

GUIDE TO DIGITAL SOURCE COMPONENTS



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FROM THE Editor

Welcome to our latest Buyer's Guide, this one covering digital audio source components. The Guide includes full reviews of:

- 19 standalone DACs,
- 3 combination disc player/DACs,
- 5 combination integrated amplifier/DACs, and
- 10 Music Servers and related digital audio accessories.

We also bring you our editorial team's Buyer's Guide recommendations for digital source components, plus reviews of high-resolution digital music downloads. Finally, we include an illustrated report showing 26 of today's most innovative new digital audio products as seen at the recent Rocky Mountain Audio Fest 2013.

We are experiencing a period of almost unprecedented growth and innovation in digital audio and as a result music lovers can now access and enjoy their favorite music in ways that might have seemed like science fiction only a few years ago. Just stop for a moment and think about the magnitude of the changes unfolding all around us.

The Music: We once bought our digital music primarily in the form of MP3 files or Compact Discs. But those days have given way to a modern era where anyone with a passion for sound quality can readily access extremely high-resolution digital audio files from a growing number of sources. CD-resolution files, once considered a sonic "Holy Grail" of sorts, are now just the starting points from which to explore even higher-quality file formats promising far greater resolution and sonic finesse.

Music Delivery and Storage Systems: Once we thought either in terms of acquiring music content either in the form of optical discs or of downloaded files stored on our computers, but now our range of options has grown. Entire music libraries can, for example, live on portable, high-capacity USB drives or memory sticks, or they could reside on NAS (network attached storage) devices, elsewhere on network or in the cloud. Further, music delivery models are evolving, so that rather than buying copies of content to own some listeners are instead subscribing to high-res music services that charge monthly fees for access to high-res material on demand (why own when you can stream?).

Digital Audio Technology: Digital audio playback technologies never stand still for long, so that over time we see equipment offering improved DACs, more powerful upsampling options, hyper-precise digital clocks, expanding network and storage connectivity options, the ability to handle ever higher resolution music files, and better analog output sections. In short, digital audio source components sound great now and continue to get even better.

We hope this Guide helps you better navigate the brave new world of modern digital audio source components as you pursue *The Absolute Sound*.

Chris Martens

Click here to turn the page.

ON THE HORIZON

New Digital Source Components from RMAF 2013

Steven Stone

Forward: The article below is an excerpt from, but also a more lavishly illustrated version of, a blog prepared by Steven Stone to report on digital source components recently seen at the Rocky Mountain Audio Fest 2013, which was held just weeks before publication of this Guide. Enjoy. –Chris Martens

RMAF 2013 provided enough new digital products to fill a show report several times over. Rather than a comprehensive report with abbreviated descriptions that have more in common with a laundry list than a show report, I've concentrated on the products I felt were the most important and will have the most impact on our audio future.



MSB Universal Media Transport

www.msbtech.com

MSB unveiled their latest transport, the Universal Media Transport Plus (\$5995). It is based on the Oppo BDP-103, and plays all disc-based media, including DVDs, Blu-Rays, CDs, USB thumb drives, and even Kodak picture CDs. The Universal Media Transport Plus works with a variety of power supplies, beginning with the MSB outboard desktop supply (\$595) and going up to their Diamond Transport Power Base (\$3495).

CD PLAYERS AND TRANSPORTS

Marantz SA-14S1 SACD player

www.us.marantz.com

Marantz SA-14S1 Super Audio CD player (\$2495) includes two digital inputs, two digital outputs, and one USB input which allows it to function as both a transport and a DAC. It even has a USB-B port on the back that allows the SA-14S1 to support DSD over PCM. The SA-12S1 utilizes Marantz' proprietary HDAM (Hyper Dynamic Amplifier Module), newly developed center-mounted disc drive mechanism, and toroidal power transformer made with oxygen-free copper secondary windings.



ON THE HORIZON

CD PLAYERS AND TRANSPORTS

Rega Saturn-R DAC + CD transport

www.rega.co.uk

For most part, the stand-alone CD player is dead, but some manufacturers have revised the “CD player” into a DAC that can also read discs. One example of this is the Rega Saturn-R DAC + CD transport (\$2995). The Saturn-R includes one asynchronous USB and four S/PDIF inputs as well as a top-loading CD transport. It uses a Wolfson WM872 DAC that can handle PCM up to 192/24, and it comes with a dedicated remote control.



Simaudio Neo 260D CD transport

www.simaudio.com

Simaudio added the Neo 260D CD transport (\$2000) to their Moon series. Using Simaudio's proprietary CD drive mounted on a four-point floating suspension system, the NEO 260D has both S/PDIF and AES/EBU digital outputs plus both balanced and single-ended analog outputs. You can add a digital-to-analog converter (\$1000) that delivers true 32-bit asynchronous processing along with one USB, two S/PDIF, and two Toslink inputs.



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Antelope Audio Zodiac Platinum DSD DAC/ preamp/headphone amp

www.antelopeaudio.com

Antelope Audio, known for their "atomic clock"-equipped Rubicon DAC/ADC-capable preamplifier, have added a new Zodiac Platinum DSD DAC (\$5495 with Voltkus PSU). The Platinum DAC trumps the Antelope Audio Zodiac Gold by adding 256X DSD support (and DSD upsampling to 256x), a 768 kHz sample rate, quad DAC architecture, a 64-bit up-sampler for PCM, and the ability to accept an atomic clock input.



ExaSound E20 DAC and E28 DSD DAC

www.exasound.com

Building on the technology of their E20 DAC (\$2899), ExaSound's new E28 DAC (\$3299) is the world's first multi-channel DSD DAC. It supports DSD up to 12.28 MHz, DXD up to 352.8 kHz/ 32-bit, and PCM up to 384/32. With automatic rate and sample switching, a bit-perfect custom ASIO driver for Windows, galvanically isolated USB, and an asynchronous USB interface, the E28 is based on the ESS9018 Sabre 32 reference DAC chip and offers eight discrete channels of analog outputs.

DACS

Bel Canto Asynchronous Stream Controller & PowerStream Monoblocks

www.belcantoblack.com

Bel Canto has gone upmarket with their new "Black" line of components. Designed to be used together, The Asynchronous Stream Controller (\$20,000) and PowerStream Monoblocks (\$15,000 each) represent a new way of arranging components in an audio system. With three boxes and only two connections, the Black system uses Bel Canto's proprietary StreamLink fibre cable to connect the Stream Controller to the PowerStream Monoblock amps. With eight digital inputs, including USB and UPnP/DLNA Asynchronous interfaces and RCA analog as well as StreamLink and AES/EBU outputs, the Asynchronous Stream Controller represents Bel Canto's designer John Stronczer's latest thinking on how to build a low-noise digital hub.



Ressonance Labs Invicta Mirus DSD DAC

www.resonessencelabs.com

Resonance Labs from Kelowna, British Columbia, had two outstanding new DACs on display. Resonance's flagship DAC is the Invicta Mirus (\$4995) which uses dual ES9018 DACs to deliver 8 DACs per channel and 130 dB DNR with 0.0002% THD. The Mirus also supports DSD 64/128, DXD and PCM 384/24. With custom up-sampling filters, balanced XLR and single-ended RCA analog outputs, asynchronous USB, and S/PDIF, Toslink, AES/EBU and S/D card inputs, the Mirus is fully-featured yet compact.

ON THE HORIZON

PORTABLE DACS

Astell & Kern AK10 DAC/headphone amp

www.astellinkern.com

Astell & Kern's AK10 (\$299) was designed to work with smart-phones. It has both iOS lightning connector as well as a micro USB for Android phones. With a built-in 1100mAh battery the AK10 delivers 11 hours of playback time and recharges in less than 3.5 hours. Its Wolfson WM8740 24-bit DAC supports up to 96/24 files and delivers a maximum output level of 1.7 rms with an output impedance of 1.1 ohms.



iFi iDSD DAC

www.ifi-audio.com

iFi unveiled a raft of new digital devices including the iTube (\$299) tube preamplifier, iLink (\$249) USB to S/PDIF converter, iDSD (TBD, but under \$200) DSD/DXD/PCM battery-powered DAC, iPurifier (\$99) USB audio and power purifier, and iCAN (TBD, but under \$200) battery-powered headphone amplifier. The iDSD and iCAN are part of ifi's new Nano line of battery-powered, completely portable devices.

Audioengine D3 DAC

www.audioengineusa.com

Audioengine's latest DAC, the D3 (\$189), features support for up to 96/24 files via USB. Based around an AKM4396 DAC chip and LME49726 audio amplifier the D3 uses asynchronous USB and requires only 5 volts and 200 ma of power via USB to produce a maximum output level of 2.0 volts. It had no problems driving a pair of Audeze LCD-2 headphones.



Resonance Labs Herus DSD DAC

www.resonancelabs.com

Resonance Lab's second new DAC introduction, the Herus (\$350), is a portable DAC that delivers big capabilities and sonics. It supports DSD 64x and 128x as well as DXD and PCM up to 382/32. It has no buttons or knobs, merely a USB input on one end and a 3.5" stereo headphone output on the other. With better than 100 dB S/N, THD into 32 ohms of less than .005%, and a maximum output of 2.4 VRMS the Herus could replace many full-sized DACs.

Hegel Super headphone amplifier/DAC

www.hegel.com

The Hegel Super headphone amplifier/DAC (\$399) has a noise floor lower than 140 dB and supports up to 96/24 PCM. It has two outputs, one mini-headphone and the other optical digital, so it can serve as a USB to S/PDIF convertor as well as a headphone amplifier. With Hegel's proprietary re-clocking and generous power supply, the Super is designed to drive even the most difficult headphones.



Core Audio Technology Kratos Fully Digital Amplifier

www.coreaudiototechnology.com

Not a product included in our original RMAF report, but rather one drawn to our attention through a release received shortly after RMAF, we wanted to highlight the fascinating Core Kratos Fully Digital Amplifier (\$2,500). In practice, the term "fully digital" means that the 100 Wpc Kratos has a fully digital signal path (no D/A conversion) and thus uses internal PCM to PWM conversion rather than just using a switching output stage. The Kratos provides two sets of S/PDIF and Toslink inputs, plus a remote volume control. Soon, however, Core plans to introduce a 32/384 DSD-capable USB input option.



ON THE HORIZON

MUSIC SERVERS, COMPUTERS & MORE

Baetis Revolution II media computer

www.baetisaudio.com

The latest version of the Baetis Revolution II media computer (\$2995), wired with Snake River Audio cables, looked and sounded like a serious audiophile product. With a published motherboard S/N figure of 108, the Baetis uses a S/PDIF rather than USB output and claims lower noise figures than any stock factory computer.



Blue Smoke Black Box II

www.bluesmokesystems.com

The first time I saw Blue Smoke Black Box was at the 2009 CES. Since then Blue Smoke has further refined their dedicated audio computer to the current Black Box II (\$3995) and companion USB to S/PDIF 382/32 Digital Output (\$2995). Based around a Haswell i7 Intel processor, Black Box II is fanless with an SSD drive and 8 GB of RAM, and runs on Windows 7.1 OS. The USB to S/PDIF unit works with any computer and operating system that outputs audio to USB.



YFS Ref-3 computer transport, YFS-modified Mac Mini, and PS012 power supply

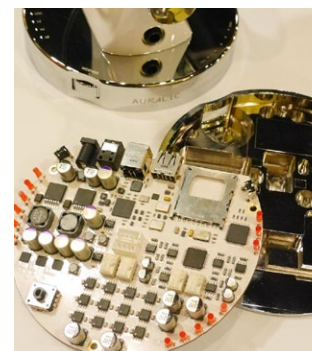
www.yourfinalsystem.com

YFS stands for "Your Final System." Although it's a phrase that is more likely to generate thoughts about finite mortality than audio, YFS' Ref-3 computer transport (\$15,500) and YFS-modified Mac Mini (\$4695) made a potent and life-affirming combination. The modified mini includes YFS' PS012 power supply modification (\$2495), SSD drive, internal power filter, and internal power supply modifications to support external power supplies. The YFS power supply put out 12 volts at 7.5 amps.

AURALiC Gemini 2000 headphone amp/DAC

www.auralic.com

AURALiC's Gemini 2000 (\$1995) combines a headphone stand with a DAC and headphone amplifier that can put out 2000 mW. The Gemini 2000 supports DSD 64x and 128x as well as PCM up to 384/24. It has inputs for USB, Toslink digital, analog via mini-stereo, and a SD card reader slot. Available in five colors, the Gemini 2000 is much more than a beautiful object - it also sounded great.



Sound Science Music Vault M7

www.soundsciencecat.com

Sound Science's Music Vault has evolved since I reviewed it in 2008. The current model, the M7 (\$5500 w/3TB drive, \$6600 w/6TB drive), supports local cloud back-up and streaming of Internet sources. Sound Science uses internal data storage instead of external NAS drives (although it supports NAS for back-ups) because according to designer Neal Van Berg, "Internal storage provides demonstrably superior sound." The Music Vault supports USB 3.0 and 2.0 output as well as Firewire and even has a S/PDIF output.



ON THE HORIZON

MUSIC SERVERS, COMPUTERS & MORE

Channel D Seta Piccola DAC Buffer/Attenuator

www.channld.com

The Channel D Seta Piccola DAC Buffer/Attenuator (\$1599) isn't a digital source component per se, but was created to be used with variable output DACs and DAC/preamps so that they can work without truncating bits due to excessive volume attenuation. The Piccola has 6 dB steps that deliver between -6 and -30 dB of volume reduction. It uses the same battery power system as the Seta phono preamp and has only 20 Ohms of output impedance.



Native DSD Music high-res DSD downloads

www.nativedsd.com

Soon it will be easier for consumers to buy DSD music. Native DSD Music announced their new Internet site, as above, dedicated to high-resolution DSD music downloads. The PR kit included a USB card with sample files, many from Channel Classics. The site promises worldwide availability and multi-label availability and expects to be "live" in the very near future..



PS Audio NuWave phono preamp with analog, PCM, and DSD outputs

www.psaudio.com

PS Audio NuWave Phono Preamp (\$1895) delivers a one-box solution to archiving and playing LPs. It combines a state-of-the-art phono preamplifier with an A/D that supports both PCM and DSD digital outputs. With built-in cartridge loading, a passive RIAA curve, and balanced XLR analog outputs as well as line-level inputs, the PS Audio NuWave Phono preamp can serve as the analog-to-digital hub for any audiophile who wants a high-quality bridge between their analog and digital sources.



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TURNING A MAC INTO A MUSIC SERVER

A Beginner's Guide

Steven Stone

Setting up an Apple computer for audio is simpler than a Windows PC because Apple offers fewer options. But it's still possible to end up with a system that doesn't perform optimally. Often it's a case of not getting the machine configured correctly. The following guide will hopefully get you to a reasonable starting point for your Mac computer audio odyssey.

For me, the three most important aspects of a computer audio system are stability, reliability, and simplicity of operation. Sound quality comes after these three primary goals are met: ultimately it doesn't matter how good your computer audio system can sound if you can't get it to work.

Given my priorities, the principal goal of this guide won't be the best performance. (John Quick talks about this in a companion article found in *The Absolute Sound* issue 237). No, the goal here is to achieve a system that is going to deliver sound 99.9% of the time without having to screw around. Even a naïve user should be able to use a computer audio system almost as easily as a CD player.

HARDWARE

Which Apple computer you choose for computer audio will depend on several factors, but principally budget and portability. Portable Macs, whether MacBook Pro or Air, make great audio computers, especially if you want one system that you can take with you. A Mac Mini is less expensive initially, but it does require an external monitor and keyboard for full functionality. An iMac is also a good option and the monitor is built-in. Some folks (like me) even use a MacPro desktop machine for audio duties.

Nowadays, the Macs I see most often used for audio are the Mac Mini or a Mac portable. Mac Minis are the most popular "desktop" machine due to their size and price. Also a Mac Mini can be run "headless" after initial setup, without a monitor or keyboard via the "Remote" Smartphone app (a Mac portable can be used this way also, but the screen will remain active). Any Mac that supports the current or near-current operating system can be used for audio playback duties. Considerations such as whether you want portability are more easily quantifiable than whether one Mac model sounds better than another.

Apple offers all its computers with different memory and hard-drive configurations. You can order a Mac directly from Apple exactly the way you want it or you can purchase a barebones configuration and add your own memory and storage later. OtherWorld Computing sells all the necessary parts as well as step-by-step instructional videos on its site for installing memory, solid-state drives, and auxiliary hard drives for nearly every model Mac.

If you want to do an audio-only computer system, be aware that there are different levels of audio-only exclusivity. And there's always a trade-off of ergonomics lost versus sonic benefits gained. Access to the Internet is not necessary to play back a music file, but it does allow for greater levels of operability, including access to Internet radio (which can be

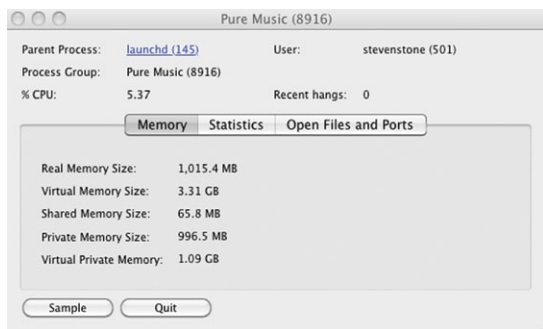
very good), streaming services, and GraceNote for identifying ripped CDs. But a system with Internet access means that more operations will be ongoing and some could have an effect on overall audio quality. The tweakiest and most obsessive sound-quality-first Mac setups tend to be isolated stand-alone systems without Internet access. PreSonus, in its guide to Mac OS use, recommends turning off the airport wireless service while using a Mac for audio. Obviously this drastically reduces functionality, sort of like supergluing your mouth closed to keep from occasionally drooling. Some Mac audio set-up guides also recommend turning off "Spotlight," which is the file-searching utility. This is great until you need to find a file.

There is no reason that a current-generation Mac needs to be gelded into a barebones operating system to perform optimally for audio. The Mac operating system and hardware were made for multitasking, and the Mac will be performing background processes while playing music even if it has been stripped-down. While I don't recommend regularly running a bunch of high-demand processing and disc-access programs such as Photoshop while listening intently to music, the reasons for creating a stripped-down music-only Mac were far more relevant back in the days of the G5 desktop than they are today.

