three-dimensional circuit design and orientation. The second is resonance management—the elimination of microphonics via the bonding of audio circuits to brass subassemblies isolated from the chassis, and the use of massive outboard power supplies supported on stainless-steel cup-and-ball tripods. The third is chassis construction. All of the Statement chassis are machined from high-grade, nonferrous aluminum, plated with AlCuNiCr to ensure superior RF rejection. The fourth is parts selection, which in the Statement line includes "naked" z-foil resistors, both film-and-foil and wax-and-foil capacitors, and VAC's unique 750kHz-bandwidth transformers. The fifth is extensive shielding to minimize the effect of stray fields. The sixth is handwiring, with all conductors carefully routed and all connection junctions supported by pricey silver turrets. And the seventh is world-class power supplies. All Statement products use massive external or dual-mono supplies with large transformers "floated in a special gel to ensure low mechanical noise and vibration." (VAC also employs proprietary techniques in its bridge rectifiers to preserve the low noise and musicality typical of vacuum-tube rectification, but with the speed of silicon rectifiers.)

The way in which each of these concepts has been implemented in practice is staggeringly complex and costly. The Statement line preamp, for example, uses an AlCuNiCr chassis to house its boards, with separate AlCuNiCr subhousings shielding each of its six transformers. The handwired and routed (via machined non-



metallic guides) audio circuits are bonded to massive brass loading-plates floating within the chassis, while the zero-negative-feedback gain stages use input and output transformers to eliminate ground loops and unwanted stray interactions between source components and amplifiers. The line preamp's volume control is a one-pound multisection potentiometer, two inches long and two inches in diameter, with machined brass shielding between the sections and surrounding the whole. (VAC claims that this very expensive part is critical to obtaining the highest fidelity.)

In addition to employing the same chassis, circuit, isolation, and wiring techniques found in the line preamp, the Statement phono preamp uses "naked" metal-foil resistors (as well as other finest-grade parts) in its Class A audio stages, implements RIAA equalization without negative feedback, and employs a wide range of magnetic-core materials, including different winding structures, silver and copper magnet wires, and mu-metal and amorphous cobalt cores to achieve ideal power delivery for phonostage preamplification.

The 450-watt Statement 450 iQ monoblock power amplifier—in some ways the technological *pièce de résistance* of Hayes' bravura effort to reproduce the absolute sound—uses VAC's patented iQ biasing system. The fruit of eighteen years of research, the iQ system, according to VAC, "represents the first time in history that each tube in the output stage of a vacuum tube amplifier can be held *precisely* at the optimal bias point at all times, regardless of how loudly or softly the music is playing." Why is this stability so important? Because bias current—what engineers call "Iq," with "I" standing for current and "q" for quiescent—determines the operating mode (Class A, AB, or B) of a given output stage, and fluctuations of as little as 1 milliampere in power-tube Iq are audible because they alter the precise load-line match between the tubes and the speaker, affect the DC-balance conditions in the output transformers, and increase crossover distortion. (Maintaining stable bias current to output devices isn't just a problem in tube amplifiers. Fluctuations in bias are one of the chief sources of distortion in solid-state amplifiers too.) VAC's iQ system is said to maintain bias-current variation at less than one percent, greatly reducing distortion, while also promoting longer tube life and increasing amplifier reliability.

Virtually everything that Hayes has done is intended to lower his tube circuits' generation of and susceptibility to noise—historically, perhaps glass audio's foremost weaknesses. And VAC's Statement products are, indeed, exceptionally quiet. Even on a first listen I heard none of the faint ground-loop hum, tube rush, or RF that I'm used to hearing with glass-bottle components, especially on phono sources.

At first, I figured that this low noise floor was owed to the use of input and output transformers in the preamplifiers—only I didn't hear the usual problems with I/O transformers, which, though they help isolate circuits from RFI, EMI, and ground loops, have also (at least in the past) tended to limit bandwidth, soften transients, and blanket detail. That is definitely not the case here. All you have to do is put on something supremely busy like Buena Vista Social Club's *Lost and Found*, with its ear-boggling plethora of toms, bongos, congas, maracas, guiros, cowbells, tres, laúds, trumpets, and guitars, to hear that the Statement products aren't softening transient attacks or reducing detail. Indeed, short of the standard-setting Technical Brain TB-Zero Series electronics or the CH Precision L1/M1 fed by an Audio Consulting Silver Rock phonostage—and, in truth, not much short of either—this tube trio is easily as high in speed and resolution as any solid-state units I've tested, and considerably higher than any other

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tube electronics I've auditioned.

So, strike low noise, transient speed, and overall resolution from the "solely solid-state" list of virtues. And while you're at it, strike "neutrality," too.

The VAC Statements have an overall tonal balance that comes as close to colorlessly neutral as the best solid-state gear (and far closer than virtually all other tube electronics I've reviewed). Here you will find none of the harmonic darkness of CAT, Jadis, VTL, or the World of McIntosh, for examples. Nor any of that "background blackness" (or airlessness) that some people confuse with a very low noise floor.