How much memory is optimal for audio? Most users find that the right amount of memory is the same amount as for a full-service Mac. Nowadays, that's 8 Gigabytes. You can "get by" with 4 Gigs, but given the cost of memory, there's no reason not to have 8GB. Adding more than 8 Gigs of memory won't buy you any advantages, and the extra memory will generate more heat and use more power. Music playback doesn't require very much in the way of processor and memory usage compared to apps such as Photoshop. I use a 2006 MacPro desktop with 16GB of memory. Playing a 29-minute 96kHz/24 music file with Pure Music software used only 1025.4MB of real memory, 3.31

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of virtual memory, 996.5 of private memory, and 1.09 of virtual private memory. The total amount of CPU usage was only 5.37%. With a newer, faster processor the CPU usage would be even lower. If I had only half the memory there would still be plenty left over.



Many storage options are available, but the most common way to go is with a solid-state drive for the OS and user files, then a second conventional larger hard drive for music files and/or Time Machine backup files (I'll tell you about Time Machine later). The reasons for using a solid-state drive are increased read and write speeds and lower power usage for less stress on the power supply. The second drive can be internal or external, but external is more common. Nowadays portable 1, 2, and even 3TB portable hard drives are inexpensive and plentiful. I use a redundant system where I have two of each external drive, one in service and one as back up. Once a week I copy new files from the one in use to the backup drive, then put the drive away again. Some users opt for a RAID array for their music files, but I'd rather have identical libraries on two separate drives than two libraries on the same drive

in a RAID array. Even with a RAID drive, if it fails catastrophically (which is usually how they go), you lose all your data, which is not an experience I recommend.

CONNECTING IT UP

The current Mac Minis and Mac portables all offer USB 2 as well as Thunderbolt interfaces. While there's little in the way of devices currently available for Thunderbolt, by using an adapter the Thunderbolt port can be easily converted to FireWire, and plenty of devices—hard drives, DACs, A/Ds—use FireWire connections.

Since Macs have both Thunderbolt/FireWire and USB 2 connectors, it makes sense to use both. Some computer audio systems use external hard drives on the FireWire connection and a DAC on the USB 2. Others use a DAC on the FireWire and external drives on the USB connection. Either way works. But it makes sense to use both of the information conduits (or "pipes" in computer lingo) since they offer two independent pathways for moving data.

Macs offer several other connectivity options besides USB, Thunderbolt, and FireWire. All Macs also have a TosLink output, adjustable line-level analog/headphone output, and an internal speaker. You can use the TosLink to connect to a DAC that lacks a USB input but has TosLink input (which you will find on most DACs). Usually TosLink will have a higher jitter level than USB or FireWire and so the latter are usually the preferred digital connection methods. But sometimes the TosLink can deliver equal or better sound. This is usually a result of ground-loop issues between the computer and

the other components in your system. Because TosLink is optical, not electrical, it breaks and isolates the ground connection between the computer and the DAC. I routinely connect the TosLink between my computer and DAC so I can compare it with the USB and FireWire feeds. Most of the time the USB or FireWire are better (USB and FireWire will both support rates higher than 96/24, which is TosLink's upper limit), but occasionally TosLink can prove to be a better option.

There is no reason that a current-generation Mac needs to be gelded into a barebones operating system to perform optimally for audio.

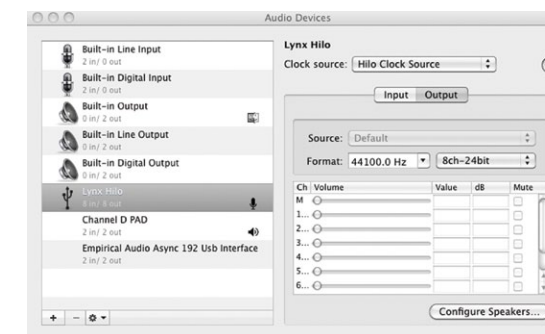
Many current-generation Macs lack a disc reader/writer, which you need to be able to "rip" or import CDs into your computer audio system's library. The solution is to buy an external reader/writer CD/DVD drive that attaches via USB. You could buy a CD/DVD/Blu-ray reader/writer, but Apple does not officially support Blu-ray playback. Although there are third-party apps such as Blu-ray Player that make Blu-ray playback through a Mac possible, possible isn't the same as bug-free—on my system the Blu-ray player app produces distorted peak levels.

Although it appears at first that most Macs have plenty of USB connections, it's easy to use them up. If you need more USB connections

make sure to use a powered USB box. Many USB-enabled devices require power from the USB to work. While they will sometimes work even when connected to an unpowered USB expansion box, they could be receiving less power than they need to function optimally. Using a powered USB box eliminates this issue.

SETTING UP SOFTWARE

The Mac operating system that comes standard with every Apple computer has all the necessary software to function as an audio computer. The principal music playback program is iTunes. And while there are plenty of reasons not to like iTunes such as its poor organization for classical music and inability to play FLAC files without some additional steps, it is still the best software to begin with for



your Mac-based computer-audio system. The iTunes library structure and cataloging format is recognized by every other Mac-based music playback app you may use in the future so you won't have to re-rip any music files if you decide to use another app. By starting out with iTunes you can also establish a base level for ergonomic and sonic performance. Any music-

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playback program that can't beat iTunes' basic performance benchmarks has no reason to exist.

As I mentioned earlier you will need a disc reader/writer to import CDs into your music library. But before you import your first CD you will need to change the preferences in iTunes. The default rip rate is only 320KBPS MP3, so you need to change that to something better in the "import settings" dialog box. I use 44.1/16-bit AIFF, but WAV is also an option. The primary disadvantage of WAV is that you won't be able to add or change the artwork in a WAV file, while you can add and change art on AIFF files. In the past WAV files were more universally playable than AIFF, but I've yet to come across a high-quality portable player that won't recognize AIFF files.

During initial set-up iTunes will need to configure where music files will be stored. I always use a separate storage drive for all my music files. But whatever else you do, if you move your music files to a different drive than the initial default, let iTunes do the moving. If you move music files to a different drive by dragging and dropping, then iTunes will no longer be able to find your files. So don't do that, please.

Once iTunes has been set up and is running I recommend living with it for a while before trying third-party music apps for the Mac. First off, if iTunes runs successfully it's a good indication that your Mac is stable and properly configured. If iTunes crashes something isn't working right, and other programs will probably behave in equally buggy fashion. It's important to get iTunes running right first.

I use iTunes as my disc-ripping program.

You can also use other programs such as dBPoweramp for disc importing. But despite some articles I've seen that claim that dBPoweramp is more likely to produce a "bit-perfect" copy of a CD, the error correction built into iTunes also guarantees a bit-perfect replica of a CD's data. So far I have yet to see any compelling evidence that iTunes disc importation reduces sound quality when compared to other disc-importation apps.

Because of the number of variables in a computer audio setup finding a "tweak" or modification that will universally improve the sound of every Apple computer is virtually impossible.

Once you've lived with and used iTunes for a while you can begin to try other playback programs. I use Pure Music, Amarra, Audirvana, and Decibel regularly. Each program has particular ergonomic advantages and they do not sound the same. Since all have free or demo modes you can try them out for yourself and see which one you like best. Pure Music has the most extensive preference options and because of this is most complex to set up. Amarra, in comparison, has very few options available from its internal preferences. So far I've not heard one playback program I would call "the best" in all setups.

Obviously, it would be great if a particular collection of settings produced optimal sound quality in every Mac in every system, but that isn't the case. For instance, when it comes to upsampling versus native-rate conversion I've found some music does sound better when upsampled while other music files sound best when played back at their native rate.

One vitally important piece of software in the Mac is called "Audio Midi Setup." I strongly recommend putting an alias of this app on your Mac's dock because you will be using it a lot. You can do this by dragging the app's icon (which looks like a keyboard and can be found in the "Utilities" subfolder) onto your dock. When you open the Audio Midi Setup app a box that shows you each input and output will greet you. It also tells you the current format and bit rate. Besides this information the Midi app lets you change format and bit rates and switch audio devices. Look at the "+" sign in the left lower corner. If you click on the little gear symbol next to it you can change audio output devices "on the fly."

Another piece of supplied software that you should definitely use is Apple's "Time Machine" backup. It will, once set up, automatically back up any drive on a regular schedule. If you have a hard drive or system failure "Time Machine" can reinstall your entire system to the point just before your crash. It has saved my life more than once. Use it.

One last piece of free software from Apple that I've found invaluable is "Remote." As you might infer from its name, Remote is an app that lets you control iTunes (or Pure Music, Amarra, or Audirvana when they are linked to iTunes)



from an iPhone, iPad, or Smartphone. You can see your whole library, make selections, build and save playlists, and play music from your listening seat.

TWEAKS

Because of the number of variables in a computer audio setup finding a "tweak" or modification that will universally improve the sound of every Apple computer is virtually impossible. Sure, there are "best practices," such as making sure that your system is not up- or down-converting a file without your knowledge (that's where the Midi Control is invaluable), but "universal" tweaks? Uh, no.

Some users have reported that one particular USB port provided better sound than the others. Usually sonic differences between USB ports are a function of what other devices besides the DAC are on those ports. If you click on the Apple symbol in the left-hand upper corner of your screen you can open "About This Mac." Under the "USB Ports" section you'll find a list

TURNING A MAC INTO A MUSIC SERVER - A Beginner's Guide

of each USB port and what is connected to it. Notice on my computer how my keyboard and printers are on a separate USB buss from my audio devices. And since both audio devices I have hooked up are on the same buss but do not receive data at the same time (with the MIDI Control I select one or the other), they

should be getting the same quality in their data streams. So far, I have detected no "alpha USB buss" during the seven years I've been using my MacPro desktop computer.

Users, including myself, have reported hearing sound quality differences when using different USB cables. As to the whys and wherefores of these differences, the most likely reasons are that differences in jitter, bandwidth, impedance, and the reflection of energy influence the time-coherence of the audio signal in subtle yet audible ways. My advice, whether you're a cable "believer" or someone who doubts that cables can make an audible difference, is to start with a basic cable, such as the Belkin Gold. Then try a "better" cable as well as the thinnest cruddiest, cheapest USB cable you can find lying around and listen for differences. I have heard USB-cable differences with many of the DACs I've reviewed when making this comparison. But sometimes, in some systems, USB cable swaps haven't made an audible difference. Regardless of where you stand on USB-cable audibility, don't try using a very long or a very short USB cable—best practices indicate that USB cables' optimal length should be between one and two meters.

Finally, as to whether a particular version of the Mac Mini or Mac portable "sounds better" than the others, all the information I've seen

has been purely anecdotal. Some computer-audio enthusiasts have gravitated to an older generation of Mac Minis that had an external rather than internal power supply because they can easily modify the external supply, and they feel that the aftermarket and sometimes homebrew power supplies have a lower noise floor and put less spurious noise back into the system. Current-gen Mac Minis have an internal power supply, which can also be modified, but that is a more difficult and usually more expensive process.

THE STARTING LINE

Obviously we can only begin to delve into the mysteries and delights of a Mac-based computer audio system in a magazine article—there are entire books on the subject. But this will get you started in the right direction. For some audiophiles computer audio becomes a consuming passion because the potential for tweaks and improvements are nearly infinite. But before you can begin to wring every last iota of performance out of your system you have to get it up and running reliably. I hope this article will make that a little easier. **tas**

For the Obsessive

For those of you pursuing all-out sonic performance, here are some refinements to Steven's article that I've picked up from computer-audio experts. First, if you're about to buy a Mac for a server, the MacBook Pro has some advantages over the other models. Because it is designed to be close to human bodies it reportedly must meet tighter requirements for radiated noise resulting in "cleaner" performance compared with the Mac Mini. The MacBook Air and iMac are less ideal for music servers, the MacBook Air because it uses inferior parts in the USB controller, and the iMac because the integrated video monitor radiates noise.

Some tweaky Mac users have reported that 16GB of RAM is preferable to 8GB, largely because the Mountain Lion operating system consumes so much memory. The bad news is that the new MacBook Pro 13" maxes out at 8GB, so if you want 16GB you'll need the more expensive 15" model. Moreover, in the latest MacBook Pros the RAM is now soldered to the board and can't be upgraded later. You're stuck at the level of RAM that comes with the computer. You can, however, opt for a small SSD if the Mac is a dedicated server because your music library will be stored on an external drive. Also keep in mind that a MacBook Pro doesn't come with a disc drive; you'll need to add the Super Drive (\$80). For the budget conscious there are many new MacBook Pros available on the used market that can have their memory increased to 16GB. —**Robert Harley**

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EQUIPMENT REVIEWS

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1. Directly play common high resolution audio discs such as Blu-ray music, DVD-Audio, SACD and HDCD.
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3. Connect the BDP-105's asynchronous USB DAC input to your computer and use your favorite high-resolution audio playback software to send audio to the BDP-105, jitter-free and bit-perfect.





Esoteric K-01 CD/SACD Player

Full Reference Status

Alan Taffel

Reviewers constantly see gear come and go, but, as you can imagine, we regret the parting of some pieces more than others. Roughly two years ago Esoteric had to pry its K-03 player from my sweaty, clenched fingers. Why did I love this thing so much? Let me count the ways.

The then-\$13,000 K-03, to my mind, represented a perfect combination of capabilities. It was—and still is—a CD/SACD player, a full-fledged S/PDIF DAC, a USB DAC, and a linestage that will directly drive a power amp. Most importantly, the K-03 excelled in every single category. I had never heard a better SACD player or USB DAC, and the S/PDIF DAC was squarely in reference territory as well. My only quibble was that CD playback, while very good, wasn't quite in the same league as the rest of the K-03's functions.

For that reason, even as I relinquished the K-03, I began lobbying to get my hands on the flagship K-01, which, at the time, ran \$23,500. The primary differences between the two models are the transport mechanism (the K-01 uses a VRDS-NEO "VMK-3.5-20S", the very same mechanism found in the company's P-02 stand-alone transport, which costs \$23,500 all by itself!) and improved DAC linearity through the use of more (eight versus four) parallel/differential AKM chipsets per channel. Given these upgrades, I figured the K-01 should do at least as well as the K-03 in every category, and I hoped against hope that its CD performance would achieve full reference status, making the K-01 something of a perfect source component. Unfortunately, the company's distributor at the time could not come through with a test K-01. Since then, I have been pouting.

Recently, though, Esoteric has done two things that warm my heart. First, it has *lowered* prices on many models, including the K-series. The K-03 is now \$10,900, a fantastic value, and the K-01 has dropped to \$19,500. Second, the distributor promised me a K-01, and came through.

Let me tell you, it was tough waiting out the *month* of continuous break-in that Esoteric mandates. After that I spent many more months evaluating the K-01 in all of its copious configurations. In the end, I can report that all my fervent hopes were fulfilled. The Esoteric K-01 is the most versatile, best-sounding, most finely crafted source component I have ever encountered.

A Reference CD and SACD Player

In listening to CDs through the K-01, I was not bashful about comparing it to the very best. My reference CD "player" is actually a Goldmund Mimesis 36 transport (a benchmark product) driving a dCS Debussy DAC. The two are lashed together via the superb (and eminently reasonably priced) Empirical Design 120 digital cable. Over time, this combination has proven tough—nay, impossible—to beat. The K-03 came close. But the K-01 coldcocked me by outperforming the reference in every parameter.

Allow me to illustrate using a couple of examples from the Simon and Garfunkel *Old Friends* box set, lovingly remastered using the always-reliable SBM process [Sony's Super Bit Mapping]. On the playful "Punky's Dilemma," the beat, laid down by guitar strums and finger snaps, is steadier compared to the reference; dynamics rise and fall with more linearity; and, especially, air around and between instruments is far more voluminous. Further, the Esoteric's ultra-quiet background allows tasty details—like the percussive flourishes that vary delightfully with each verse—to emerge in a clear but unforced way. Timbres are more natural, too; Simon's guitar sounds more like a guitar, and on other tracks pianos sound more like pianos, bongos more like bongos, etc.

EQUIPMENT REVIEW - Esoteric K-01 CD/SACD Player

At the other end of the production spectrum is "America," which features an orchestra, brass, and grand cymbal crashes. Through the reference, climactic moments betray some congestion and compression. Not so through the unflappable K-01. And there is again that difference in spatiality; the reference renders voices in the usual 2-D perspective, but through the K-01 they are downright holographic. At this point you might be thinking the reference rig isn't that great after all. But you would be wrong; the reference sounds awesome! It's just that the K-01 sounds better in each of the ways I have described. The cumulative effect is that the Esoteric is even more engaging—and fun—to listen to. This is truly exemplary CD playback.

On to SACD. In my review of the K-03 I stated it was "the best SACD player I have heard—not by a mile, by a marathon." Given the K-01's exceptional CD performance, though, I found myself skeptical that its SACD playback could sound much better. I needn't have fretted; the increase in resolution and timbral realism over CD was dumbfounding.

Consider "With You I'm Born Again" from the Chesky recording of the Billy Cobb Quartet's *Jazz in the Key of Blue*. The CD layer already sounds rich and refined. The only overtly noticeable problem is during Roy Hargrove's trumpet solo, which at times gets loud so quickly and intensely it's scary. On the CD layer, the K-01 pulls off the dynamics, but telltale distortion signals the format's limitations. Playing the SACD layer, though, the Esoteric accomplishes the feat while retaining absolute purity at the limit. SACD also dramatically opens up the soundstage, the trumpet's brassy burnish is far more evident, and the

air through it is so visceral you might feel in danger of being spit on. Chalk up another reference-caliber performance.

A Reference S/PDIF and USB DAC

Fond memories of the K-03's DAC danced in my head as I turned to the K-01's version. I no longer had a K-03 in hand, of course, but I remembered a lively, open sound. The K-01 was all that, as well as extremely dynamic, quiet, detailed, and rich. When I compared it to the Debussy, using the Mimesis 36 as the common transport, both DACs sounded great—as they should in this price range. Clearly, these components are both in reference territory. Yet, once again, the Esoteric proved superior in significant ways, all of which were foreshadowed by its CD performance.

First, the K-01 shows greater resolution, especially at the highest frequencies. This makes its reproduction of the recording venue's ambience far more palpable. Through the Esoteric, the soundstage on which the instruments play is almost an instrument unto itself. Further, instruments have "pillows" of air around them that allows the listener to easily follow each one—just as in listening to live music. For example, I was amazed to discover that the cymbal—yes, the cymbal—on Michael Wolff's *Zam* is a thoughtfully played, varied, and integral musical component. I had never much noticed it before.

Another consistent advantage of the K-01 is its timing. As good as the dCS is in this respect, the K-01 is better. Tempi are absolutely, unwaveringly locked in, making rhythms irresistible regardless of genre. Finally, as with CD playback, the Esoteric has a very slight edge over the reference in dynamics. On gradual crescendos in particu-

Set-Up Notes

More and more audio manufacturers are paying attention to vibration control. Such measures are especially important in components with moving parts, like the K-01. Esoteric has admirably equipped this player with feet reminiscent of the Stillpoints Ultra. The result is one of the few products I have reviewed that does not benefit from a good set of aftermarket cones.

How, then, to explain the lack of attention to the chassis top plate, which rattles and rings with the gentlest tap? I suppose one could buy a "brick" of some sort to tame its jitters, but I settled for a thick book. Placed atop the K-01, this sophisticated audio dampening mechanism quieted down the player's sonic background, solidified imaging, and generally permitted more of the K-01's goodness to come through. Hopefully, Esoteric will quickly find a more elegant fix.

Also, like all Esoteric DACs, the K-01 offers a plethora of configuration options. Many of them don't sound very good, and quite a few of those turn out to be the defaults! For this reason, the K-01 cannot be treated as a plug-and-play product. My recommended settings are enumerated in the "Set-Up Notes" for my review of Esoteric's D-07X DAC, as published in *The Absolute Sound* issue 230. When auditioning the K-01, check that the dealer hasn't simply settled for the defaults.

lar, the K-01 builds in a more linear fashion. The opening movement of Handel's *Water Music*, for instance, benefits with an enhanced drama the composer would no doubt have applauded.

As for USB, the K-01 and K-03 remain the best such DACs I have ever heard. When playing the infectious title track from Wilco's latest, *The Whole Love*, a 96/24 download from HDtracks, the Esoteric delivers its trademark drive, detail, and clarity without edge. Jeff Tweedy's voice sounds uncannily realistic. Even more difficult for USB, strings are sweet and aural fatigue, no matter how many repeat plays, is non-existent. Listening to this song through the K-01 and an appropriate USB cable is every bit the joyous experience it is meant to be. This is USB not only at its best, but sounding as good as any other digital source. That's a milestone achievement.

A Remarkable Linestage

Whenever I switch from my Goldmund linestage to

SPECS & PRICING

Formats: CD, SACD	ASSOCIATED
Outputs: stereo balanced analog, stereo balanced single-ended	EQUIPMENT Goldmund Mimesis 36 digital transport, dCS Debussy DAC, Bryston BDA-1 DAC, HP Latitude (Windows 7) PC,
Inputs: Coax, Toslink, USB, word clock	Goldmund Mimesis 22
Maximum digital resolution: 192/24	Preamplifier, Goldmund Mimesis 29.4 Power Amplifiers, Metaphor Acoustics 1 Speakers, Empirical Design cables and power cords,
Dimensions: 17" x 6 3/8" x 13"	Wireworld Platinum Starlight USB cable, Goldmund cones
Weight: 68 3/8 lbs.	
Price: \$19,500	
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EQUIPMENT REVIEW - Esoteric K-01 CD/SACD Player



any lineage buried within a DAC, I expect the drop-off to be precipitous. This has been the pattern since day one. So I was surprised when I encountered a DAC-based lineage, Esoteric's own D-07X, that performed quite respectably. But the K-01 is another matter entirely. Esoteric put great thought—and backed it up with top-quality circuitry—into this player's lineage. The volume control is digital, which normally exacts a resolution toll at lower levels. However, in this case the control has a bit-depth of 32, allowing it operate at high attenuation without the usual compromises. Too, Esoteric blessed the K-01 with a fully balanced, fully buffered analog output stage. As a result, the K-01 comes closer—much closer—to my reference lineage than any DAC before it.

Take the Jimmy Cobb SACD. Both lineages deliver the same stellar dynamics, tight timing, and virtually identical midrange tonality. On the surface, the differences seem pretty minimal. But, of course, you do give up something by not spending \$25k on a separate component. The K-01's bottom end is not as fully fleshed out as it could be, transients are ever so slightly dulled, and the upper reaches do not have quite enough

extension to convey air, a large soundspace, or details like the shimmer of a cymbal. You could live with this lineage, and it soundly trounces every other such unit I have heard, but personally I would not want to sacrifice even a smidgen of what the K-01 does as a source.

Conclusion

\$19,500 isn't chump change, but how often does such a sum purchase *three* reference-level components? The K-01 delivers benchmark performance as a CD player, an SACD player, and a DAC for both S/PDIF and USB sources—all packaged in a flawlessly operating, elegantly hewn chassis. Its lineage, too, is a standout among DAC-based units. However, I suspect those looking at twenty-grand sources already have a more than satisfactory lineage. What they likely do *not* have is a CD player that sounds this good, an SACD player that sounds this good, a DAC that sounds this good, and a way to play USB audio that sounds this good. If I could choose just one source component for my system, the Esoteric K-01 would be it. Maybe the distributor will let me hang onto it for a spell. **tas**

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Oppo BDP-105 Universal/Blu-ray Player and DAC

Gives "Flexible Flyer" A Whole New Meaning

Chris Martens

In recent years Oppo Digital has followed a simple recipe for success: Just build universal disc players that offer greater versatility, more audiophile-friendly features, and more sensible pricing than the competition does, and then give them decisively better sound and picture quality than their peers. Naturally, this laudable goal is a lot easier to describe on paper than it is to achieve in the real world, but Oppo has made good on its promises, year after year and player after player, in the process earning a reputation as the nearly automatic "go-to" source for players that will satisfy discerning music (and movie) lovers on a budget.

Historically, many of Oppo's most popular players have sold for around \$499. But with the 2011 release of its BDP-95 universal/Blu-ray player (\$995), the firm began to explore a more upscale market. What set the BDP-95 apart was that it was not merely a "hot-rodded," sonically tweaked version of a standard Oppo player; rather, it was a unique, dedicated high-end model with a distinctive configuration all its own.

The award-winning BDP-95 sounded remarkably good both for its price and in a broader sense. Never a company to rest on its laurels, however, Oppo has recently announced the successor to the BDP-95; namely, the BDP-105 (\$1199)—a player that promises to do everything its predecessor could do and then some.

Like its predecessor, the BDP-105 can handle virtually any format of audio or video disc, including Blu-ray Video, Blu-ray 3D, DVD-Video, DVD-Audio, SACD, CD, HDCD, and more. But with the BDP-105 the universality theme doesn't end with disc playback

because the new player is also designed to serve both as a network-streaming player *and* as a multi-input high-resolution DAC (complete with asynchronous USB).

To really "get" what the BDP-105 is about, think of it not so much as a powerful multi-format disc player (although it is that and more), but rather as a multi-function digital media playback hub whose bag of trick includes, but is in no way limited to, disc playback. In practical terms, this means the BDP-105 neatly resolves debates about whether it is better to listen to discs, to stream content from the Internet, or to enjoying audio files stored on computers, because it can quite happily do all of the above.

The BDP-105 comes housed in an all-new steel chassis said to be significantly more rigid than the chassis used in previous Oppo players (including the BDP-95), and it benefits from a fan-less architecture, meaning all internal components are convection-cooled (most previous Oppos required fan-cooling). Do such seemingly small detail changes like a more rigid chassis or a fan-free design make for meaningful sonic improvements? My opinion, based on extensive comparisons between the BDP-105 and 95, is that they do. Specifically, the new player offers a noticeably more solid and "grounded" sound with quieter backgrounds, improved resolution of low-level transient and textural details, and superior three-dimensionality.

Moving on, the BDP-105 uses a beefy toroidal power supply and provides both 7.1-channel analog audio outputs plus two separate sets of stereo analog outputs (one single-ended and the other fully balanced). Interestingly, the BDP-105 (like the BDP-95) features not one but rather *two* costly 8-channel ESS Sabre32 Reference DACs, one to feed the 7.1-channel outputs and the other to feed the two sets of stereo outputs. ESS's Sabre32 Reference DACs are used in some very pricey components, making it impressive that Oppo fits two of the devices into its sub-\$1200 player.

Another new touch is that the BDP-105 provides a

built-in headphone amp that runs straight off one of the player's ESS Sabre32 Reference DACs. While the headphone amp offers relatively modest output, it has the undeniable benefit of being fed directly from one of the Oppo's ESS Sabre32 Reference DACs, so that it gives listeners an unusually pure, uncluttered, intimate, and up-close perspective on the music (precisely what you would want for monitoring applications, for example). I found the Oppo headphone amp had more than enough output to drive moderately sensitive headphones such as the HiFiMAN HE-400s or PSB M4U1s, though it might not have sufficient "oomph" for more power-hungry top-tier 'phones (for instance, the HiFiMAN HE-6).

While the original BDP-95 offered a reasonable range of Internet-content options and could play digital audio files from USB storage devices or eSATA drives, it was never set up to function as multi-input playback device or as a high-resolution audio DAC. The 105 changes all this by offering a greatly expanded range of general-purpose inputs, including two HDMI inputs (one that is faceplate-accessible and MHL-compatible) and three USB 2.0 ports (one that is faceplate-accessible). Moreover, the BDP-105 also provides three dedicated DAC inputs: two S/PDIF inputs (one coaxial, one optical), plus one asynchronous USB input. Finally, to complete the connectivity picture the new player provides both Ethernet and Wi-Fi network connections implemented, respectively, through a rear panel-mounted RJ-45 connector and a handy USB Wi-Fi dongle.

To take full advantage of these network-connection options, the BDP-105 offers DLNA compatibility, complete with support for DMP (Digital Media Player) and DMR (Digital Media Renderer) protocols. In practice, this means the BDP-105 can access audio, picture, and video files stored on DLNA-compatible digital media servers (that is, personal computers or network-attached storage devices) that share a common network with the Oppo within your home.

From this technical overview, you can see that the

EQUIPMENT REVIEW - Oppo BDP-105 Universal/Blu-ray Player and DAC

BDP-105 is an extraordinarily flexible source component, but for most audiophiles the key question is, and always will be, "How does it sound?" Let's focus on that question next.

From the outset, the BDP-105 struck me as being a very high-resolution player—one that made child's play of digging way down deep within recordings to retrieve small, essential pieces of musical information that helped convey a sense of realism. To hear what I mean, try the track "O Vazio" from the Jim Brock Ensemble on *Jazz Kaleidoscope*—a sampler disc (in HDCD format) from Reference Recordings. Throughout this track the Oppo did a stunning job of rendering the distinctive attack and action of each of the instruments in the ensemble (accordion, bass, drum kit, guitar, trumpet, winds, and other more exotic percussion instruments), giving them a commanding sense of presence with precisely focused placement within a wide, deep, three-dimensional soundstage. In particular, the 105 showed terrific speed and agility on the leading edges of notes (especially on the drums), rendering them with the sort of clarity and impact that reminded me of the sound of far more costly players.

Another song from *Jazz Kaleidoscope*, "Jordan" from the Brock/Manakas Ensemble, contains a brief, quiet passage that reveals another important aspect of the BDP-105: namely, its impressive ability to maintain focus and resolution even when playing at very low levels. After the introduction of the song, which lasts about 35 seconds, the music comes to a dramatic pause that eventually is broken by the extremely faint sound of a cymbal (or small gong?) gently introducing the rhythmic pulse

that will supply a heartbeat for the rest of the song. At first, the cymbal is heard so softly that its sound barely rises above the noise floor, yet even so the Oppo gets the sound of the instrument right, preserving all the essential elements of attack, timbre, and decay. This uncanny ability to resolve very-low-level musical information enables listeners to hear all the little interactions between instruments and the acoustic spaces in which they are playing. While the original BDP-95 did a fine job in this respect, I would say the BDP-105 sounds better still.

The voicing of the BDP-105 is generally neutral, with taut, deep, and well-controlled bass, transparent mids, and revealing, extended highs (highs that can, however, expose mediocre recordings for what they are). Pleasing though the Oppo can be, some might find it a bit lean-sounding compared to the deliberately warmer-sounding offerings on the market. If you prefer components that give a voluptuous musical presentation then the Oppo might not be your cup of tea, but if sonic honesty and neutrality are your things you should get on very well with it.

Let me expand on my voicing comments by pointing out that the BDP-105 needs a *lot* of run-in time to sound its best (some say as much as 200 hours or more). As playing time accumulates, traces of leanness and austerity gradually melt away, thus enabling the player to reveal a smoother, more full-bodied, and more forgiving sonic persona.

If you buy the notion that some source components try for a softer, smoother, and thus ostensibly more "musical" presentation, while others aim for maximum musical information retrieval, then I would say the Oppo falls squarely

in the information-retrieval camp (as do a great many other high-performance solid-state players). Thus, tonal colors are rendered vividly through the Oppo, but without any exaggeration or oversaturation, so that there is nothing artificially sweetened, enriched, or "glowing" about the 105's sound. Instead, the Oppo is one of those rare "what you hear is what you get" sorts of players, whose primary mission is to tell you how your discs or digital music files actually sound, which in my book can be a beautiful thing.

As a disc player, the BDP-105 is more than good enough to show in palpable ways that well-recorded SACDs really do sound better than their equivalent CDs (there's greater smoothness and ease with SACDs, and simply more "there" there, so to speak). But as a DAC, the Oppo really comes into own, sounding much like it does when playing discs, but with subtly heightened levels of tonal saturation and warmth that make the music more engaging and intense.

Are there caveats? Apart from the extensive run-in requirements noted above, I can think of only a few. First, the BDP-105 is an inherently complex product that—at the end of the day—is simpler to navigate and control when it is connected to a display screen. Second, the player's sound is so unashamedly refined and sophisticated that you may feel inspired (if not compelled) to use top-tier interconnect cables that will wind up costing more than the player does. But trust me on this one: The Oppo's worth it.

If ever a product deserved to be considered the Swiss Army knife of digital media playback, the BDP-105 is the one. Whether you choose it for multi-format disc playback, for network-

streaming capabilities, or to use as a DAC at the heart of a computer-audio system, the BDP-105 will consistently serve up levels of sonic refinement and sophistication the belie its modest price. Enthusiastically recommended. **tas**

SPECS & PRICING

Disc types: BD-Video, Blu-ray 3D, DVD-Video, DVD-Audio, AVCHD, SACD, CD, HDCD, Kodak Picture CD, CD-R/RW, DVD-R/RW, DVD-R DL, BD-R/RE	RCA jacks), two digital audio outputs (one coaxial, one optical), two HDMI outputs (can be configured for video output on one port and audio output on the other), one headphone output
Internal storage: 1GB	DAC resolution: (USB Audio) 2 channels @ 192k/24b PCM, (Coaxial/Optical) 2 channels @ 96k/24b
Inputs: Three USB 2.0 inputs (one faceplate accessible), two HDMI inputs (one faceplate accessible and MHL compatible), three dedicated DAC inputs (one coaxial, one optical, and one asynchronous USB), one Ethernet port (RJ-45), one Wi-Fi port (via USB dongle)	Dimensions: 16.8" x 4.8" x 12.2"
Outputs: One 7.1-channel analog audio output, two stereo analog audio outputs (one set balanced via XLRs, one set single-ended via	Weight: 17.3 lbs. Price: \$1199
	OPPO DIGITAL, INC. 2629 Terminal Blvd., Suite B Mountain View, CA 94043 (650) 961-1118 oppodigital.com

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dCS Vivaldi Digital Playback System

Ne Plus Ultra

Robert Harley

There are few companies in high-end audio that can be considered unique. By that I mean a company that creates technologies unlike those of any other brand, and designs products that are fundamentally different from the innumerable “me-too” components that flood the market.

Take the important job of digital-to-analog conversion, for example. Virtually all DAC manufacturers buy from the same menu of available chips and configure them in slightly different variations of the same theme. Some are more successful than others in creating good-sounding products, but none builds a digital-to-analog converter from the ground up with technologies invented entirely in-house.

An exception to this rule is the British company Data Conversion Systems (dCS). Every key element in every product it manufactures is designed and built by dCS using proprietary technologies. You won't find an off-the-shelf DAC chip, digital filter, or input receiver in a dCS product. What you will find are circuits, techniques, software, and engineering unlike that of any other product.

The ultimate expression of dCS' unique approach is embodied in the new Vivaldi, the most advanced and ambitious digital-playback system yet created. This \$108,496 four-box *tour de force* takes dCS' proprietary technologies to their ultimate realization. It is impossible to overstate the Vivaldi's technical sophistication—or its revelatory musical presentation. dCS has wrapped all of this advanced technology in stunningly bold and elegant metalwork that is as unique as the circuits inside.

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Describing the Vivaldi, its capabilities, and how it functions is quite a challenge. This is by far the most complex, technical, intricate, and feature-laden product I've ever reviewed. I'll give you a brief overview here, with more technical detail in the sidebars.

The complete Vivaldi system is a four-box design, but not all four boxes are required. Those four units are the Vivaldi Transport (\$39,999), Vivaldi DAC (\$34,999), Vivaldi Digital-to-Digital Upsampler (\$19,999), and Vivaldi Master Clock (\$13,499). You could, for example, buy just the Vivaldi DAC and drive it with a computer source (it has a USB input) or connect your CD player (if the CD player offers a digital output). A big step up is the Vivaldi Transport and DAC combination; when used together the two units offer unique features including upsampling in the transport and the ability to transmit encrypted high-resolution audio (DSD or upsampled PCM) from the Transport to the DAC. In fact, a Vivaldi Transport and Vivaldi DAC will get you much of the way toward the sonic performance described later in the review. In addition to reading CDs, the Transport is compatible with SACD.

The Vivaldi Upsampler converts any common sampling frequency to any other sampling frequency, each user-selectable. Moreover, the Upsampler adds network capability, allowing you to integrate the Vivaldi with a music server, control the system via an iPad/iPhone/iTouch, and play music directly from a USB stick. The Vivaldi Clock simply serves as a high-precision master-timing reference to which all the other units are locked.

Each unit is housed in a gorgeous chassis featuring a three-dimensional sculpted front panel. Raised flowing lines grace the front panels like gentle waves. My review sample was silver, but

black is also available. A full-color display toward the left side of each front panel shows, under normal use, the operating status (input selected, sampling frequency, whether the unit is locked to the Master Clock, etc.). But when you put one of the units into menu mode the display shows a myriad of details for setting up and configuring the component. The menu structure is so extensive that dCS provides a plastic-coated map in addition to the owner's manual.

Connecting and configuring a Vivaldi is best left to your dealer; a typical setup requires 12 digital cables, and that's without adding networking capabilities. The four units that make up the Vivaldi have collectively a mind-bending 56 rear-panel connectors. Moreover, the settings on each unit need to be optimized for the best sound. These include the upsampling options, whether the clock is dithered, and which of the six digital filters is selected, to name just a few of the many, many settings that are required to make the system work and realize its sonic potential.