By the way, the fact that the VAC comes close to colorlessly neutral isn't a left-handed way of saying that it sounds lean, bright, or analytical (though it does veer very slighly to the "top-down" side in balance). What it sounds like, in plain fact, is an open window on the real thing. Just listen to the chiming fourths of Barbarito Torres' twelve-string laúd on the Buena Vista Social Club album previously mentioned, or the intricate Bartókian mix of skittishness, fierce insistence, and melancholy of the Janaki String Trio's violin, viola, and cello in the Penderecki Trio, or Dean Martin's honeyed baritone glissandos and tremolos on *Dream with Dean*, and be amazed at how close hi-fi electronics can come to the timbre of the real thing. Indeed, with acoustic instruments that play primarily from the lower midrange through the top treble the VAC Statement gear doesn't just sound real in timbre; it sounds uncannily real in all regards.

Over the years, I've done a lot of thinking and writing about what makes a hi-fi reproduction come this close to creating the impression that you're hearing an actual singer, violinist, guitarist, or pianist in your listening room. Resolution of fine detail is certainly a very large part of it, and as noted the VAC trio is every bit as good at resolving textures, timbres, and low-level dynamics as much of its solid-state competition. But it's the more fully lifelike way this detail is presented that makes the VAC gear (and certain other tube components) such standouts on unamplified acoustic instruments.

To explain what I mean by VAC's more lifelike presentation, take a look at the two directivity charts below, taken from the late John Eargle's indispensable book *Music, Sound, and Technology* [Springer]. The first shows a violin's vertical directivity in four octaves ranging from 500Hz to 4kHz, and the second shows its horizontal directivity in the same octaves. What you should take away from these charts is this: a) at 500Hz (approximately B4) a violin projects as much energy behind and around it (and in a horizontal plane more energy to the top of it, where the scroll and peg box are) as it does towards you, the listener (it is this spherical dispersion of energy that gives the violin fuller timbre and more "body" when it plays in the heart of the midrange); and b) as fundamentals and harmonics get higher in pitch, more energy is projected directly toward you than to the rear and sides of the instrument, making timbre brighten, focus tighten, and presence increase, though also note that a considerable amount of sound is still being directed into the air of the performance space around the instrument.

None of this is likely to come as news to you, but reiterating it makes an important point about the presentation of instruments in life and on stereo systems. In a recital or a concert hall, this vertical and horizontal dispersion of sound, what I call "action" or dynamic/harmonic bloom, creates a kind of nimbus—a loosely defined sphere of energy, some vectors of which are directed toward you like an increasingly sharply focused beam and some of which illuminate the surrounding air of the hall, like light shed from a bulb. In life, voices and instruments always "image" in three dimensions, and that imaging changes with pitch and intensity.

And here's where the old saws about solid-state and tubes still hold sway. Save for a few rare exceptions (the Soulution 7 Series gear being foremost in my experience), solid-state still does a relatively poor job of imaging in 3-D. Instruments are, more often than not, presented as relatively flat, sharply edged, disc-like objects rather than more loosely defined, three-dimensional ones. This is generally not the case with tubes—and it is particularly not the case with the VAC Statement components.

Here (in so far as microphones allow it) you get closer-to-lifelike sonic imaging. Voices and instruments are slightly less sharply defined (though never oversized or amorphous), and their sound is projected toward you with greater power and presence as pitches and intensities change. Moreover, because the VAC Statement electronics and tube electronics in general still reproduce the duration of timbre and decay more fully (score another one for the glass paradigm), the way instruments light up the venue around them is also reproduced more fully.

It used to be that tubes were all about this richer, more three-dimensional projection of tone, but were much less adept at reproducing the transient details so crucial to determining how, where, and when instruments are being played. In other words, it used to be that transistors were much faster and higher in resolution than glass bottles. As I've already noted, this is not the case with the VAC gear, which, from the lower midrange to the top treble, comes damn near to sounding as fast, clear, and colorlessly neutral as the fastest, highest resolution, least colored solid-state.

So, to return to where I started before I took this ramble, what makes the VAC's handling of detail different is that—between its transistor-like transient speed, clarity, and colorlessness and its tube-like development of tone, decay, and 3-D bloom—it comes closer to reproducing the entire dynamic/harmonic package as it sounds in life. The result is a substantially more realistic presentation.

BTW, one of the side benefits of the VAC's more natural imaging is the way it affects soundstaging. Because instruments seem to bloom towards you *and* away from you in all directions, they seem more "rooted" in the ambient space of the hall, as they, in fact, are in life. Rather that presenting transients, timbres, and decays as discrete events that take place at separate times in separate places within the soundstage—like a series of rapid-fire stills taken by a motorized camera—as solid-state tends to do, the VAC gear makes transients, timbre, and decays sound more like an unfolding

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sequence of interconnected events—like ripples in a pond. Indeed, depending on the recording, the VAC gear can capture the way instruments participate in *creating* the sound of the hall—a very lifelike effect.

Now you may have noticed that I haven't yet talked about the VAC Statement's bass, although the fact that I've qualified its superbly realistic sound by repeatedly talking about how it handles unamplified acoustic instruments from the lower midrange to the treble should be a clue that the apple cart is about to be upset. Or at least jogged.