Once the system is set up and has settled in, however, operation is quite simple. The DAC remembers the filter chosen for each input and sampling rate, for example, so there's no need to adjust these settings (although you may want to change filters for different recordings—more on this later). The only button you'll probably need to press on a daily basis is the DAC's input selector to switch between CD and SACD from the transport, or the Upsampler's input-select button to play music from a server. You can select DAC and upsampler inputs from the full-featured remote (supplied with the DAC). This hefty and well-designed unit controls transport functions, adjusts the DAC's output level, selects the DAC filter, fine-tunes the left-right

SPECS & PRICING

VIVALDI TRANSPORT CD/ SACD TRANSPORT

Outputs: Dual AES/EBU with DXD or proprietary dCS encrypted DSD, AES/EBU, SPDIF (one RCA, one BNC), SDIF-2, word-clock in, word-clock out

Dimensions: 17.5" x 7.8" x 17.2"

Weight: 51.1 lbs.

Price: \$39,999

VIVALDI DAC

Inputs: Four AES/EBU (each can be used independently or as dual pairs to accept DSD or DXD); three SPDIF (two RCA, one BNC); SDIF-2; three USB Type B; word clock

Outputs: One stereo pair balanced on XLR jacks, one stereo pair unbalanced on RCA jacks

Output level: Variable (maximum of 2V or 6V output user selectable)

Digital filter: Selectable, six for PCM and four for DSD

Dimensions: 17.5" x 6" x 17.2"

Weight: 35.7 lbs

Price: \$34,999

VIVALDI DIGITAL-TO-DIGITAL UPSAMPLER

Inputs: Network (RJ45), USB (Type B connector), USB (Type A connector), AES/EBU, SPDIF (two RCA, one BNC, one TosLink), SDIF-2

Outputs: Two ES/EBU (can operate independently or as a dual pair to carry high-res PCM or dCS-encrypted DSD)

Dimensions: 17.5" x 6" x 17.2"

Weight: 31.3 lbs

Price: \$19,999

VIVALDI MASTER CLOCK

Outputs: Two groups of four independently buffered outputs on BNC connectors

Clock frequencies: 44.1, 48, 88.2, 176.4, 192kHz

Dimensions: 17.5" x 6" x 17.2"

Weight: 29.9 lbs

Price: \$13,499

ASSOCIATED COMPONENTS

Digital Sources: MacBook Pro; AVA Media Zara Premium ripping server, Pure Music and Audivana playback software

Analog Source: Basis Inspiration turntable with Basis Vector 4 tonearm, Air Tight PC-1 Supreme cartridge; Simaudio Moon 810LP phonostage

Preamplifiers: Rowland Corus, Constellation Perseus, Absolare Passion

Power Amplifiers: Rowland 725, Lamm ML2.2, Constellation Centaur monoblocks, Absolare Passion 845

AC Conditioning and Cords: Shunyata Triton and Talos, Audience aR6TS conditioners; Shunyata Zitron Anaconda and Audience Au24 AC cords

Cables: Shunyata Anaconda interconnects and loudspeaker cables; MIT MA-X2 and MA-C interconnects, MIT MA-X SHD loudspeaker cables; AudioQuest WEL Signature interconnects, Transparent XL Reference interconnects; AudioQuest Diamond USB and WireWorld Platinum Starlight USB

Equipment Racks: Stillpoints, Critical Mass Systems amplifier stands

Isolation: Stillpoints Ultra SS and Ultra5

Acoustics: ASC 16" Full-Round Tube Traps, 10" Tower Traps

Accessories: VPI 16.5 record-cleaning machine; Mobile Fidelity record brush, cleaning fluid, stylus cleaner

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balance, and changes the upsampler's output sampling rate, among other functions.

I received a very early production model that had a couple of minor glitches, but a software update (easy to do from a CD or USB stick) fixed them. Interfacing the Vivaldi with a music server via a wireless network was considerably more challenging. My setup included a wireless router and an AVA Media Zara Premium ripping server connected to the Upsampler via an Ethernet cable. Downloading dCS' iPad app from the Apple store allowed me to browse music on the server, choose music for playback, and assemble playlists. Although this sounds simple, it took many frustrating hours of troubleshooting to get the whole thing working. My experience might not be typical, particularly as dCS continues to improve its software.

Listening

The Vivaldi is built like no other digital source, and it sounds like no other digital source. Although there are obvious similarities between dCS' Puccini CD/SACD player and the Vivaldi, this new cost-no-object implementation of the company's best technologies vaults the sound quality into the stratosphere. The Puccini is the only other dCS product with which I'm familiar; many of you will want to know how the Vivaldi compares with dCS' former flagship, the Scarlatti. I asked our reviewer Jacob Heilbrunn, who owned a Scarlatti for many years (and bought the Vivaldi after hearing it) to make that comparison (see sidebar).

One of the key characteristics of any dCS product is the sheer density of information it

conveys. By that I mean not just resolution of fine detail, but the impression that the fabric of the music is intricately woven from the finest silk. By contrast, other digital sounds somewhat less "continuous" in texture, as though, to expand on the cloth analogy, it were woven from coarser, less tightly woven threads. With the Vivaldi, instrumental timbres have a richness and saturation that more convincingly create the illusion of hearing the instrument itself and not a digital reconstruction of it. This increased density of tone color and impression that the sound is organic and continuous—unique among digital playback systems in my experience—goes a long way toward narrowing the gap between digital and analog. The Vivaldi renders timbres with a vividness and immediacy that are startling, even from CD and 44.1kHz/16-bit files. What the Vivaldi does better than any other digital source I've heard is to make a piano sound more "piano-like" and a sax more "sax-like." I could have chosen any two instruments for this example—the Vivaldi simply portrays every instrument more realistically and less synthetically. Part of this quality is due to the increased density of texture and tone color mentioned, but also to the lack of a mechanical tincture that makes digitally reproduced timbre sound slightly unnatural. When at the front end of a chain that includes the ultra-transparent Constellation electronics, MIT interconnects and cable, and Magico Q7 loudspeakers (along with state-of-the-art power conditioning and vibration isolation), the Vivaldi offers an absolutely gorgeous and lifelike portrayal of instrumental textures.

There's another reason why instruments and voices sound so "there" with the Vivaldi, and that's the system's tremendous clarity and transparency. The old cliché "veils were lifted" could have been coined to describe the Vivaldi's startling sense of nothing between you and the music. Frankly, the Vivaldi makes other digital sound somewhat thick and opaque. This clarity and crystalline transparency not only increases the impression of timbral vividness and immediacy, it also contributes to the Vivaldi's astonishing spatial presentation. This transparency isn't just between you and the lead instruments; it extends to the far reaches of the soundstage. The ability to see deep into the hall and hear instruments at the back of the stage sound just as vivid and alive as instruments at the front is unprecedented in my experience.

Think all digital sounds flat and lacking in dimensionality? Listen to the Vivaldi and you'll hear just how much space, air, depth, and bloom is encoded in your music library just waiting to be liberated. I've repeatedly been amazed over the years to discover greater spatial fidelity and musicality from familiar discs after hearing those discs through better and better components, but never to the degree of the dCS. The Vivaldi represents a huge leap forward in rendering digitally reproduced music with dimensionality, depth, and a sense of transparent space between instrumental images. Listen to the first track on the amazing *Playing With Fire* from Reference Recordings. The wall behind the loudspeakers completely disappears; the low brass sounds as though it's twenty feet behind the loudspeaker plane.

Not only does the Vivaldi recreate depth, but there's an organic continuousness to the presentation of depth along a continuum. I can vividly hear the placement of each instrument in the soundstage. Not only is the soundstage deep, it's also expansive, in the sense of top-octave air riding "over" the music. I'm not referring so much to musical information in the top octave, but rather to the impression of a lid being taken off the top of the soundstage, with a resultant opening-up of the presentation. The impression of air around cymbals, for example, makes them more vivid and alive than a rendering that presents just the instrument itself. The latter sounds flat and lifeless, paradoxically being simultaneously bright yet lacking in treble extension. The Vivaldi's top-octave air and soundstage openness are unlike any other digital I've heard, and much closer to a great analog front end.

The Vivaldi's soundstaging pays tremendous dividends in the ability to hear individual musical lines and shift focus between instruments no matter how complex the music. The presentation is the antithesis of homogenized, thick, congested, and confused. This clarity of instrumental lines was apparent, and musically significant, on even small-scale music like the acoustic guitar and violin duet "Northern Lights" from the Dixie Dregs' *Freefall*, where the interplay between instruments suddenly became clearer, and the musicians' intent more palpable. Listen also to Joe Pass' comping during the muted trumpet solo in "Contractor's Blues" from the XRCD of Count Basie's *88 Basie Street* through the Vivaldi and any other digital playback device. The dCS conveys every

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nance of his expression and in doing so, restores the energy, the unbridled swing, and sense of contemporaneous music-making that other digital sources dilute.

I would characterize the Vivaldi's treble balance as leaning toward the incisive rather than the relaxed. I'm generally intolerant of a bright or forward treble—it's a deal-breaker in my book. Yet the Vivaldi manages to present a full measure of treble information with no sense of forwardness or aggression. That's partly because the treble is so well integrated with the rest of the spectrum, is finely woven in texture as described earlier, and is presented in its proper spatial perspective within the soundstage. Bright digital sources force the treble forward and make it sound like a separate component riding on top of the music. The Vivaldi's treble is at once delicate and refined, yet full-bodied and unrestrained. Moreover, the top end is richly and finely detailed, particularly at very low levels. It is also extremely clean and free from glare, another factor that allows the Vivaldi to sound fully alive in the top end yet not cross the line into brightness. When thinking about the Vivaldi's upper-midrange and treble I was reminded of Jonathan Valin's wonderful phrase "illuminated from within," which he first used to describe Audio Research electronics. That's exactly how the Vivaldi sounded—infused with light and air. The treble resolution sounded completely natural, devoid of etch, grain, glare, and mechanical artifice. Nonetheless, I should mention that in my system I preferred the slightly softer-sounding DAC Filters 4 and 5 rather than the brighter and "sharper" Filter 1 (which dCS claims is technically "correct").

As you scroll through the filter choices, moving to higher numbered filters, the sound becomes increasingly more relaxed. Filter 5 has no pre-ringing (the filter's ringing energy is shifted so that it occurs *after* the transient rather than before *and* after the transient) and is useful when listening to hard-sounding 44.1kHz/16-bit sources. This illustrates the utility of having multiple filters available at the press of a remote-control button.

In the reproduction of bass—extension, weight, dynamics, articulation, pitch definition—the Vivaldi is simply in a class of its own. The bottom end is big and powerful, yet fast and delicate. The entire bass region has a clarity that, again, is unlike any other digital I've heard. This quality alone makes the Vivaldi revelatory—it conveys the texture, the body, and life of low brass, cello, acoustic and electric bass, piano, and kick drum. The Vivaldi doesn't dilute the timbre, dynamics, power, weight, or clarity of bass-rich instruments. The thundering left-hand lines of *Nojima Plays Liszt* [Reference Recordings], for example, conveys the piano's size, power, and authority, as well as Nojima's commanding mastery of this music. I had the same goosebump-raising experience with this recording as when I stood a few feet from a 9' Steinway while pianist Fan Ya Lin performed with powerful ferocity at the last Rocky Mountain Audio Fest. These bass qualities combined with the transparency, bloom around image outlines, and textural finesse described earlier to create a more credible illusion of an acoustic bass in my listening room than any other digital I've heard—by a wide margin. Listen, for example,

to Edgar Meyer's superbly recorded instrument on the CD *Hop, Skip & Wobble* [Sugar Hill], a trio album with Jerry Douglas and Russ Barenberg. Rather than hearing a mere source of low-frequency sounds, I got an uncanny impression of the instrument's large wooden body resonating, and the attacks of each note expanding out into the room.

The Vivaldi's SACD performance was off-the-charts-great. Fabulous-sounding SACDs were sublime in their resolution, clarity, and lack of a "digital" signature. I recently discovered the Japanese label Eighty-Eights (distributed by Eastwind Imports). Judging from the first two discs I've heard from its catalog—*The Great Jazz Trio* (Hank Jones, John Pattitucci, and Jack DeJohnette) and Roy Haynes' *Love Letters*—the label is recording great music in state-of-the-art sound. All the titles are recorded originally in DSD and released as hybrid SACDs. The disparity between CD and SACD was not as great as I've heard from other players, but not because of any limitation in the Vivaldi's SACD performance. Rather, the Vivaldi's ability to make CDs sound so great vaults their performance closer to SACD territory than I thought possible. In comparisons between SACD and the same titles in 96kHz/24-bit PCM played from the server I'd have to give the edge to the SACD format for its smoother, more lifelike treble and concomitant greater ease. The PCM file, by comparison, has a hint of hardness in the treble not present in SACD playback. Cymbals reproduced in the SACD format are more delicate, airier, and lack the slightly hard timbre of PCM.

I was able to play native DSD files from a

computer but didn't have the equivalent SACDs to make comparisons. I was also unfamiliar with the limited selection of music available. I can, however, report that the sound was superb and that the Vivaldi played DSD files with no problems.

High-resolution PCM files with which I'm very familiar were taken to another level by the Vivaldi. The low-level detail, spatial cues, and dimensionality of *Exotic Dances for the Opera* [Reference Recordings] at 176.4kHz/24-bit were stunningly portrayed. The Vivaldi revealed these spectacular recordings in all their glory. The qualities that make high-res better than standard-resolution—transparency, low-level detail, dimensionality—were fully realized via the Vivaldi's stunning resolution, timbral fidelity, dynamics, bottom-end weight and precision, and particularly, its tremendous dimensionality and sense that the soundstage is infused with air and light.

If you're wondering whether it's worth spending the money for the Transport in this age of computer audio, my view is that the transport is essential for several reasons. First, the Transport will allow you to enjoy the large catalog of SACD titles. There are enough great SACDs to make it worth investing in hardware to access this format. Moreover, the Vivaldi represents the highest realization of the SACD format now and in the foreseeable future; I doubt that anyone will ever build a player that eclipses the Vivaldi. And when dCS inevitably discovers new techniques for extracting higher performance from the format, those techniques will likely be available via a software upgrade. Second, in comparisons between playing a CD

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Inside the dCS Factory

I visited dCS' sparkling new factory last September to get the full technical briefing on the Vivaldi and to see first-hand how this extraordinary product is built. Last year dCS moved from an older building south of Cambridge to a brand new and very modern facility ten minutes north of the city. The new factory was built-out specifically for dCS to give the company greater efficiency of manufacturing.

dCS was founded in 1990 to build high-precision electronics for military applications, including ultra-precise analog-to-digital and digital-to-analog converters. The company then began applying its technology to professional audio, where dCS earned a reputation for extraordinary sound quality. dCS introduced its first consumer product, the Elgar DAC, in 1997. Since then the focus has been on pushing the envelope in high-end digital-playback systems. The company has 17 employees, five of them in engineering. The two leading engineers have between them more than 40 years at dCS. When visiting a company I always note the ratio of engineers to sales and marketing personnel; it gives you an idea of whether the company is technology-driven or marketing-driven. dCS is most assuredly an engineering-led firm.

The Vivaldi's industrial designer, Ray Wing, gave me a fascinating in-depth look at the design process via 3-D drawings on his computer. dCS wanted a distinctive new look

for the Vivaldi and it achieved that goal. The front panels have gentle three-dimensional waves that are elegant and visually interesting, but exceedingly time-consuming to machine. Creating one front panel for a Vivaldi component takes four hours of CNC machine time.

As with all dCS products, the Vivaldi is software-intensive. All the control systems, upsampling, digital filtering, input receiver, and the algorithm that converts PCM or DSD to the five-bit Ring DAC code are created in-house. The metal work and printed-circuit board stuffing are performed by local outside vendors, with assembly in dCS' factory. Each board undergoes testing before assembly, and repeatedly during the build process. Some of these tests take four hours to complete on an automated test-jig. The critical clocks inside Vivaldi are individually calibrated by putting them in an oven for four days, varying the temperature, and monitoring the clock's frequency drift with the changing oven temperature. A support circuit is individually calibrated for that particular clock's characteristics based on the measured data. Each component of the Vivaldi system (Transport, DAC, Upsampler, Clock) is visually inspected by three different individuals before the unit is boxed—the test technician, the production manager, and either someone from marketing or the president of dCS himself. RH



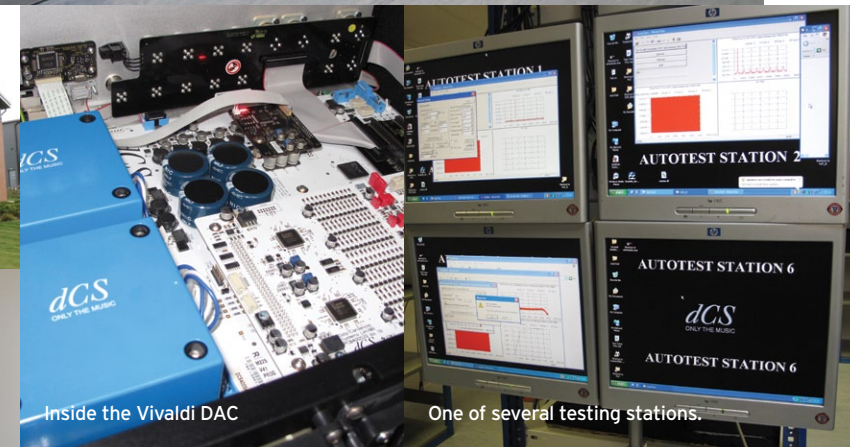
The production shop.



dCS' new factory



The oven and clock-measurement system.



Inside the Vivaldi DAC

One of several testing stations.

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in the transport and listening to a ripped file of that CD I thought that the Transport had a small but noticeable sonic advantage. You wouldn't think that reading data from an optical disc on the fly could be preferable to accessing a file from a hard drive, but to my ears the CD had a slightly greater sense of musical flow and involvement. It was hard to pin down to a specific sonic attribute, but the file sounded very slightly mechanical by contrast. The difference was small—less than that between USB or Ethernet cables, for example—so the disparity could have been my particular setup.

You might also wonder what contributions the Upsampler and Master Clock make. The Upsampler gives you more options for upsampling (the Transport's upsampling choices are limited), a networking capability, and an improvement in sound quality similar to that offered by the Master Clock. Adding either unit sharpens the soundstage focus, deepens the spatial presentation, increases dimensionality, resolves more fine detail, and renders timbres with greater realism. Even without the Upsampler and Clock, the Vivaldi Transport and DAC pair deliver the best-sounding digital I've ever experienced. The Upsampler and Clock just take what is already a spectacular presentation to an even higher level. Note that when listening to SACDs the Upsampler isn't in the signal path; the Transport connects directly to the DAC via dual AES/EBU cables.

The Vivaldi sounds in many ways like the Magico Q7 loudspeaker: ultra-transparent, ultra-realistic in its rendering of timbre, precise without being analytical, wide in bandwidth, tremendous in clarity and resolution, with a

bass presentation that combines authority with definition. The Q7's transparency and neutrality allowed me to fully hear the Vivaldi's remarkable musical performance. The Vivaldi's clarity and textural density gave me a new appreciation for the Q7's resolving power and realism.