Having grown accustomed to the Soulution 7 Series bass, than which nothing I've heard is superior, I find the VAC Statement bottom octaves to be a bit of a mixed bag. The funny thing is that this is not because of the usual tube-amp sluggishness and overripeness (particularly in the mid-to-upper bass). On the contrary, VAC Statement bass is at least as quick, detailed, and well defined, and nearly as deep-reaching, as transistor bass. In fact, minus some energy in the 60–100Hz range and from 30Hz down, the VAC trio is highly reminiscent of CH Precision low end. What the Statement gear doesn't supply—and you can hear this on any rock record with a spotlighted kickdrum and Fender Precision (which, now that I think of it, is just about every rock record)—is the horripilating slam of something like the Soulution 7 components. The VAC gear may, in short, be a little too lean and laid-back for fans of rock 'n' roll.

Having said this, let me quickly add that on classical music or acoustic music of any kind (including jazz and pop), the VAC Statement's way with the bottom octaves will be anything but a liability. As it does in the midrange and treble, it combines transistor-like speed, detail, and neutrality with tube-like tone and bloom, making cello, doublebass, piano, low-pitched brass and winds, and percussion simply sound that much more "there"—and, let me also add, more freed-up from the loudspeaker's drivers and enclosure. (One of the remarkable side benefits of the VAC's combination of speed and bloom is to "disappear" the speakers better than just about any electronics, tube or solid-state, I've had in my system.)

For absolute sound listeners, the VAC Statement electronics are a no-brainer highest-of-the-high recommendation. Indeed, for any kind of listener who longs to hear acoustic instruments sound more like the real things, this very-pricey-but-worth-it trio of electronics will be hard to beat. It is my current reference for acoustic music—indeed, the most lifelike tube gear I've yet heard with classical, jazz, or pop. For those of you who are primarily looking for thrills and chills in the bottom octaves, there are other options, although I'd still give the VAC Statement trio an audition, as its incredibly lifelike way with voices, guitars, winds, brass, and upper-octave percussion may counterbalance any perceived losses in "slam."

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EQUIPMENT REVIEW - VAC Statement Electronics

JV Talks Tubes (and Solid-State) with Kevin Hayes

From the start, your circuits have been tube-based, including input stages and power-supply regulation. Why do you choose to go all-tube rather than semiconductor? In general, what do you think are the key sonic advantages of glass-bottle electronics? And what do you think are their weaknesses?

From very early in my life I recognized a systematic difference in the sound character between amplifiers based on solid-state devices and those based on vacuum tubes, and strongly preferred the traits that the vacuum-tube-based equipped tended to preserve in the music—nuances, the sense of space. The music was just more alive, the recordings more distinct from each other. So, it was only natural that when I wanted to build something special for myself that I would try vacuum tubes.

The solid-state designer has a task a bit like an expert tailor who must make an elegant suit from more flawed cloth. Not only are solid-state devices less linear than tubes; they also have greater stray capacitance. To make matters worse, the dielectric characteristics of this capacitance are far worse than those in a vacuum tube, akin to the difference between ceramic and vacuum (the finest dielectric known) capacitors. Further, with a bipolar transistor the capacitance changes with signal level. There are many things wrong with solid-state design, ranging from the myth of truly complementary devices to the unavoidable fact that more components in the circuit yields more sonic thumbprints altering the sound. Generally speaking, a simple circuit that can actually get the job done right sounds better than a more complicated circuit.

From an engineering perspective, the fact that vacuum tubes are far more linear than transistors means each device distorts the signal less. This allows simpler signal pathways with fewer components than are typically found in solid-state amplifiers. Solid-state amplifiers generally resort to much more complicated topologies, as they play the non-linear characteristics of one transistor against another's in attempt to get an overall linear result. And then, of course, almost universally a large amount of negative feedback is applied to further improve the measurements, although many companies call it by some other name to sweep it under the marketing rug.

With the multiplicity of active devices and the application of feedback loops comes higher orders of distortion products, and the ear is acutely sensitive to higher-order distortions (particularly odd-orders), as these are not musically consonant. It's one of the ironies of engineering that the application of feedback can reduce the amount of THD, yet increase audible artifacts.

Large amounts of negative feedback yield the high damping factor figures that many people assume are favorable, but the reality is far different. Every loudspeaker produces a "back EMF," which is a voltage generated by speaker ring and overhang. This voltage enters the amplifier via feedback loops that sample the amplifier output, and the amplifier acts to resist it. The problem is that the back EMF seen here bears little relation to the speaker's output. There are several points of divergence. First, the motion of the voice coil (which generates the voltage) may differ from the acoustic output due to cone break-up and room loading. Second, the voice coil is highly inductive, which causes a phase shift in the generated voltage. Next, in most cases, the back EMF travels through a crossover network, which greatly alters the signal, and then adds to it the erroneous back EMF from other drivers. It's just a mess, and the simple, low-order misbehaviors of each driver become complex composite misbehaviors, which are more audible.

Time and time again in experiments we observe that the more feedback one employs, the more the sound is bleached of its tonal colors, recessed in soundstage, picking up an artificial texture, and more homogenized in presentation from recording to recording. Bass picks up a false emphasis of the transient, while the tone and natural decay of the instrument are reduced. And since feedback is the only practical way to achieve a high damping factor, it ironically suggests that a lower damping factor tends to yield better subjective speaker control.