After listening to the Vivaldi for a month with it connected with generic digital cables (AES/EBU and BNC-terminated clock cables), I replaced the signal and clock cables (one at a time) with AudioQuest digital cables (Wild AES/EBU and Eagle Eye BNC). It wasn't a big surprise that the AudioQuest AES/EBU cables elevated the performance, but I didn't expect replacing the cables carrying the clock would make such a difference. The sound with the Eagle Eye clock cables became more coherent, relaxed, and more musical. It wasn't so much that the digital cables improved specific areas, but rather that the sound become more engaging and expressive. The Vivaldi is such a finely tuned instrument that it reveals everything, and at this level of quality, every improvement is significant.

Conclusion

After living with dCS' Puccini CD player, and then learning about the Vivaldi's technology, I had expected this new flagship to raise the bar in digital playback. I just didn't expect that it would raise it so far above the current state of the art. The Vivaldi is in a class of its own in every category—technical sophistication, capabilities, and most importantly, sound quality. It was mind-blowing to hear well-worn references brought to life with such



realism; I never thought that I would hear such dimensionality, clarity, and timbral fidelity, or experience such musical involvement, from standard-resolution digital.

In addition to reference-class sound from CD, SACD, and high-resolution files sourced from a computer, the Vivaldi also sets the benchmark in functionality. There's nothing the Vivaldi won't do—PCM to DSD conversion, PCM to DXD, play DSD files, upsample any sample rate to any other rate, connect to a network for music-server integration, play files from a USB stick—the list goes on and on. Moreover, the Vivaldi's hardware platform is overbuilt for the current software; new features and capabilities can be added with software updates without taxing the hardware's capabilities. This state-of-the-art functionality, however, comes at

a price: The Vivaldi is a highly complex and sophisticated instrument that asks much of the user in terms of selecting the operating parameters and monitoring the displays to be sure that the settings are optimized. In addition, I was not entirely satisfied by the music-server integration function. It was a challenge to set up, and the dCS iPad-control app is not as intuitive as, for example, the free Apple Remote app for iTunes.

If you are in the fortunate position of being able to afford it, there's no better sounding, more capable, more technologically advanced, or more future-proof digital source than the dCS Vivaldi. There's simply nothing else like it. It is truly, and by a wide margin, the *ne plus ultra* of digital playback.

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The Vivaldi's Technology

The Vivaldi Transport is built around the massive Esoteric VRDS Neo disc mechanism. I attended a detailed technical presentation on this mechanism several years ago at Esoteric's California office and can tell you that it's built like no other disc-playback system in the world. The 14-pound device (conventional transports weigh a few ounces) is made from parts cut from solid-steel blocks. Most transports hold the disc at the center with a flimsy clamp; the VRDS Neo mechanism features a clamp just bigger than a CD that is made from machined Duralumin. The disc is clamped from above via a solid steel "bridge," securely holding the disc as it is spun and read. The laser pickup is mounted on a sturdy sled and only allowed to move in three directions (horizontal, vertical, and circular) to reduce vibration and servo activity. The sled is mechanically isolated from the rest of the transport mechanism. Each mechanism is made by hand in Japan, and undergoes two days of quality-control testing.

The Vivaldi Transport is unusual in that it can upsample 44.1kHz/16-bit data read from a CD to DXD or to DSD. DXD (Digital eXtreme Definition) is PCM data at 352.8kHz/24-bit. This format offers a data rate of 8.4672Mbs, considerably higher than DSD's 2.8224 Mbs. DSD is Direct Stream Digital, the encoding method of SACD. The Vivaldi Transport outputs DXD or DSD on dual AES/EBU jacks.

When outputting DSD, the data are encrypted with a proprietary encryption scheme. To use the Vivaldi Transport's upsampled DSD outputs, you'll need to connect it to the Vivaldi DAC (the DAC decrypts the signal). For those of you who prefer no upconversion, you can connect the transport to the DAC via a single AES/EBU connection, or better yet, with the SDIF-2 interface. Not to be confused with SPDIF, SDIF-2 is a three-cable interface developed for professional audio. The three cables carry, respectively, left-channel audio, right-channel audio, and word clock. This connection method, with the clock signal on a separate line, greatly reduces sonically degrading clock jitter.

The Vivaldi DAC is highly flexible and capable, able to convert digital data of any commonly found sampling frequency or signal format to analog. In a typical configuration one pair of the DAC's AES/EBU inputs is connected to the Transport for decoding DSD, and another pair to the Upsampler's outputs. The latter is selected when listening to CDs played in the transport, to an Apple device connected to the Upsampler, or to network attached storage under iPad control. The analog output is available on independently-buffered balanced and unbalanced outputs, and is variable via a front-panel knob or up/down buttons on the remote control. In a nice touch, a menu setting allows you to set



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the full-scale output level to 6V or 2V to match your power amplifier's input sensitivity and avoid large amounts of digital-domain attenuation. A useful display indicates the volume level. Of course, you can leave the volume at maximum and adjust the level with your preamplifier. Six filters are offered for PCM decoding and four for DSD decoding. The PCM filters include one with no pre-ringing. The DSD filters vary only in the filters' cutoff frequencies. Digital-to-analog conversion is performed by dCS' famous Ring DAC, a novel and ingenious solution to a fundamental problem in digital-to-analog conversion (see sidebar).

The Digital-to-Digital Upsampler fits between the Transport and DAC, upconverting audio from its native sampling rate to high-resolution PCM (up to 192kHz/24-bit) or DXD (352.8kHz/24-bit). The Upsampler's AES/EBU, RCA, and BNC connections can output PCM up to 192/24, with the dual AES/EBU jacks supporting DXD. It is also a digital hub with multiple inputs that can stream audio from a computer or a network-attached storage device such as a hard drive. The inputs include the network connection on an RJ45 jack, two asynchronous USB inputs (one Type A, one Type B), four SPDIF (two RCA, one BNC, one TosLink), and one SDIF-2. The Upsampler also supports the emerging DSD-over-USB protocol (which dCS developed and offered

to everyone free as an open standard). This means that you can play DSD files from a server through the Vivaldi. The Upsampler also supports direct-digital playback from Apple devices, bypassing the Apple device's internal DAC. The Type A USB input will play files stored on a USB stick, with navigation and music selection provided by the front-panel display. dCS offers an iPad app that allows you to browse and play your music library from a server or network attached storage device through the Upsampler.

The Vivaldi Master Clock isn't in the signal path, but instead sits outside it generating a reference clock to which the Transport, DAC, and Upsampler are locked. Without the Vivaldi Clock, the Transport, DAC, and Upsampler run on their own clocks (which are themselves high precision), but those clocks are not perfectly synchronized with each other. In addition, the Vivaldi Master Clock improves the clock precision by an order of magnitude, from +/-10 ppm to +/-1 ppm. The advantage to the Master Clock is that all the digital operations occurring in the various chassis are all locked to the same, higher-precision, reference. Note, however, that when using the Transport and DAC alone, the Transport will lock to the DAC via the SDIF-2 interface's separate clock line.

Each of the four chassis has a display window showing operating status,

including which input is selected, the upsampling ratio, whether the unit is locked to the Master Clock, etc. It took some experience with the system before I understood fully how it operated. The menu system is so extensive that the Vivaldi is, as previously noted, supplied with a menu hierarchy map. The Vivaldi is without question the most sophisticated and complex piece of consumer-audio hardware I've ever used. With one network cable and one USB cable attached, a fully loaded Vivaldi requires 14 cable connections—not counting the analog output cables. In addition, there are so many different combinations of settings that it's easy to find yourself listening to one that is less than optimum. After a few weeks, however, I had it down to just selecting the input on the DAC or Upsampler and occasionally changing filters. RH

It's important to note that the entire system is based on software running on a hardware platform. The new hardware in the Vivaldi (DSP chips, field-programmable gate arrays, flash memory) is considerably more powerful than what's needed to run the current software. This allows future upgrades and expansion of capabilities. To use just one example, the PCM interface and PLL-based input receiver are controlled and reconfigurable by software. Future improvements can be incorporated with a software update.

EQUIPMENT REVIEW - dCS Vivaldi Digital Playback System

Technology: Scarlatti vs. Vivaldi

The Vivaldi came to life as the result of dCS engineers asking, "What are the limitations of the Scarlatti?" That four-box flagship was designed in 2007 as a cost-no-object project, and has stood the test of time. Still, six years is a long time in today's world given changes in component parts, increasing options for accessing high-res music, as well as advances in dCS' thinking and expertise. The decision was made to examine every aspect of the Scarlatti and create a new reference that would transcend Scarlatti. The Vivaldi is the result of that three-year development effort.

For starters, the digital-signal processing platform in each of the four chassis was redesigned from the ground up to take advantage of new field-programmable gate arrays (FPGAs) and DSP chips. The new chips enabled dCS engineers to greatly increase the system's maximum processing capacity, speed of data transfer, and overall performance. The Vivaldi hardware platform has 200 times the processing power of its predecessor. The additional power not only streamlines operations, but allows for future capabilities via software updates. In addition, some parts of the code that were previously in firmware are now in software, allowing easier upgrades. An example is the software that converts PCM or DSD data to the five-bit Ring DAC code; when dCS improves upon this algorithm you can load the new code via a CD update rather than replac-

ing ROMs. The control-system circuit boards are now eight-layer rather than four-layer. Eight-layer boards are quite rare in high-end audio products.

One of the biggest differences between the Scarlatti and Vivaldi is the latter's use of new single-element latches in the Ring DAC (see sidebar). The Scarlatti employed 22 latch chips, each containing four individual latches. The Vivaldi's 96 separate latches confer a significant advantage in that there's no crosstalk between the latches as occurred when four latches were contained on a single chip. In addition, the new discrete latches offer higher performance.

The analog output stage is all new. It is 6dB quieter and has 20dB greater channel separation than the Scarlatti (100dB vs. 120dB). The two halves of the balanced signal are also more closely matched in performance, as are the left and right channel characteristics. The analog board's traces are routed by hand, not by an automated computer program. This allows the designer to optimize the layout and parts placement for the best performance.

The user interface is also more intuitive and streamlined. Certain functions that the user once had to manually perform when switching inputs, for example, are now automatic. The Vivaldi's greatly improved industrial design and cosmetics are readily apparent to anyone familiar with the Scarlatti. RH



EQUIPMENT REVIEW - dCS Vivaldi Digital Playback System

The dCS Ring DAC

The Ring DAC, invented by dCS in 1987, is a brilliant solution to the challenge of converting digital data to an analog output signal. To understand the Ring DAC, let's first consider how conventional DACs work. You can think of a multibit DAC as a ladder, with as many rungs on that ladder as there are bits in a sample. A 24-bit DAC will have 24 "rungs," each one a resistor that corresponds to each bit in the digital sample. The resistors are connected to a current source through a switch; the digital data representing the audio signal open or close the switches to allow current to flow to the output or not. The currents of each rung are summed, with that summed value representing the audio signal's amplitude.

The resistor values are "binary weighted." This means that each resistor lower down on the rung must have double the resistance of the rung above it, and so forth, corresponding to the binary progression 1, 2, 4, 8, 16, and so on. Because each bit in the digital code represents twice the value of the next lower bit, each resistor must have a value exactly half that of the resistor on the rung below it. One problem with these so-called "R-2R ladder" DACs is that it's impossible to make resistors with the precision required for perfect binary weighting. The result is that the tolerances in resistor values introduce amplitude errors in

the analog output. Moreover, those amplitude errors will occur in the same places on the audio waveform.

This problem becomes more acute the greater the number of rungs on the ladder. In a 16-bit resistor-ladder DAC the value of the lowest resistor rung should be exactly 0.0000152 the value of the highest resistor rung. In a 24-bit converter the lowest resistor value should be precisely 0.000000119209289550781 the value of the highest resistor. It is obviously not possible to achieve anywhere near this level of precision in resistor manufacturing, and any deviation from the resistor ratios translates to amplitude errors in the analog output.

The now-defunct UltraAnalog company addressed this challenge by driving its 20-bit DACs (which were composed of two off-the-shelf 16-bit DACs ganged together) with 100,000 different digital codes, measuring the DAC output at each code value, calculating the degree of error in each specific resistor, and then having technicians hand-

solder tiny precision metal-film resistors on the ladder rungs to bring them closer to the correct value.

A DAC technology that doesn't rely on binary-weighted resistor ladders is the one-bit DAC. This device converts a multi-bit code into a single-bit data stream that has two values, one and zero. Unlike a multibit DAC, the one-bit DAC's amplitude precision is very high, but the one-bit DAC suffers from very high noise that must be "shaped" (shifted away from the audioband). One-bit DACs are also very susceptible to jitter. dCS's solution is the Ring DAC, which can be considered a hybrid of the two approaches. It is based on a five-bit code that drives resistors of identical value. Because the resistors in dCS' Ring

DAC are all the same nominal value their actual values are very close to one another. The five-bit code has a much higher signal-to-noise ratio than a one-bit datastream and requires an order of magnitude less noise shaping.

Digital signal processing first "maps" whatever datastream is coming in (192kHz/24-bit, or the 2.8224MHz 1-bit code of DSD, for examples) into a unique five-bit code. This five-bit code opens and closes latches connected to a current source that drives one of five resistors of identical value. Because these resistors can never have *exactly* the same resistance, the Ring DAC employs an array of resistors and randomly shifts the audio signal between resistors in

the array. The Ring DAC gets its name from this "passing around" of the signal from one resistor in the array to another, as in a ring. The effect is to convert what would be amplitude errors in the analog output into a very small amount of random white noise.

The Ring DAC is brilliant in concept, and achieves its highest realization in the Vivaldi. The commonality in sonic character between all dCS products—the density of information, the resolution of fine detail, the unique spatial qualities—are probably attributable in large part to the Ring DAC. RH



EQUIPMENT REVIEW - dCS Vivaldi Digital Playback System

Jacob Heilbrunn On the Scarlatti and Vivaldi

Digital playback has long been the problem child of high-end audio. Suggest to a diehard vinyl lover that there might perhaps be some redeeming qualities about digital recordings and, more than likely, you will be met with a frozen or even pained smile. The implication is clear: For the true connoisseur seeking the audio truth and nothing but the truth, it is a foolish deviation, a trap and a snare, to listen to digital recordings. And for a number of years the disdain has not been wholly unjustified. Vinyl has always had an inherent relaxation and warmth that digital can only envy from afar. And yet in recent years, the gap has been narrowing between the two formats.

One company that has been at the forefront of that welcome development is dCS. A few years ago I sat up with a jolt when listening to the dCS Scarlatti playback system. There was a resolute quality to the bass and an abundance of detail that I had simply never heard before on digital. I bought it. Now dCS has upped the ante with its new Vivaldi system, which I first heard in New York at Ears Nova, where dCS introduced it to an American audience. Since then, I have had the opportunity to audition it in my own system.

Actually, that's baloney. I haven't been auditioning the Vivaldi. I've been reveling in it. While the Scarlatti was an excellent performer, the Vivaldi visually and audibly surpasses it in several important respects. For one thing, its casework is more impressive than the Scarlatti's—heavier and more inert, rendering it less susceptible to vibrations. It also looks more attractive than the Scarlatti.

But none of that would matter so much if the Vivaldi

didn't offer superior performance. The differences with the Scarlatti are instantly apparent. It seems to be even tighter in the nether regions than its predecessor—on Christian McBride's sensational CD *Conversations with Christian I* was awestruck at the speed and energy of his bass. The notes seemed to fly into my room at warp speed. The Vivaldi also has more control and grip than the Scarlatti. It has more extended decays that seem to linger on into infinity. And it has a much more refined and extended treble. Slam and dynamics are second to none. I could keep going down the audio checklist, but it's like breaking down a fine painting and discussing its individual attributes without recognizing its overall beauty.

Which is to say that these sonic attributes result in the most significant aspect of the Vivaldi when contrasted with the Scarlatti. The Scarlatti was unable to efface the sense of a slightly aggressive treble region. Not so with the Vivaldi. Plunk a CD in the tray or stream a high-resolution file, and the music seems to simply appear out of the ether with a sense of utter relaxation. The Vivaldi has, by and large, banished the sense of electronic reproduction and it has a nuance and filigreed sound in the treble that the Scarlatti lacked. There is an addictive and sensuous quality to the sound that approaches what, for better or worse, is usually called analog-like. Mind you, I'm not saying that the Vivaldi is superior to the Continuum Caliburn I use or other top-flight 'tables. What I do mean to say, however, is that given the quality of the Vivaldi, I am perfectly happy listening to CDs and that I don't find quarreling over the distinctions between the two

formats particularly rewarding or edifying.

The blunt fact is that digital playback is reaching new heights. There is a gentleness and absence of grain, particularly in the mids and highs, that place the Vivaldi on an entirely different plane from the Scarlatti. Listen to the Lorraine Hunt Lieberson on Handel's *Julius Caesar* [Harmonia Mundi] and I defy you not to feel goosebumps at the pellucidity of the sound.

To my mind, the Vivaldi represents a revolutionary

advance in digital playback. Over the past several decades, dCS has steadily refined its digital products. Each generation has represented an improvement over the previous one. Now dCS has surpassed itself with the Vivaldi. Indeed, when listening to it, I was reminded of the immortal remark by *Gilligan Island's* Thurston Howell III: "No one can pull the wool over my eyes. Cashmere maybe, but wool, never." Friends, the Vivaldi will pull cashmere over your eyes. **t&e**





EQUIPMENT REVIEWS

DACs

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EAR-Yoshino 192 DACute DAC

Maximum Analog, Minimum Digital

Dick Olsner

When Tim de Paravicini set out to design the DACute, I'm fairly certain that he sought to maximize its analog footprint. After all, analog is his métier. In fact, he freely admits to trying to equate digital performance to good analog practice, the payoff being that smooth and soothing sonic sensation analog tape and vinyl provide so well. Take, for example, the DACute's DAC chip, a Wolfson WM8741 multi-bit delta-sigma DAC. It's a high-performance stereo DAC designed for audio applications. It supports PCM data-input word lengths from 16- to 32-bits and sampling rates up to 192kHz. The folks at Wolfson included a smorgasbord of features such as fine resolution of volume and soft-mute control, digital de-emphasis, and a range of advanced digital filter responses. The digital filters include several selectable roll-off and performance characteristics. Tim's approach was to minimize use of the internal digital filters. Because they cannot be totally bypassed, he set them for the highest frequency point and then implemented analog LC elliptic filters for 3dB down at a frequency of 40kHz. This is the sort of analog filter Tim has always used on analog tape recorders for bias and other ultrasonic-noise filtering. An LC elliptic filter is rather economic in terms of parts count for a given slope, but does produce a nonlinear phase response over its passband. In Tim's view, the filters "are quite good as far as phase response is concerned over the audio band to about half an octave away from 3dB down, so up to 20kHz is more than good enough for me."