Ironically, the drawbacks of a high-feedback amplifier can on occasion lend an artificial clarity to some poorly recorded material, most particularly of loud, complex electronic events. Drying out reverb trails, artificially sharpening transients, and increasing the percussiveness of bass notes (artificial slam) can help enhance a messy recording, but this is not fidelity—and such amplifier characteristics ultimately will be revealed as diminishing the tone and texture of reasonably good recordings. A few years back we were part of a shootout as judged by a rock group and their producer, and they unequivocally stated the VAC sound was the most like what they heard in the studio. In fact, they labeled the big, high-end solid-state gear as having an "old-timey hi-fi" sound. Just ask those who make the music!

Solid-state designers also face a major problem in terms of obsolescence. It is not uncommon for a given transistor to have a production life from a few months to a few years. Many engineers have told me that they are continually having to redesign because key parts are quickly obsoleted. And what happens in ten or twenty years when the part must be replaced? Contrast that with the vacuum-tube world, where all of our key devices have been in continuous production for sixty to eighty years!

From a sonic perspective, I do not consider vacuum tubes, as employed at VAC, to have weaknesses. It is true that, just like the tires on your car, they wear and must be replaced every few years. Then again, transistors also can wear and fail, in some cases over a period of twenty years or so, and sometimes (as noted) cannot be replaced, so there is a bit of a silver lining in the tube's situation. Vacuum-tube power amplifiers generally use output transformers, which add weight and cost, but the effortless, musical result justifies the expense. And, again, there is a silver lining in that the output transformer

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allows us to match the output stage to the loudspeaker load, somewhat akin to a tennis player aligning the ball on the racket's sweet spot for a lovely launch.

VAC has been in business since 1990, when you and your dad introduced the PA45 and PA90 tube power amplifiers. From that starting point, what has most changed over the years in your approach to the design and manufacture of amplifiers and preamplifiers, and what has stayed fundamentally the same?

We were blessed to have gotten many things right in our initial attempt, quite surprisingly so—design techniques, and parts selection. One particular key part has never yet been bettered in its application from our initial work in 1987 until today!

That being said, many things have evolved in our understanding and practice. Generally, improvements occur in three areas: circuit topologies, the characteristics of available parts/materials, and implementation (layout, etc.).

One example would be film capacitors. Many variations have been made over the past 26 years, and some are an improvement on the older parts in use as, say, circuit-coupling elements. We are always checking new versions, and occasionally adopt one; I say "occasionally" because most of the time the newest boutique part is not an improvement, at least in the context of our products. A few times each year we receive one of our amplifiers back from a customer who paid a guru several thousand dollars to "upgrade" it, with the plea to put it back the way it was! This usually involves removing a flock of $100 boutique capacitors and jacks.

We are always challenging our theories, understandings, favorite techniques, and current parts selections in annual R&D projects, which intentionally work with circuits, materials, and parts that we don't currently use. We'll spend a number of months experimenting to see if there is something good there which we have overlooked (and, incidentally, this sometimes involves solid-state devices). A theory is a very simple abstraction of a very complicated world. In my experience, many engineers mistake their theories and models for reality. We make sure to let reality tell us about our theories, not the other way 'round! Several times over the years a major improvement in our products has come from this process.

There certainly have been changes in circuit topology, changes in grounding technique, refinement in the selection of wire types, improvements in capacitors, jacks, and resistors, and unexpected developments related to the sonic effects of mechanical design, just to name a few things.

What has remained fundamentally the same is the basic credo that our equipment must measure reasonably well and sound superb. To that end, there is a rigorous quality-assurance program that spans from design, to parts selection and ordering, to incoming inspection, to bench tests, to a final audition by me, personally. Nothing, whether new production, repair, or upgrade, leaves our factory until it sounds correct. It amazes me the range of things which can easily be heard, but cannot readily be measured!

How would you answer proponents of solid-state electronics who claim that their lower coloration, wider bandwidth, better bass slam and grip, higher current delivery into (and lower interaction with) variable loads, and greater reliability make them superior to tube electronics?

I've touched upon much of this in my foregoing comments, but I will reiterate that the very techniques which lead to the claim of less interaction actually create subtle interactions that yield greater offense to the ear. For example, greater bass slam does not necessarily mean greater faithfulness to the sound of the actual bass that was recorded; indeed, many solid-state amplifiers make a doublebass sound more like an electric bass due to the factors already noted.

By the way, the bandwidth of the Statement 450 monoblocks is approximately 4Hz to 80kHz, which is hardly narrow!

Over the years, audiophiles have sometimes used phrases like lower "coloration" or greater "transparency" to describe what is actually a reduction in the intrinsic character of the music, a bleaching of body and vitality. Without question I find that a good tube circuit, as employed at VAC, tends to present more of what is actually on the recording, and provides a greater sense of character and variation in sound from cut to cut and album to album (or CD).