According to Tim, all these DACs by Burr-Brown, TI, Wolfson, or whomever produce significant high-frequency (HF) noise. Tim believes that it's important to filter out HF hash lest these artifacts upset some amplifiers and tweeters. However, he still

requires that response at 20kHz be within 0.1dB of the midband and frowns on the practice of rolling off the top end for so-called sweetness.

The DACute uses a Cirrus SPDIF receiver and accepts up to 24/192 digital data from USB, coaxial SPDIF, and TosLink SPDIF inputs. After passing through the analog filters, the signal is fed to a line preamp stage that is configured like a single-ended amplifier. A 6922/ECC88 twin triode is used per channel. The two sections are cascaded with the second stage being transformer coupled. The output transformer incorporates two secondary windings, one of which provides unbalanced and the other balanced output. A tertiary winding provides some feedback. Maximum output is said to be 5V into 500 ohms with reasonable distortion figures. Tim says that he's not interested in vanishingly low distortion levels at max output since "we hear best the stuff that goes on at lower levels, just where many digital systems fall down."

Dan Meinwald, the U.S. EAR distributor, sent along a pair of Philips JAN 7308 tubes, of which he is fond. And I have to agree; the Philips sounded gorgeous in this application and represents a big step up from the stock 6922. Needless to say, it didn't take me long to make that call, and the Philips was used for the remainder of my listening tests. There's not much to say about the motorized volume pot, except that I found the remote control a bit touchy to adjust and, as with other such volume controls, difficult to set to reproduce a particular volume setting. The presence of a volume control combined with an exceedingly low output impedance of under 60 ohms make it possible for this DAC to directly drive a power amp. However, should you desire to go through a preamp, simply set the volume control to about 2pm and let the preamp do the rest. Of course, one would expect some loss of immediacy when the signal is made to pass through two volume controls, and I can confirm that the most transparent soundstage to be had was with the DACute directly driving a power amp.

The fact that the output stage is tube amplified and transformer coupled is quite significant. In my experience, a DAC or CD player's output stage plays a major role in its overall sound quality. Quite frequently this boils down to the mitigating effects of tubes versus transistors. Call it heretical or even anachronistic, but in my view digital wants tubes—digital needs tubes. Tubes are the requisite "cavalry" to the rescue with a dose of textural warmth and liquidity. Even in the highest echelons of high-end audio, the presence of a solid-state output buffer or gain stage often makes for a double whammy—digital crispness aided and abetted by solid-state tonal-color blindness that makes toast out of musical textures. And it's that sort of a sorry combination that has pushed many discerning listeners away from digital sources and back to vinyl and analog tape. I've been advocating for many years the insertion of tubes, as early as feasible, into a digital front end as a means of controlling digital nasties. And that's exactly what Tim has done, and it's also the basis for ModWright Instruments' modification of the Sony XA-5400ES SACD player.

At the heart of Dan Wright's Truth Mod is a 6SN7-based output stage, which replaces the op-amp-infested stock analog stage. Not only that, but the tube stage is powered by an external high-voltage tube-rectified power supply. The Sony looks a bit odd with a couple of 6SN7 triodes sticking out of its top deck, but it has been a staple in my reference system for several years now. It really is that good. Naturally, I was curious to see how the DACute stacked up against my modified Sony. This comparison played out with the Sony acting as a transport for the EAR DAC, connected to one of its SPDIF inputs. Since both units are tube based I expected some common ground, especially when it came to imaging performance.

And while that, indeed, was the case, the DACute outperformed the Sony/Truth Modification in several areas, at least in the context of a high-efficiency speaker being driven by the Triode TRX-M300 monoblocks. It

EQUIPMENT REVIEW - EAR-Yoshino 192 DACute DAC

was capable of finer modulation of harmonic colors, the Sony sounding slightly more grey and less saturated. The boogie factor, the rhythmic drive that propels musical lines forward, was also enhanced. That coupled with exceptional resolution of dynamic contrasts made for a vibrant presentation packed with dramatic tension. Harmonic textures ebbed and flowed with a natural edgeless fluidity and a heightened sense of purity due no doubt to freedom from digital hash. And all the while the DACute shone a light on low-level detail. But there was nothing forced about its presentation. Much like ripples in a pond, detail dotted the fabric of the music—a far cry from the surreal hyper-etched presentation being accepted by some audiophiles today as music. No sir, that's not what the real thing sounds like.

Another comparison I was eager to try was with April Music's Eximus DP1 DAC/preamp. The DP1 packs a fantastic DAC and a high-quality op-amp-based analog stage. This was to be a classic confrontation of tubes versus solid-state. Not surprisingly, the DP1 bettered the DACute in the areas solid-state designs have traditionally excelled in—at the frequency extremes. The DP1 exhibited a tighter bass range and was subjectively more extended on top. However, it lacked the smooth grainless textures of the EAR, which in the case of the DACute turned out to be a package deal. Much like red hair and freckles, the smoother textures and diminished top end came bundled with slightly softer transients. As a result, the EAR came across as a kinder and gentler purveyor of music, while the DP1's crisper presentation was the more impressive and was responsible for an enhanced sense of

soundstage transparency. In the end though, the DACute's tube attributes shone through and won me over with a wonderfully palpable presentation that shimmered with dynamic energy.

That finally brings me to the DACute's USB input and the subject of computer audio. Early this year I fell though the rabbit hole into the wonderland that is high-end computer audio. Actually, it was a deliberate move designed to take advantage of a technology that in the span of just a few years sprouted from infancy to a relatively mature state. In particular, I was intrigued by the possibility that 44.1kHz/16-bit files streamed off a computer hard drive could be reproduced with less jitter and greater fidelity relative to what even an expensive CD player or transport is capable of. The core of my computer audio system consists of a Mac BookPro laptop with 8GB of memory and a solid-state hard-drive running Sonic Studio's Amarra Version 2.5 music player software. From my perspective, Amarra's integration with Apple's iTunes, support for up to 384kHz sample rates, memory cache playback, and playlist mode make it a clear winner. But that's not the whole story. I found it essential to avoid using the Mac's onboard DAC for clocking the datastream. The cleanest solution was to synch Amarra to an external digital data converter with an asynchronous USB input. Not all CD players or DACs possess a USB input and some of those that do, as is the case with the DACute, do not offer an asynchronous USB capability. My converter of choice was and still is April Music's Stello U3 (\$495). The U3 is a stand-alone device, powered directly by the computer's USB port, that runs

a custom xCORE 32-bit/500MIPS microprocessor from chip-maker XMOS. The Mac-to-Stello USB connection was made via a 1.5-meter AudioQuest Carbon USB cable. The U3's output was connected to one of the DACute's SPDIF inputs via a 1-meter coaxial cable.

This system combined to produce an exceptional virtual transport. I was startled by my findings when comparing computer files ripped onto the Mac to the same CD's digital feed from the Sony to the DACute. I didn't expect much of a difference, but for the record, the computer file playback resulted in enhanced microdynamic shadings, purer textures, and an increased sense of transient clarity. The sound quality of the playback was so fabulous that I seriously doubt that any conventional transport under \$25k could improve on it.

The next round of listening tests pitted file playback through the Stello U3 against a direct feed from the Mac to the DACute's own USB input, the latter connection being made via an AudioQuest top-of-the-line Diamond USB cable. Re-clocking the data through the Stello U3 made for a huge sonic difference. Simply put, the direct USB input resulted in loss of spatial integrity. What was a cavernous depth perspective flattened out considerably. What was precise image focus became diffuse. With the U3 in the chain, massed strings never sounded so pure and refined. Numerous complaints I've lodged in the past about digital reproduction of string tone being adulterated by an upper mid-range hardness were now ancient history. The moral of the story is this: For best results, avoid the DACute's USB input and resort to using an external asynchronous data converter.

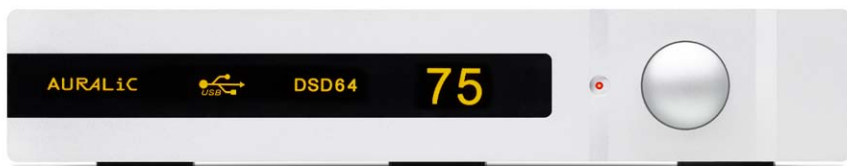
If I were in the market to purchase an external DAC right now, the EAR DACute would be at the top of my shopping list. It's mission accomplished for Tim de Paravicini, who has managed to reveal digital's analog persona in convincing fashion. The DACute is a fantastically compelling DAC that has restored my faith in digital audio. **tas**

SPECS & PRICING

DAC chip: 24-bit, multi-level delta-sigma conversion	EAR USA (U.S. DISTRIBUTOR) (562) 422-4747 ear-usa.com
Inputs: USB, two 75-ohm coaxial SPDIF, TosLink optical SPDIF	ASSOCIATED EQUIPMENT: MartinLogan Summit X and Acoustic Zen Crescendo loudspeakers, Basszilla Platinum mk2 DIY loudspeaker; April Music Eximus DP1 DAC/Pre and Stello U3 digital data converter, Sony XA-5400 SACD player with ModWright Truth modification; FMS Nexus-2, Wire World, and Kimber KCAG interconnects; Acoustic Zen Hologram speaker cable; Sound Application power line conditioners
Output level: 5V RMS	
Tube complement: Two ECC88/6DJ8	
Output Impedance: < 60 Ohms (balanced or single ended)	
Weight: ??? lbs.	
Dimensions: 435mm x 95mm x 320mm	
Price: \$5895 in black finish, \$6595 in chrome	
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AURALiC VEGA Digital Audio Processor

High Performance, Reasonable Price

Chris Martens

AURALiC's Vega Digital Audio Processor (\$3499) is a powerful and versatile digital-to-analog converter that can also serve as a digital-input-only, balanced-output-capable preamplifier. Specifically, the Vega supports all PCM files from 44.1kHz/16-bit resolution on up to 384kHz/32-bit resolution, while covering all sampling rate/word-depth combinations in between. Moreover, the Vega is DXD- and DSD-compatible and can decode both DSD64 and DSD128 bitstreams via the DoP V1.1 data transmission protocol. In short, the Vega is an ambitious, premium-quality DAC/preamp that aspires to top-tier performance. Does it reach this goal? I think it does as I will explain in this review, but first let's first take a look at AURALiC's company background and at the Vega's underlying technologies.

As mentioned in my review of the firm's TAURUS MkII balanced headphone amplifier in this issue, AURALiC is a Hong Kong-based high-end audio electronics company co-founded in 2008 by President and CEO Xuanqian

Wang and his business partner Yuan Wang. Xuanqian Wang has had formal training as an electrical and audio recording engineer and is an accomplished classical pianist, while Yuan Wang has a background in sociology and management science. The common denominator is that both men share a passion for music and sound quality, having met (where else?) at a musical event—the 2008 Festival of Waldbühne Berlin. Not long thereafter, the men decided to launch AURALiC Ltd.

More than many DACs in its price class, the Vega is chockfull of advanced technical features, yet it is also informed by Xuanqian Wang's thoroughgoing familiarity with classic analog-audio circuit designs. In practice, this means the Vega is a modern-as-tomorrow DAC with stellar performance specifications, yet one that goes the extra mile not only to measure well but also to deliver sound that, first and foremost, holds true to the sound of live music. As we survey the Vega's rich set of technical features it is important to bear in mind that this is more a "music first" design than it is a "technology über alles" product.

As noted above, the Vega is a DXD- and DSD-compatible 384kHz/32-bit-capable DAC/digital preamp. The Vega provides five digital audio inputs: one AES/EBU, one TosLink, one USB, and two coaxial SPDIF. In turn, the Vega provides single-ended and balanced analog outputs, with volume levels controlled by 100-step digital controller said not to compress dynamic range at all.

Digital audio processing is handled by AURALiC's proprietary Sanctuary Audio Processor, which the company says is based on a "multi-core ARM9 architecture" and provides a prodigious 1000MIPS (millions of instructions per second) of data-crunching power. Unlike many competing DACs, the Vega upsamples all incoming PCM audio data to 1.5MHz/32-bit resolution prior to decoding. Further, the Vega provides six user-selectable digital-audio filter modes (four for PCM formats, two for DSD formats). The PCM filter modes each comprise four individual filters optimized for a specific group of sampling rates. One can choose Filter Mode 1, a high-accuracy/high-transparency mode that offers the best performance measurements; Mode 2, which reduces group

delay while imposing minimal amounts of treble attenuation; Mode 3, which minimizes pre-echo and ringing effects but with a somewhat higher degree of treble attenuation; or Mode 4, which applies minimum-phase type and is said to allow "no pre-echo effect at all" with "very small group delay so as to eliminate ringing."

Filter modes 5 and 6 are designed specifically for use with DSD files, and they address the problem of the very-high-frequency noise that DSD bitstreams can entail, providing strategically chosen levels of ultrasonic treble roll-off. The concept is to preserve the music intact while getting rid of ultrasonic noise that could potentially damage wide-bandwidth amplifiers or speakers.

Significantly, the Vega permits users to switch between its various filter modes on the fly to compare their subtly different voicing characteristics and overall impact on the music. Xuanqian Wang wisely observed that one's choice of filter mode might depend to a large extent on the recording quality of the material being played. Great recordings, he says, often sound best through Filter Mode 1, while customer comments suggest that Filter Mode 4 is the best "general purpose" setting for day-to-day use with a mix of audiophile-grade and more commonplace recordings. The important point is that the Vega allows users to fine-tune the DAC's sonic persona to fit the musical material at hand.

Another signature feature of the Vega is its Femto Master Clock, which yields a spectacularly low 0.082 picoseconds (or 82 femtoseconds) of jitter—a figure few DACs at any price can match. The Vega provides three master-clock control settings: the default "AUTO" setting, which maintains "a balance between lock-in ability and jitter performance," plus "FINE" and "EXACT" settings (available only after the Vega has warmed up for an hour), which "force the (clock controller's) PLL bandwidth into a very narrow range to maximize jitter performance." Not all digital sources are precise enough to use the "FINE" or "EXACT" settings, but Xuanqian Wang notes that with the EXACT settings in play he sometimes hears "a significant improvement, compared to the AUTO setting, for certain sound tracks, such as a well-recorded classical piano solo."

EQUIPMENT REVIEW - AURALiC Vega Digital Audio Processor

As expected, the Vega is compatible with both Macs and PCs and with most popular music-playback software. The Vega auto-installs in Mac environments, but requires installation of an included Windows driver when used in PC-based systems. AURALiC does feel that music-software packages have a big impact on the DAC's sound and for this reason offers a free download of the third-party JPLAY software package, which AURALiC recommends for use with the Vega. Accordingly, I used JPLAY software in conjunction with jRiver Media Center 19 music-management software in a PC-based system for my review listening.

The Vega's analog outputs are driven by a pair of AURALiC's signature ORFEO Class A output modules, whose design was inspired by the circuitry of the classic Neve 8078 analog recording console and whose sound is said to "share the same warm and natural sound with (the) Neve 8078." Perhaps as a result, the Vega claims vanishingly low THD and noise (just 0.00015%). Part of the performance equation, naturally, involves not only having high-performance analog output modules, but also addressing noise issues wherever possible. To this end, AURALiC constructs the Vega's chassis of a highly EMI-resistant metal-alloy called AFN402 and coats the chassis' interior surfaces with a multi-layer electro-mechanical damping material called Alire, which is used in most other AURALiC components.

The Vega sports an easy-to-read OLED front-panel display that shows the input selected, the format and data rates of whatever digital audio input has been selected, and the volume level (on a scale of 0-100) to which the processor

is set. By design, the Vega can be operated from its faceplate or from an included remote control. The control menu offers options for adjusting absolute phase, left/right channel balance, or selecting preferred filter modes. Users can also control the OLED display itself, turning illumination up, down, or off (for zero visual distractions at all). Overall, the Vega is an ergonomic delight, though it is sufficiently complex that it pays to read the manual to understand the scope of the control options at hand.

If the foregoing technical description seems promising, then please know that the sound of the Vega is fully as good as, if not better than, the description might lead you to expect. Frankly, I've been around the world of computer audio for years, but I never felt a keen desire to make a dedicated high-performance DAC a permanent part of my reference system until I heard the Vega in action. Up to this point, most of the computer-audio/DAC-based systems I have auditioned seemed to me to fall short of the sound quality I was used to hearing from top-tier disc players. I also found that those DAC-based systems that were sonically satisfying tended more often than not to be astronomically priced.

In contrast, what makes the Vega so captivating to my way of thinking is that it is reasonably priced yet consistently supplies a rich panoply of audiophile virtues while also demonstrating an uncanny ability to keep its focus on the musical whole. In short, the Vega represents the intersection of good value, great (and forward-looking) technology, plus terrific musicality—a compelling combination indeed.

If you asked me to cite several specific

qualities that characterize the sound of the Vega, two that come instantly to mind would be transparency and resolution—effortless, elegant, and unforced openness and detail that sound more like the real thing than like hi-fi artifacts. On the track "Embraceable You" from The Larry Coryell Organ Trio's Impressions [Chesky] the Vega lets you listen deeply into the voices of each of the instruments at play and so to savor the round, ripe tone of Coryell's guitar, the reedy and breathy voice of the organ, and the delicacy of the drum kit's contributions in general and of the cymbal work in particular. Moreover, the Vega shows you the worth of high-res files, helping you to appreciate how much more full and complete they make the music sound. The beauty of the Vega's sound is that the additional layers of detail it provides are delivered in a relaxed and lifelike manner; additional music information is simply there—whole and complete without unwarranted spotlighting or pyrotechnics, so that the music is free to breathe and flow.

Another quality that typifies the sound of the Vega is its dramatic and at times explosive dynamics, which likewise unfold in a naturally expansive way. As with musical details, the dynamic qualities you hear seem to flow more from the music than from the equipment. Consequently, the music seems energized and illuminated from within, much as it does when heard live. To hear what I mean, try listening to Silvestre Revueitas' Sensamayà as captured on the Chicago Symphony Orchestra Brass Live recording [CSO Resound]. This exotic-sounding piece is full of lithe twists and turns as it progresses from one dynamic highlight to the next, with tension building as the composition

unfolds. I've heard this piece through many digital source components, but none I have had in my system made Sensemayà sound as powerful or expressive as the Vega did; nor could they convey the tsunami-like force of the composition's final crescendo as effectively as the Vega.