It's not difficult for us to make a tube amplifier sound like a solid-state amplifier (for example, by applying much more negative feedback), but our goal is to sound more like music. We want to preserve and present the sense of body and space, three-dimensionality of soundstage, tonal colors, organic ease and liquidity, projection, resonance, jump, and emotion—these are the hallmarks of a real musical presence. Certainly the hi-fi attributes (speed, transparency, extension, etc.) are present, but in a manner that is wholly subservient to the intent of music. A voice is not a pinpoint in space against a black background; it is flesh and bones, located in a room or hall that fills in all the space around it with life.

When someone first hears music through a VAC, I hope that they will first focus on the performance, instruments, etc., and only later reflect on the qualities of the electronics that brought it all back to life. It's about the music, not the technology!

As to reliability, I first encountered this question from a journalist during our first year in business. A given reviewer had lost a tube in a competitor's amplifier. He had a new tube and was up and running the next day, but he devoted over a page to a discussion of reliability. In that same magazine issue, there was a review of a well-known solid-state amplifier. That amp had failed during the first week of test, filled the room with smoke, and spent several weeks at the manufacturer for repair—and all of that rated only two sentences. I think the predisposition to think of tube amplifiers as having a reliability issue far exceeds the reality.

Of course, some brands or models may have design flaws, but this should not color the results obtainable with good design practices. After reading the difference in the way the journalists above handled the two failures, I sat down and listed every solid-state component I had ever owned, and every tube component I had ever owned. By a small margin I had experienced more problems with the solid-state gear.

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And, as a side note, have a peek at eBay. There are legions of fifty- and sixty-year-old tube amps for sale and going strong. Do you see much in the way of old solid-state gear? Of course not, and many service techs will tell you that even solid-state amplifiers of less than 30 years in age are highly likely to fail and will not likely be repairable as originally designed. I can only think of one brand of solid-state amps that are still frequently repaired and traded after forty years, and they are on their second, third, or fourth adaptation of their output stage due to several cycles of transistor obsolescence. And even with this brand, there are some models that simply cannot be repaired.

To a large extent, tube electronics seem to live and die by the quality of their transformers. Can you discuss what is different about your trans, in construction and implementation? I know, for instance, that you use a series of smaller transformers in your 450 iQ amplifier (one for each pair of output tubes). What does this configuration buy you sonically that a single large transformer doesn't? And, on a related topic, you use input and output transformers in your preamps (phono and line). Why? What does this add that cannot be had via a triode-tube or JFET input—and how have you avoided the bandwidth and dynamic limitations that used to be part and parcel of transformer inputs, particularly in your phonostage?

It's interesting that many assume a transformer has greater limitations than other approaches. An active device (tube or transistor) also has non-linearities and, unlike a transformer, contributes random noise. Our earliest phono circuits used triodes for "head-amp" gain, and many experiments were conducted with solid-state and hybrid first stages. We found (and find) a good transformer to be the best overall approach.

Like everything in life, it's not just what you do, but exactly how you do it. There are plenty of poorly designed and executed transformers out there. There are good transformers applied badly. And there are superb transformers applied artfully.

Without going into excess detail of proprietary matters, each Statement 450 monoblock has four output transformers, interconnected in an appropriate manner, weighing a total of sixty pounds. Each transformer has performance characteristics between two and three times better that the ones you would find on tube gear from the "golden era." The use of multiple smaller units rather than a single large unit is something akin to parallel high-speed processing, using faster, smaller, more lithe elements.

In the case of the linestage, the use of transformer coupling on the input and output allow the preamp to break ground loops between the source and the power amplifier. The absence of negative feedback in the active circuit between the transformers allows the preamp to buffer the source from interactions with the power amplifier's feedback loop. We've surprised many dealers who find more nuance and detail when we insert this sort of preamplifier between their high-end volume-controlled DAC and a big solid-state amplifier. Incidentally, as of this date, every VAC preamplifier uses this technology.

Some of our earlier linestages used a combination of direct coupling and capacitor coupling. We find the sonic artifacts from a capacitor are more significant than those from a good transformer at these signal levels.

Your power amps now use KT88s and 6SN7s. Why have you chosen the KT88s (as opposed to the 300Bs that you used to use) and the octal 6SN7 (rather than a nine-pin 12AX7/ECC83 type)? And what is your view on tube-rolling?

There really are two questions here, one of type selection, and one of brand selection.

One of our technicians frequently wants to build a component around some obscure tube type, but after further work comes to the conclusion that it's not as good as what we do now. And I tell him, "Of all of the thousands of tubes that have ever been invented, the dozen or so that are common today have survived for a reason: They have been found to be useful."

So, you don't see VAC selecting obscure and discontinued tube types, not only for the reason given above, but because I want a VAC component to be one that can be re-tubed fifty or one hundred years from now. And I do expect our handiwork to be speaking for our idea of quality for a very long time. As I often say, a VAC component is something you should be able to give to a grandchild in your will.

Generally speaking, the octal triodes (such as the 6SN7) and nine-pin miniature triodes (such as the 12AU7) cover similar basic ranges of traits. The 6SN7 tends to be more useful in a power amplifier because it carries a higher maximum voltage rating and therefore can swing the greater audio signal levels often required there; it also has lower distortion at these high signal levels. However, its larger structure makes it more prone to microphony, so the miniature tubes tend to be a better choice for these lower signal levels, and they are highly linear in such applications.

For many years our best amplifiers employed the 300B in the output stage. However, several years ago we developed a new input/driver circuit that could be applied to a tube like the KT88, but would not work with the 300B. The combination of the new input and driver circuit with the KT88 yields a result superior to the older input circuit with the 300B, and so that is what we now produce.

An amplifier (or an audio system) is a bit like a stew. It's not just about the characteristics of the individual ingredients by themselves, but how they relate to each other in context.

As far as "tube rolling" (the changing of brands of a tube type), we have no objection. We work diligently to provide a factory lineup of tubes that provides excellent sound, but that does not mean that a little tweak might not better match up to your overall system, and there is nothing wrong with experimentation here any more than there would be with, say, interconnect cables or power cords. You might be able to find a better overall sound, but you don't need to tube roll to have an excellent sound. Some tube rollers find an alternative they prefer, while others reconnect with us and say that we got it right with the factory tube set.

By the way, it's not easy for the audiophile to discover this, but different brands of the same transistor type also have different sounds. We

EQUIPMENT REVIEW - VAC Statement Electronics

"rolled" solid-state devices in the design of the DACs that we've made over the years. The ability to change devices easily for fine-tuning is a virtue of tubes over solid-state!

The Statement products under review are very expensive, even by ultra-high-end standards. In a word, why? Why do they cost what they cost?

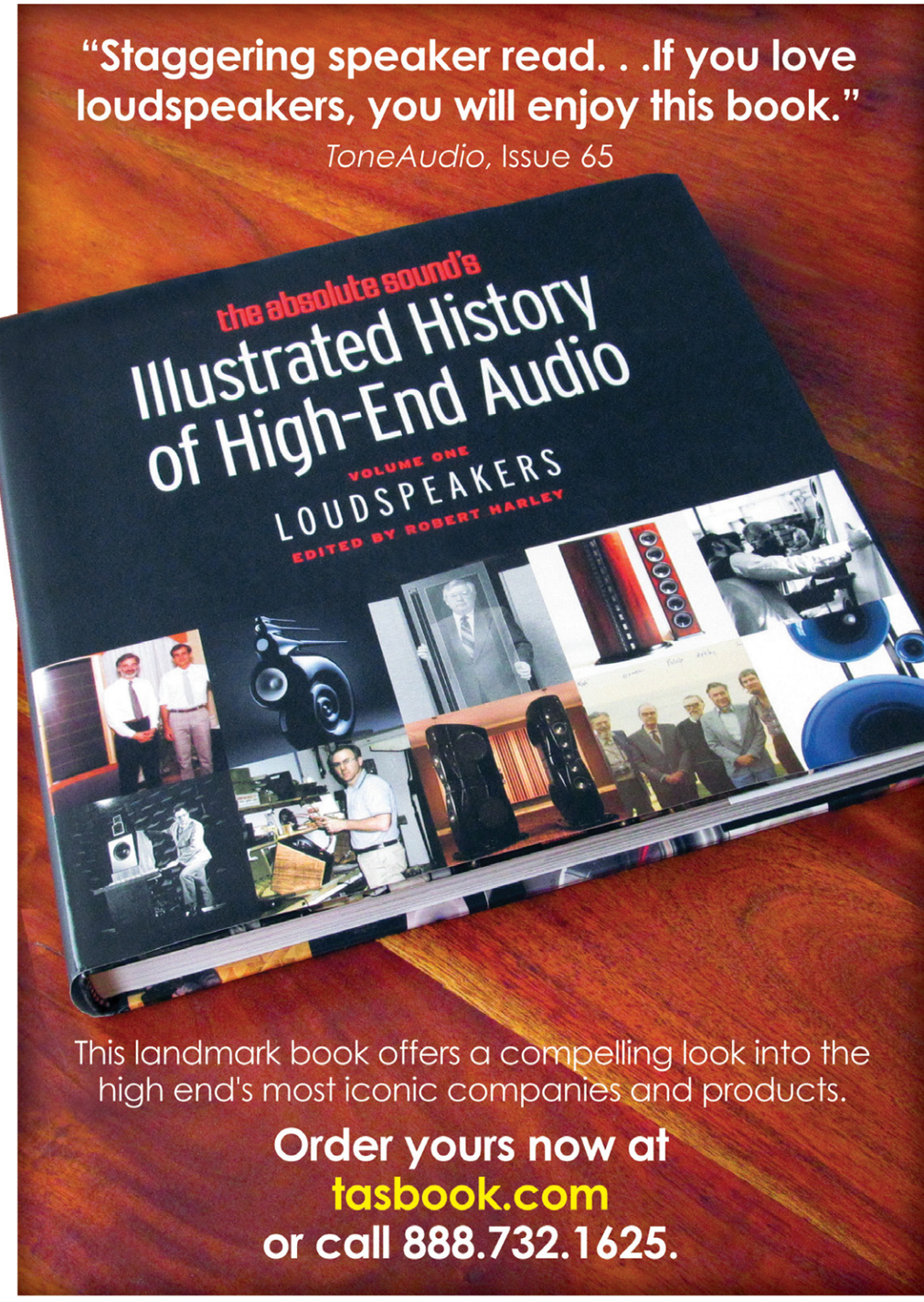
We use the same margin for all of our models. In other words, there is not a greater mark-up on the Statement products; it simply takes a lot more to build them.