SPECS & PRICING

Type: Digital-to-analog-converter/digital preamplifier	DSD128 (5.6448MHz)
Digital inputs: One AES/EBU, two coaxial, one TosLink, and one USB 2.0 buffered by ActiveUSB	Important format information: 352.8kHz and 384kHz are supported through USB only; 32-bit word lengths supported through USB only; DoP V1.1 transmission protocol supported through USB only
Analog outputs: One stereo single-ended (via RCA jacks), one balanced (via XLR connectors)	Output Voltage: 4V rms at maximum, with dynamic-loss-free digital volume
Frequency response: 20Hz-20kHz, ± 0.1dB THD+N: <0.00015%, 20Hz-20kHz at 0dBFS	Dimensions: 11** x 2.6** x 9**
Dynamic range: 130dB, 20Hz-20kHz, A-weighted	Weight: 7.5 lbs.
Supported digital formats: All PCM from 44.1kHz to 384kHz with word lengths up to 32-bit, DSD64 (2.8224MHz), and	Price: \$3495
	AURALIC AMERICAS INC. 12208 NE 104th St. Vancouver, WA 98682 (360) 326-8879 auralic.com

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EQUIPMENT REVIEW - AURALiC Vega Digital Audio Processor

Finally, I was struck on multiple occasions by the Vega's unfailing musicality, which I sometimes—tongue-in-cheek—called the “Neve factor.” Neve recording consoles are known for pulling off a difficult but highly rewarding tightrope act of sorts; on the one hand, they deliver exceedingly high levels of transparency, clarity, and timbral purity, while on the other hand they preserve a naturally warm, organic, and lifelike sound. I think it is significant that Xuanqian Wang has chosen the classic Neve sound as his sonic model for the Vega and that the Vega strives (successfully) to strike a similar sonic balance. As a result, the Vega's sound is every bit as revealing, crisply defined, and informative as any “analytical” DAC would be, but without the drawbacks (coldness, sterility, or a vaguely “mechanical” quality) that analytical products usually entail. Rather than dissecting or de-constructing the music, then, the Vega simply reveals musical textures, timbres, tonal colors, and dynamics, and then gets out of the way to let the music speak for itself.

I compared the Vega to my primary digital reference, Rega's superb Isis CD player/DAC, and found the Vega's sound competitive, though somewhat different. I had a slight preference for the Rega's sound on 44.1/16 material owing to the Rega's somewhat more coherent upper midrange and treble presentation, though in truth the contest was very, very close. But a key point is that the Vega is less than half the price of the Rega and is capable of exploring high-res PCM and DSD files, which the Rega is not. In particular, listening to DSD files through the Vega proved revelatory, because DSD files as rendered by the Vega seemed to do a much

better job than standard-resolution PCM files in filling in the “spaces between the spaces” in the music, enabling the presentation to sound markedly more three-dimensional and realistic.

Although I'm not ready to part with my top-shelf Rega Isis CD player just yet, the Vega is the first sensibly-priced DAC I've heard that I could readily embrace as one of my primary digital source components. For less than \$3500, the Vega takes discerning audiophiles and music lovers very far up the high-end audio performance ladder, providing them with a versatile and technically advanced digital playback solution they will not soon outgrow. **tas**

Analog ...



Or Digital ...



Audio Is Fragile, Audio Needs Respect

The frontier of transferring an audio signal keeps moving, the details change. However, the unchanging audio reality is that in every new application, and every way of packaging beautiful sound, audio is in danger of becoming not-so-beautiful ... unless love & respect, and good engineering & clever design, are applied at all times.

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We share the fantasy that someday transferring audio will be fully robust and immune to degradation. In the meantime, we are very pleased that AudioQuest can make a huge difference in sound quality, whether for just a few dollars, or for the state-of-the-art.



MSB Technology Analog DAC

Just Like an LP?

Vade Forrester

Analog DAC? What the heck is that? Doesn't the "D" in DAC stand for digital? Yes, but what do all DACs try their best to sound like? Right: analog. Manufacturer MSB Technology went all-out to assure its new DAC sounded as much as possible like the fabled analog source. When I auditioned MSB's top-of-the-line DAC IV, I thought it was possibly the best source I had heard, analog or digital. But its lofty price might have spooked some audiophiles. I appreciate it when technological developments advance the state of the art in playback quality, even if they carry high price tags. That's because the technology used in high-priced gear often trickles down to equipment within my financial means. That's what's happened with the Analog DAC, which MSB bills as "The Most Technologically Advanced DAC in the World!" And even though the price couldn't be described as low, it's a lot lower than MSB's DAC IV.

So what makes the Analog DAC special? For one thing, its physical construction is unique. Instead of building a typical chassis—you know, a metal box to house the electronic components—MSB has made the Analog DAC modular. It's basically a machined aluminum slab under which are attached modules that give the Analog DAC its functionality. You start off with a basic unit with one input module (your choice) and a basic power supply for \$6995, then add additional modules to suit your needs. Want another digital input? \$995. Want a stepped-attenuator volume control, with 78 1dB steps? \$995. The volume control is one option that's not modular, since it requires a hole in the top of the chassis for the volume control knob. It's \$995. Want a better power supply than the stock unit (which is a very respectable linear model)? \$2995. Want a different color than the stock matte-white or matte-black? That's \$700 for satin black, \$350 for custom colors (I think a red one would be neat; black and silver are boring). And there are quite a few other options like remote control, iPad control, Wi-Fi, and so forth. The review unit (\$6995) had a volume control (\$995), a USB input (included in the base price), a SPDIF input (\$995), and an Inter-IC Sound (I2S) input (\$995). An aluminum remote control was also included, which is an \$85 option; so if I add up all the options correctly, the total price of the review unit was \$10,065. See the MSB web site at for a complete list of options and prices.

The different input modules connect to an internal I2S buss. If a need for a new input develops (maybe USB 3.0?), a module for that will be developed and can be installed with a screwdriver. After it's installed, it becomes totally plug and play. The I2S buss connects

to the DAC module, which is not an off-the-shelf chip; rather, it's a 384kHz discrete-ladder DAC constructed from extremely precise resistors. The firmware that controls the internal operation of the DAC is easily upgraded (see the Setting Up section below). That makes it easy and fast to make changes. The firmware-update files are in WAV format, making firmware changes just like playing a song. That's very clever. The Analog DAC's output impedance through the RCA outputs is 53 ohms without a volume control; 38 ohms with the control. That's low enough to drive any amplifier or cable.

MSB Technology uses its precision "Femto Clock" technology to minimize jitter, and includes a large internal memory where you can set filters, upsamplers, and other DSP instructions. This is not an off-the-shelf DAC design using conventional parts and circuits.

The Analog DAC's optional power supply has exactly the same form as the DAC, and is usually pictured with the DAC stacked on top of it. The stock power supply is a linear power unit with two transformers.

The Analog DAC can play Direct Stream Digital (DSD) files in their native format without converting the files to PCM. These are the files used to make SACDs. DACs capable of playing DSD files in their native format may be the hot item in the hi-fi industry right now. We speak of DSD sampling rates as "DSD64" and "DSD128," where the numbers "64" and "128" denote multiples of CD's 44.1 kHz sampling rate. DSD recordings created as masters for SACDs are DSD64, but it's possible to record DSDs at twice that rate. The Analog DAC plays both DSD64 and DSD128 recordings. And as I was pleasantly surprised to learn, it plays

EQUIPMENT REVIEW - MSB Technology Analog DAC

DSD files through both USB and SPDIF inputs. The capability to play DSD was added by a firmware update—no hardware changes were necessary. The Analog DAC also plays PCM files up to 384kHz/32-bits. That allows it to play the 352.8/24 Digital eXtreme Definition (DXD) files used for high-resolution mastering by several recording companies. A few companies now sell DXD files, should you want to hear super-high-resolution recordings. Be sure your music player can handle them before you pull the switch to download DXD files.

A Windows driver came on a CD, and can also be downloaded from the MSB Web site. Also on the CD were some set-up instructions. A manual can be downloaded from the MSB Technology web site.

Setting up

I used a WireWorld Platinum Starlight USB cable to connect my laptop server to the Analog DAC. MSB Technology advised that since the internal circuit of the Analog DAC was unbalanced, the unbalanced connectors should sound better, so that's what I opted for. If you have the volume control installed, the Analog DAC is designed to be used as your system controller in lieu of a preamp, so it should be connected directly to the power amplifier's inputs and the very fine volume control operated by the MSB remote control. Since my Berning ZH-230 amplifier has unbalanced inputs only, the unbalanced connection from the Analog DAC was ideal. If you have other analog sources, such as a phono preamp, you can plug it into the Ana-

log DAC's analog inputs and select it from the MSB remote. I must say it would seem a little weird to plug a phono preamp into a DAC, but, hey, welcome to the digital age. I connected my tuner to the analog input just to see if it worked. It did, and I could select the tuner using the remote control.

I discovered the Analog DAC was sensitive to the cables used to connect it to the power amplifier. A Clarity Cable Organic interconnect sounded a bit bright and lean—not the way it usually sounds in my system. Purist Audio Design Venustas interconnects sounded a bit fatter with more bass, but the best sound I found came when I used High Fidelity Cables' CT-1 interconnects. Operating via magnetic conduction instead of normal voltage conduction, the High Fidelity Cables interconnects are probably the best I've heard to date. I don't really understand how they work, but their sonic advantages are audible. With them, the Analog DAC sounded more balanced, with deeper bass.

When I used an Audience powerChord e power cord, the Wattgate IEC connector that plugged into the power supply almost completely blocked the on/off switch, so to turn the Analog DAC on and off, I had to plug/unplug the power cable. Wattgate IEC connectors are pretty average in size for aftermarket connectors, so I would expect the same problem with other aftermarket power cords. The molded IEC power connector that comes with the power cord included with most components wouldn't have this problem.

I placed the Analog DAC on a middle shelf on my Billy Bags equipment rack and adjusted the cone feet until the DAC was perfectly stable. There wasn't room on a single shelf for both the power supply and DAC, so I placed the power supply, which is about the size of a hardback novel, two shelves above the DAC. That's about as far as the connecting power cord would reach. The Analog DAC has a huge display, the largest I've ever seen in a DAC, and it shows both the volume control setting and the input source; however, since it's only visible from the top, it can't be seen if you're sitting across the room, unless the Analog DAC is on a low shelf in your rack.

To use my Windows-based laptop server, I had to install a driver so Windows 7 would play Class 2 USB Audio, which enabled playback of high-resolution PCM and DSD input. After checking to be sure it was the current version, I installed the driver that was on the included CD. Installation was straightforward, i.e., not tricky.

The Analog DAC manual recommends Foobar 2000 as a music-server program, and included a file on the CD describing how to set up Foobar 2000 to work with the Analog DAC. I view this type of help as essential; DACs are seldom plug and play, and each computer-based music server has to be set to use a particular DAC. Most have different settings which need some tweaking to sound best. My preferred software, J. River Media Center 19, was simple to set up—after I figured out what all the settings meant.

MSB Technology's position on burn-in is

SPECS & PRICING

Inputs: One digital input included in base price, additional inputs optional; one analog input on RCA jacks

Sample rates supported: PCM-44.1k, 48k, 88.2k, 96k, 176.4k, 192k, 352.8k, 384k up to 32 bits; DSD at 2.82M and 5.64M (DSD64 and DSD128)

Line output level: 2.62V RMS, balanced or unbalanced output

Output impedance: 53 ohms without volume control, 38 ohms with volume control (unbalanced); 106 ohms without volume control, 76 ohms with volume control (balanced)

Dimensions: DAC, 17.63** x 1.5** x 12.5** plus connectors; power supply, 6.7** x 2.25** x 8.9**

Weight: DAC, 12 lbs.; power supply, 7 lbs.

Price: \$6995, \$10,065 as reviewed

MSB TECHNOLOGY CORPORATION

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Watsonville, CA 95076
(831)662-2800
msbtech.com

ASSOCIATED EQUIPMENT:
Speakers: Affirm Audio Lumination speakers

Amplifiers: Berning ZH-230 stereo amplifier

Preamplifier: Audio Research LS27 linestage

Digital sources: Hewlett Packard dv7-3188cl laptop computer running 64-bit Windows 7 Home Premium and J. River Media Center version 19; Auraliti PK100 music player; Audio Research DAC8

Interconnects: High Fidelity Cables CT-1

Speaker cables: Clarity Cables Organic

Power cords: Purist Audio Design Venustas power cords, Blue Marble Audio Blue Lightning power cords, Clarity Cables Vortex power cords, Audience powerChord e power cords

Digital: Wireworld Platinum Starlight USB cable, Gold Starlight 6 S/PDIF cable, and Gold Starlight 5 AES/EBU cable
Power conditioner and distribution: IsoTek EVO3 Sirius

EQUIPMENT REVIEW - MSB Technology Analog DAC

ambiguous. It begins by asking if burn-in is real or just a period of familiarization; then it says feedback (whose?) recommends 100 hours' burn-in, then it says customers recommend one month burn-in. Come on—it either needs burn-in or it doesn't; and it should be possible to specify a length of time. I burned in the review unit for about 300 hours.

Thanks to a recent software update, my Auraliti file player now plays DSD as well as PCM, and, somewhat unusually, plays DSD64 through both SPDIF and USB outputs. DSD128 is played through the USB output only; apparently, DSD128 exceeds SPDIF's limits. When I plugged the Auraliti into the Analog DAC's inputs, it worked without a hitch, providing plug-and-play DSD sound. I could get used to that!

During the review period, I received another software update, this time from MSB Technology. The firmware update took the form of a WAV file, and all that was necessary to apply the update was to play the WAV file. If the update doesn't "take," an audible message tells you so. How cool is that? I first tried playing the WAV file with iTunes, and heard the failure message. Then I tried it with J. River Media Center, and this time, there was no error message. When I restarted the Analog DAC, the correct firmware version was displayed. Most manufacturers don't ever update their firmware, and I don't know of any that makes it this easy.

Sound

While the Analog DAC's most advanced feature is its ability to play DSD files, it's just

as important to assess how well it plays PCM files, even those ripped from CD. After all, what makes up most of your collection? So I enjoyed playing a wide variety of music through the Analog DAC.

In a word, the Analog DAC was detailed. I don't mean it was analytical, just that it revealed a ton of information about the music played through it. Since I had it on hand when writing the article about DSD downloads published in the previous issue, I used it to sample DSD files from various download sites. Unsurprisingly, the Analog DAC showed that not all DSD files are created equal; some were glorious, while some, well...not so much.

Dynamics were finely delineated when the music called for it. They weren't amped up, as may be the case with some components, but were fast enough to enhance the sense of musical flow. On Jordi Savall's *La Folia* 1490-1701 (ripped from Alia Vox AFA 98050) the track "Folia Rodrigo Martinez" is a dynamic minefield, requiring the audio system to play at continuously varying levels of loudness. Some components artificially divide the sound into discrete steps, but the Analog DAC showed the loudness changed continuously. The Analog DAC reproduced the bass drum, which descends into the mid-30Hz range, with extension and detail. Power and slam were good overall. The amount of detail revealed in this information-dense recording was amazing; it was not even slightly etched or bright, but very natural-sounding. I've never heard a component extract this much detail from the recording—a recurring theme in my listening notes.

On Alex de Grassi's album *Blue Coast Special Event 19* (DSD64/DFF, Blue Coast Records), the cut "Shenandoah" exhibited exceptionally detailed guitar sound, with an unusual drone effect I had never heard before. But the picture of de Grassi's guitar showed it to be a very unusual design, so maybe that explained the sound. The Analog DAC really showed how realistic a recording of solo guitar recording engineer Cookie Marenco had captured.

Piano recordings were spectacular. On Thomas Günther's performance of Schubert's *Piano Sonata in A minor* (DSD64/DSF, Cybele Records), the Analog DAC reproduced the piano's complete harmonic structure with a combination of delicacy and explosive power rarely heard on recordings. The sense of the hammers striking the piano's strings was captured superbly. It's odd that I noticed this particular detail on several piano recordings. Other finer details of Günther's performance were strikingly realistic, too. I'd never mistake the recording for a real piano, but it's getting closer to the real thing. Isn't that what the hobby is about?

Rebecca Pigeon's "Spanish Harlem" from her album *The Raven* has been an audio fave since it first appeared on LP. Remastered as a 176.4/24 FLAC album by Bob Katz for Chesky Records, it was eerily realistic through the Analog DAC. Pigeon's voice, in particular, had a "reach-out-and-touch-it" quality, creating the illusion of someone standing in front of me singing. Instrumental accompaniment was equally detailed, especially the stand-up bass.

The Tallis Scholars' *Miserere* was their signature album, and on Gimmell Record's

96/24 FLAC download of *Allegri's Miserere & Palestrina's Missa Papae Marcelli*, the Analog DAC showed off its ability to throw a large soundstage. The "Miserere" piece is an a cappella work which has a small choral group at the front of the soundstage and a smaller solo group some distance behind it in the large church where the recording was made. The Analog DAC showed the separation between the main group and the solo group clearly, while making the words sung by the distant solo group unusually distinct.

DSD vs PCM

The 2L company offers several sample files in both DXD and DSD format. The company records its masters in DXD, performs whatever editing is necessary in that format, and then converts them to DSD. I expected that the original DXD files would sound better than the converted DSD files, but to my surprise, I slightly preferred the DSD derivative files. On Beethoven's *Sonata No. 32*, the piano sound was more full-bodied and detailed. Once again, DSD portrayed the sound of the piano's hammers hitting the strings much more realistically than the DXD version. On the Allegro movement from Mozart's *Violin concerto in D major*, DSD string sound was richer and less mechanical, i.e., less digital. On a vocal selection, Vivaldi's "Recitative and Aria" from *Cantata RV 679*, "Che giova il sospirar, povero core," my impression was similar to the one I had with the Mozart concerto—the soprano sounded more like a person singing than a recording of a person singing. The differences weren't night and day, but they established DSD as

EQUIPMENT REVIEW - MSB Technology Analog DAC

more analog-like. That doesn't mean DXD files sounded bad; they sounded good before DSD files came along, and still sound good. What's important for this review is that the Analog DAC made it easy to distinguish between the DXD and DSD versions of a recording, illustrating the MSB's transparency.

Comparison

My Audio Research DAC8 doesn't play DSD files, but it's what I have on hand, so I'll limit my comparison to PCM files. After all, the vast majority of my collection of downloaded and ripped music files are PCM, so that's not much of a limitation. The \$4995 DAC8 is a single-chassis unit which looks very conventional compared to the Analog DAC.