What are the cost factors? There is something on the order of 200 person-hours in the assembly of each Statement model. They are completely handwired. The chassis consists of discrete plates machined from what is often termed "aircraft aluminum." The raw material ranges from ¾" in thickness to blocks 5" square, and sheets of brass 1" thick. There is major machining time, particularly on the preamplifiers. Most of the aluminum parts are plated through layers of copper, nickel, and chrome, resulting in an enhanced broad-range rejection of RF interference (as well as looking beautiful). Various signal sections are compartmentalized from each other internally in this way, and a very careful ordering and alignment of the various signal and ground conductors is used to direct interference of one part away from another without increasing stray capacitance in the circuit.

As you mentioned earlier, the transformers are crucial elements in these products. In the case of the Statement 450 monoblocks, approximately $9000 of the price is wrapped up in these. The volume control assembly in the Statement linestage costs us over $1200 just for the parts. The connection points for the circuit wiring consist of several hundred silver-plated supports, which cost us (that is, without any factor for overhead, R&D, dealer margin, etc.) around $1 each. These products are manufactured with obsessive attention to every detail. Perhaps some of this doesn't show to the untrained eye, but there is a great deal of cost in the manufacture of these products.

Interestingly, there is another amp manufacturer you and I have touched upon, with a tube amplifier that costs even more that the VAC Statements. On examination one would see that they use a simple bent and welded chassis, such as we do in the $9900 Phi 170 iQ, our least expensive amplifier. Where you find $30 z-foil resistors in the VAC, you see one-cent SEI resistors in the other amplifier, or twenty-five-cent Dales; they even use some off-the-shelf magnetics. If you go through the VACs carefully, you will find that we are delivering far more value than most other manufacturers. And that's probably why I'm driving a 22-year-old car!

Regardless of price, every VAC component delivers high value in its context. And due to our practice of "voicing" our amplifiers in concert with, for example, many different types and brands of loudspeakers, we can be very confident that in most cases the addition of a VAC component to a given stereo system will improve the sound of that system (although, as always, fine-tuning, such as cable selection, speaker placement, etc., is always advisable when making a major equipment change). In essence, a VAC enables the other parts of a system to be the best they can be.



Setup and Use

Setting up the VAC Statement electronics isn't particularly difficult, just exhausting. The 450 iQ amp, for instance, weighs 130 pounds and its outboard power supply, upon which the amp sits (via a tripod-and-ball-bearing support system built into the PS's top plate), another 85 pounds. That's 215 pounds of amp per side. Because they, too, use outboard power supplies with substantial transformers, the preamps are almost as hefty as the amps—120 pounds apiece. (Ever seen a one-hundred-and-twenty-pound phonostage?) However, the preamp power supplies do not have a mounting system built into them and must be placed, for best sound, on separate shelves, rather than below the control units on the same shelf. This means that you're going to need a total of six shelves and/or stands for the VAC Statement system as I've reviewed it: one shelf each for the linestage preamp and its power supply, the phonostage preamp and its power supply, and the amp/power supply combos.

The preamps came to me with tubes installed, so, outside of hooking the power supplies to the control units via their umbilicals, no assembly was necessary. (With products of this sophistication at this price point, it is highly likely that the dealer you bought from will do all the work—as Keith Sequeria and Jim Kumpe of The Audio Company of Marietta, Georgia, did for me.) The amps did require some mechanical setup—attaching the glass faceplates and the tube cages to the chassis. And you do have to install the tubes, which are numbered and easily plugged into their corresponding sockets. Then, of course, you normally have to go through the tedious, inexact process of biasing the eight KT88s. Only, guess what, with the VAC 450 iQ, you don't!

This is the first tube amp I've had in my home that requires *no user bias adjustment whatsoever!* Thanks to Kevin Hayes' patented iQ system, the VAC Statement 450 iQ is literally plug 'n' play. Not only do you not have to set bias on initial tube-installation; you never have to check or adjust it as the tubes age. Bias to the power tubes is set, constantly monitored, and (most importantly) precisely main-tained at its ideal value automatically. And thanks to Hayes' other ingenious patent, if a tube goes bad (or threatens to), the amp will let you know which tube is going south via lights on the front panel of the amp that correspond to each of the power tubes—and if the tube fails, the amp will be muted instantly.

If your excuse in the past for not using glass bottles is that they are pains to set up and maintain, the VAC 450 iQ removes one of the biggest obstacles in your path. This is a remarkable engineering achievement.

The fabulous (and very expensive) volume control on the Statement linestage preamplifier is motorized and easily adjusted via a three-button remote (one button to raise level, one to lower it, and one to mute the preamp). All other controls on the linestage (on/off, source-selection, etc.) must be manually set via large rotary knobs—just as you did with preamps in the old days. (BTW, turning the on/off knob to "on" puts the preamp in mute mode—to allow tubes and voltages to settle; you must rotate a second "Mute" knob to go from muted to operational.)

The exceptionally good-sounding Statement phonostage preamplifier must also be adjusted by hand. (Tough luck, couch potatoes.) In addition to on/off, there is a knob for setting gain (52dB, 70dB, and 76dB) to match the output of your cartridge. There are also separate knobs for setting impedance for moving coils (ranging from 13 ohms to 400 ohms) and capacitance for moving magnets.

The mc impedance settings of the Statement phonostage really do make a sizable difference in sonics, so you would be well advised to switch among with them until you come up with the value that sounds best to you (which may not be the value that the cartridge manufacturer recommends). tas

OUR TOP PICKS REFERENCE-LEVEL ELECTRONICS

Constellation Altair II and Hercules II
$80,000 ($9000 for optional DC filter)/$180,000/pr.

The Altair II is improved over its predecessor, in both sound quality and user interface. As colorless a component as you're ever likely to hear, with no sonic flavor of its own, the Altair II allows the finest micro-details of timbre, transient information, and spatial cues to pass through without imposing its own signature on the music. Most preamplifiers shave off some low-level detail, add a bit of grain to instrumental textures, and drape a fine scrim between you and the music. Not the Altair II; what you put in is what comes out. The sheer amount of detail the Altair II resolves, the transparency to sources, speed, clarity, and dynamics are breathtaking. Moreover, the resolution comes without a trace of etch. The Altair II and the matching Hercules II amplifiers are world-class, reference-quality electronics that would be at home in the most demanding systems.

The massive Hercules II is a dreadnought, delivering a whopping 1100W into 8 ohms, yet has all the power, dynamic impact, and effortless ease one would expect from such a behemoth. But the Hercules II is much more than a brute; this amplifier has the greatest delicacy, resolution, and finely filigreed rendering of treble that RH has heard. The Hercules II's transparency and resolution of fine musical detail are simply sensational—in a class of their own. The polite bottom end of the original Hercules has been replaced by a full-bodied and weighty presentation that provides a more solid tonal and dynamic foundation. RH's reference.

Soulution 701, 711, and 725
$155,000, $65,000, and $50,000

On the outside, the 7 Series components from the Swiss firm Soulution are identical to their celebrated forebears; both are housed in the same gun-metal grey, Bauhaus-style chassis that Soulution used for the 700 monoblock, 710 stereo amp, and 720 preamp. Inside, they use the exact same high-speed, high-negative-feedback circuits found in their 7 Series predecessors. In fact, the main difference is the use of fully regulated switch-mode power supplies. These SMPSes offer substantial benefits beyond providing cleaner, near-inexhaustible power. For instance, since SMPSes allow for much more efficient power-factor correction, the supplies no longer pollute the mains with harmonics and current spikes, as linear supplies do, improving the performance of the amps themselves and of ancillary electronics that are also plugged into the wall. Furthermore, the smaller size of the SMPSes allow for a more efficient arrangement of parts and boards inside the amp chassis, reducing the lengths of cable that have to be used between and among components, thus making for shorter signal paths. Finally, when these much more stable and efficient, lower-noise, higher-output SMPSes are paired with 1,000,000 microFarads of custom-made ultra-low-ESR capacitors (as they are, for example, in the 711 stereo amplifier), current peaks, particularly in the bass, can be reproduced with greater ease and fidelity, and current delivery can be raised from 60A to 120A. What this translates to sonically are amplifiers with simply unparalleled bass-range power, color, and impact, a power range and midrange of exceptional warmth and tonal beauty (with a tube-like three-dimensionality and bloom that are very nearly unique for solid-state), and a treble that is liquid, edgeless, and delicately detailed. The 701 and 711 stereo amplifier are also seemingly inexhaustible, sounding virtually the same at very low levels as they do at ear-splittingly high ones. JV's solid-state references, in 2014 the Soulution 701 and 711 amplifiers and 725 preamplifier won *The Absolute Sound*'s highest honor, our Overall Product of the Year Award.

VAC Statement Electronics
$75,000–$120,000

Used to be that if electronics stood in a police lineup, the solid-state stuff would be the shifty-eyed speed freak with the finger-in-the-socket hairdo, and the tube gear would be the Caspar-Gutman-looking fat guy with the gold watch-fob stretched across the pinstripes of his bulging vest. My, how times—and the usual suspects—have changed. Kevin Hayes' Valve Amplification Company $75,000 all-tube Statement line preamplifier, $80,000 all-tube Statement phono preamplifier, and $120,000 450 iQ all-tube 500W monoblock amplifiers—Hayes' answer to the question of what audio gear would be like "if there were no constraints with respect to expense, time, or difficulty of manufacture"—offer the low noise, transient speed, overall resolution, and colorless neutrality that were once the exclusive purview of solid-state, without any sacrifice in the low-level textures and natural timbre, lifelike imaging and soundstaging, and uncannily realistic three-dimensional bloom of the very best tubes. For absolute sound listeners, JV found the VAC Statement electronics to be no-brainer highest-of-the-high recommendation. Indeed, for any kind of listener who longs to hear acoustic instruments sound more like the real things, this very-pricey-but-worth-it trio of electronics will be hard to beat. The VAC Statement electronics are JV's current reference for acoustic music—and, indeed, the most lifelike tube gear he has yet heard with classical or pop.