On "Folia Rodrigo Martinez," the Audio Research displayed its hallmark bass, the most powerful I've heard from any DAC. I've started to wonder if it's not actually too powerful, as peculiar as that concept may seem to some audiophiles. Tonally, the Audio Research is similar to the Analog DAC, although the latter captures more details of the performance.

"Spanish Harlem" was a close match, but the Analog DAC's superior detail retrieval made Rebecca Pigeon sound just a smidgen more lifelike.

The "Miserere" track sounded a bit different on the two DACs. The Analog DAC's extra detail made the distant solo group more understandable, which had the effect of making them sound closer to the main group in front. The Analog DAC was just squeaky clean, whereas the Audio Research sounded a little more smeared.

Bottom line

So does the Analog DAC sound like, well, an analog DAC? Maybe it does, if you can find an analog source as free from noise and distortion as the Analog DAC and if your idea of a quality analog source excludes any coloration from tubes or solid-state gain stages. If you want a flexible, top-notch DAC capable of playing any digital source currently available, in a unique, strikingly-designed package that can function as a line source as well as a DAC, the Analog DAC may be just your ticket. It's expensive, but its sound quality and functionality are hard to beat at the price. And its ability to replace an expensive linestage, connecting cables, and power cord can save you a bundle, reducing your overall system price and increasing the amount of free shelf space on your equipment rack. Viewed from that angle, maybe the Analog DAC isn't as expensive as it first looked. *tas*

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Simaudio Moon 100D USB DAC

A Great Place To Start

Neil Gader

Any conversation about computers reminds me of my son-in-law, Dan. Classic Gen Y profile. Thirty-two years old, just married, a professional with an advanced degree. Dan, like much of his generation, is a savvy computer guy (Apple, natch) and music junkie. Dan loves the indie scene, respects the classics—classic rock anyhow. In most ways he embodies the audio ethic of his generation, meaning he’s a fervent music-downloader and disc-ripper. Dan pays very little out of pocket for his musical fix. Until recently his “system” was almost entirely iTunes/iPod-based, but after discovering his dad’s vinyl collection he sprung for a budget turntable and speakers and began assembling an entry-level system. High end was the last thing on his mind. But that was then. He’s discovered that sharing a life and paying a mortgage leaves little room for earbud listening in the man-cave. Yet, with thousands of tracks on a hard drive that he wants to access through his growing two-channel rig, what to do? The short answer might be something along the lines of the Simaudio Moon 100D.



The Moon100D is a stoutly built and elegantly finished component, whose looks are consistent with the extensive Simaudio lineup. Its front-panel layout includes LED indicators for sample rate and pushbuttons for power and input selection. The Moon 100D is based on the BurrBrown PCM1793 high-resolution 24-bit/192kHz D/A with an 8x oversampling digital filter. An asynchronous sample-rate converter upconverts all input signals to 24-bit/192kHz. As is Simaudio’s practice, a highly accurate digital clocking system maintains the DAC’s extremely low jitter levels. Three stages of DC voltage regulation are incorporated into the 100D power supply, as well as traditional

Simaudio touches like pure-copper circuit board traces and a symmetrical circuit design.

Taking centerstage is the USB input which accepts a digital audio signal of up to 16-bit/48kHz. Like a favorite pair of slippers USB has become a mainstay of the computer world for its convenience—and this is in spite of the audio limitations that frequently draw fire in many high-end circles. Simaudio is refreshingly candid about the fact that due to jitter, phase errors, and other latency issues USB was never intended to appeal to audiophiles—it was meant for mundane data transfer only, not audio signals. In Simaudio’s words, “We opted to provide the best possible

EQUIPMENT REVIEW - Simaudio Moon 100D USB DAC

power supply, D/A converter, and analog stage in the Moon 100D at this price level.”

Simaudio, however, is an old hand at high-end digital, so it's armed the 100D with both optical and S/PDIF inputs to make the most of its 24-bit high-resolution DAC when used in conjunction with a CD transport's digital output or a computer equipped with an S/PDIF high-resolution soundcard. However, if your computer doesn't have one of these outputs, don't despair. There's an easy work-around via a USB-to-S/PDIF interface. There are quite a few available, reasonably priced, and many will work with USB datastreams up to 24-bit and sampling rates up to 192kHz. For example, near the top of the rung is a state-of-the-art \$1695 model like the Berkeley Audio Design Alpha USB (Issue 214) or the more down-to-earth \$169 Musical Fidelity V-Link, a modestly priced 24-bit/96kHz asynchronous

USB interface (Issue 213). While thousands of dollars apart, both take advantage of the superior continuous bitstream of S/PDIF.

Setup is a snap. Using my MacBook equipped with Pure Music software from Channel D, I clicked on the Sound icon of System Preferences, which identified the DAC instantly. Just double-check that you've selected the USB for output, and you'll be off and running.

For those of you accustomed to the run-of-the-mill iTunes experience, straight-line performance through the 100D USB will be a revelation. A laundry list of deleterious artifacts, from indistinct imaging to tonal hardness to treble etch, will begin to fade away. Bass pitches and harmonics will tighten up and lighten up considerably. The overall sound becomes more robust and limber. There will be an expanded sense of musicians occupying physical space, rather than flat-footed images on a tent-card. Dynamics will be livelier, low-level resolution higher. In general, music via the USB provides an easy listening experience, while manifesting a character that is a bit darker on top and a bit truncated in bass decay.

In retrospect, this signature is paradoxically the near polar opposite of early compact disc sound. Back then, CD was noted for its powerful bass punch and icy, often brittle treble. Here the 100D USB input softens and shades the sound somewhat, and transients don't quite have the urgent call-to-arms response of live music. It's for this reason alone that I laud Simaudio for offering the S/PDIF option. Adding the V-Link USB-to-S/

PDIF interface allowed Jen Chapin's cover of "Renewable" to develop a greater degree of openness and bloom across the tonal spectrum. As micro-dynamics fully ignite, it's simply easier to trace individual notes in space, whether they be delicate piano motifs or the nylon-stringed guitar riffs from Ana Caram's cover of "Fly Me To The Moon" [Chesky]. And on a 24-bit/88.2kHz recording like Malcolm Arnold's *A Sussex Overture* [Lyrita], the orchestra seems to come alive in three dimensions—the once papery and pita-flat soundstage replaced with complex acoustic textures, the venue seemingly inhaling and exhaling with ambience and presence. But the improvement doesn't just apply to high-res; the benefits are easily appreciated on stock 16-bit/44.1kHz.

So how does the 100D compare to the prevailing digital standard of the last thirty years, namely CD? Close and growing closer, but ultimately falling short. Something like the primo Audio Research CD5 renders timbral and textural detail with more sophistication. When, for example, the melodies of singer Jen Chapin and the baritone sax begin to parallel each other, the CD5 maintains a warmer midrange, and breathes a bit more upper-frequency air and buoyancy into the performance. The CD5, to borrow an analog term, just seems to *track* a bit more cleanly, thereby allowing images a stronger sense of spread across the stage and a fuller, more complete sonic presentation. And while the sonic backgrounds that underlay a venue's acoustic are very quiet through USB, they are midnight black with the ARC. In imaging and

three-dimensional soundstaging, the S/PDIF input hews closer to the ARC with only minor subtractions in image focus.

The 100D is a flexible and forward-thinking solution for addressing the diversity of computer-based audio. It's a glitch-free device with an all-important upgrade path for those inspired to stay ahead of the curve. And to the extent that it allows a family member like Dan to have a few thousand tunes at the touch of a finger and to bypass the CD format entirely, its potential impact cannot be underestimated. When it comes to the brave new world of digital music there is seemingly no end in sight. But Simaudio offers an ideal place to begin. **tas**



SPECS & PRICING

Inputs: S/PDIF, USB, TosLink

Weight: 4 lbs.

Dimensions: 5" x 2.9" x 6.5"

Price: \$600

SIMAUDIO LTD.

1345 Newton Road
Boucherville, Quebec
J4B 5H2 Canada
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Bryston BDA-2 Digital-to-Analog Converter

Presence from Absence

Karl Schuster

Perhaps it was serendipity, perhaps inevitability, that led me to play *The Modern Jazz Quartet's The Last Concert*. "Softly, As In a Morning Sunrise" unfolds kaleidoscopically, somehow by turns psychedelic, funky, dapper, bluesy, and sly. "Summertime" blossoms open with a novel hypnotic repeating figure on the vibes that we cannot help but hear through the haze of the late 60s, then morphs through variations both familiar and enlightening, ultimately returning to the dreamy, gauzy reverie whence it all began. So what do we have here? Masters of effortless ensemble musicianship, leading us on a journey—their journey—through the decades of their storied careers.

I hadn't expected this sort of musical revelation, but I have gratefully come to accept such delightful rewards from the technically evolutionary but musically revolutionary Bryston BDA-2 digital-to-analog converter.

Bryston's BDA-1 DAC has been a cornerstone of my reference system for several years. Frankly, I have found little to criticize about its performance, which has earned justified praise and a Golden Ear Award in these pages. Thus, my curiosity regarding what improvements those clever Canadians might have incorporated into the new BDA-2 was tempered by an "if it ain't broke, don't fix it" wariness. That

concern was effectively up-ended the moment that I began auditioning the BDA-2.

The most notable new feature added to the BDA-2 is an asynchronous USB input capable of handling all standard sample rates up to 192kHz, replacing the "convenience feature" adaptive USB input of the BDA-1. Bryston's USB implementation aims to be state-of-the-art, featuring proprietary firmware running on the XMOS USB Audio micro-controller platform. The addition of this feature alone fully justifies the minor price differential over the BDA-1, which remains in the Bryston product line, albeit now at a reduced price. Whereas the BDA-1 utilized a pair of time-tested 24-bit Crystal CS4398 DACs, one per channel in a dual-differential configuration, the BDA-2 has been upgraded with the latest top-of-the-line 32-bit AKM 4399 DACs. Of course both products feature Bryston's venerable discrete Class A analog output circuitry, rather than off-the-shelf IC op-amps.

The BDA-2 retains the input flexibility of its progenitor, with two TosLink optical, two RCA, and two 75-ohm BNC SPDIF inputs, and a balanced AES/EBU input. Both single-ended RCA and balanced XLR analog outputs are offered, as well as a convenient RCA SPDIF pass-through digital output. Inputs can be selected via front-panel switches or Bryston's BR2 system remote control, which also enables the user to toggle the BDA-2's upsampling function from the listening position. This feature synchronously upsamples the input data to either 176.4kHz (for 44.1 and 88.2kHz signals) or to 192kHz (for 48 and 96kHz signals), thereby preserving all the original sample data while interpolating intermediate values at the higher sample rates. In contrast, asynchronous sample-rate-conversion techniques essentially synthesize an entirely new data set from the input signal (with the disquieting implication that none of the original input data are rendered with bit-perfect accuracy). I found that upsampling could smooth the rough edges of

some older pop CDs, but that the majority of recordings sounded best when decoded at their native sample rates. An array of front-panel LEDs displays the input sample rate, though the arrangement of those LEDs would have been more logical with the left column indicating 44.1, 88.2, and 176.4kHz (rather than 44.1, 48, and 88.2) and the right column indicating 48, 96 and 192kHz (rather than 96, 176.4, and 192kHz). Consider this nit-picked.

Since the asynchronous USB input is the BDA-2's most eagerly anticipated new feature, let's begin our listening therewith. Apple's Macintosh operating system natively supports USB Audio Class 2 devices such as the BDA-2 in versions 10.6.4 and above. Microsoft Windows users need to install the driver supplied by Bryston on a USB key (literally the USB "stick" resembles a metal key).

Unfortunately, my decade-old Windows XP desktop PC did not like Bryston's USB driver at all; regardless of the output mode that I selected (ASIO, Kernel Streaming, and even DirectSound for diagnostic purposes), every time that I attempted to begin playback the computer crashed with an alarming "blue screen of death" Stop error. This was not an auspicious start. Fortunately, Bryston's USB driver has worked well on my Dell Latitude D620 notebook PC, with nary an operational glitch.

The BDA-2's asynchronous USB input must be judged a resounding success, fully competitive with the relative performance of other top-class USB implementations that I have had the privilege of hearing, such as those of the Esoteric D-07X and dCS Debussy DACs. Indeed, because of its particular strengths, the BDA-2 will be especially appealing to listeners seeking to maximize enjoyment from USB sources. The overriding impression of music played via the BDA-2's USB input is one of relaxed ease and unflustered composure. Tonality exhibits a rounded, mellow, non-fatiguing character. Rhythms are well preserved, and spatial

EQUIPMENT REVIEW - Bryston BDA-2 Digital-to-Analog Converter

relationships are clearly portrayed.

Alas, as with every other DAC that I have auditioned—including the aforementioned dCS and Esoteric products—the BDA-2 can sound substantially better when driven by a SPDIF or AES/EBU source than via USB. To be sure, the manifestations of USB's lingering deficiencies differ between these products. For example, via USB, both the Esoteric and Bryston homogenize timbres, dynamics, and textures, but do so differently. The D07-X renders everything with a superficial glaze or sheen, akin to the synthetic air-brushed “perfection” of the cover models on contemporary fashion magazines, while the BDA-2 imposes a barely perceptible foggy haze between the listener and the performers, reminiscent of the flattering soft-focus filters that glamorized the leading ladies of Hollywood's golden era. Neither effect is a deal-breaker, and may even escape notice absent a superior non-USB source for comparison.

The BDA-2 substantially reduces the grainy textures and wiry edginess that have marred the sound of massed strings on lesser USB DACs, but it does not entirely eliminate these stubborn artifacts. However, here is a case where the BDA-2's specific strengths tilt the balance in favor of Bryston's USB implementation, since its intrinsic balance is so self-effacing, refined, and relaxed, in contrast with, for instance, the D07-X's more forward presentation. Upgrading the USB cable from the baseline Belkin Gold to the reference-grade WireWorld Platinum Starlight wrought obvious across-the-board improvements in purity, dynamic contrast, impact, and scale. All things considered, since

the BDA-2's USB performance mirrors that of far more expensive products both in character and degree, it merits a strong recommendation to anyone looking for a USB DAC.

However, in order to unlock the full potential of the BDA-2, one must feed it from a superior source. In every conceivable parameter, the BDA-2's performance took an unequivocal leap forward when connected to the SPDIF output of the ESI Juli@ sound card in my desktop PC. With the Juli@ card delivering the bits, the BDA-2 sounded vibrant, rich, energetic, lithe, open, and engaging. In contrast, its presentation via USB sounded comparatively smaller, desaturated, muffled, and constrained, paralleling my experience with other premium DACs. Since I extolled the virtues of the ESI Juli@ in Issue 213, there is no need to belabor this point, other than to confirm that USB audio still has a way to go before it can compete with this inexpensive sound card.

Playback from optical disc players was also well-served by the BDA-2. As Alan Taffel observed in his review of the BDA-1, Bryston's digital input circuitry exhibits less variation between SPDIF sources of varying quality than many DACs, and the BDA-2 continues this tradition. I use an admittedly off-the-wall technique to play high-resolution music from optical discs: feeding the HDMI output of an Oppo Blu-ray player into an HDCP-compliant “audio de-embedder” fitted with a standard SPDIF RCA output. (Non-intuitively, this arrangement sounds demonstrably better than the Oppo player's SPDIF output!) Configuring the Oppo to decimate DSD to 88.2kHz PCM opened the door to the tantalizing prospect of utilizing an

external DAC even for SACD playback. DSD purists may scoff at this approach, and indeed I used to prefer listening to SACDs decoded in their native DSD form via my previous Marantz disc players. But it's imperative to keep an open mind and open ears. With the Oppo BDP-83, BDP-83SE, and BDP-93 I was surprised to find that I emphatically preferred the pitch stability, rhythmic precision, and solidity of SACDs when internally converted to PCM.

The Bryston BDA-2 sounded delightful playing the 88.2kHz signal derived from SACDs, whether effortlessly revealing the subtle interplay among guitar, organ, and drums on The Wes Montgomery Trio's essential October 1959 Riverside recording or the complex dynamic shadings and meticulous rhythms of Paavo Jarvi's captivating performance of Stravinsky's *A Soldier's Tale* [PentaTone]. Despite the “heretical” conversion of DSD to PCM by the Oppo player, the BDA-2's timbral purity, relaxed fluidity, and refined ebullience dovetailed exquisitely with the virtues of SACD.

As wonderful as the BDA-2 sounded with both the Oppo player and the ESI Juli@ sound card, its performance entered another realm entirely when playing music files from Bryston's BDP-1 Digital Player (reviewed in Issue 215). My initial reaction to this combination betrayed that dumbfounded sense of momentary confusion that accompanies first exposure to something defying expectation. Driven by this reference-grade digital source, the BDA-2 simply does not sound “digital.” It imposes none of the usual digital artifacts on the music: no grainy texturing, no edge, no glare, no smearing, no frequency-specific colorations, no level-

dependent distortions of spatial perspective.

The BDA-2 portrays instruments with vivid three-dimensional body, precise focus, and rich timbres, but in a natural and unforced manner. It is the first DAC in my experience to completely eliminate “peak shriek”—the unfortunate tendency for high-level transients to induce momentary dynamic instability, thereby imposing a sharp, shrill edginess during musical peaks. We have had to put up with this fatiguing digital artifact for so long now that hearing a product that finally banishes it from the listening room is cause for a rousing standing ovation. I spent hours indulging in this unique virtue of the BDA-2, delighting in the freedom to enjoy digital music at louder levels than with lesser DACs—tellingly, with the same abandon that I experience when listening to records played on my Goldmund turntable.

SPECS & PRICING

Sample rates: 44.1, 48, 88.2, 96, 176.4, 192kHz

Frequency response: 20-20kHz +/-0.1dB

Noise: -140 dB unweighted

Output level: 4.6 volts balanced, 2.3 volts unbalanced

Dimensions: 19" x 2.5" x 11.2"

Weight: 18 lbs.

Price: \$2395

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EQUIPMENT REVIEW - Bryston BDA-2 Digital-to-Analog Converter

Much of the BDA-2's remarkable transparency must be due to its preternaturally low noise floor. Bryston cites a noise figure of -140dB, and turning my preamp volume control all the way up leaves no reason to doubt this claim. With electronic distortions reduced to vanishingly low levels, music blooms and decays with lifelike ease. This freedom from low-level interference is complemented by imperturbable handling of high-level crescendos, without overshoot or ringing. Listening to large-scale orchestral recordings through the BDA-2 is a revelation, as each instrument's distinctive timbral signature is maintained without alteration throughout its full dynamic envelope.

Accustomed as we have become to the digital artifacts that tend to add glare, grain, or brightness in the upper octaves, some listeners may at first wonder if the BDA-2 is lacking in high-frequency extension. A quick listen to a well-recorded jazz album with ample percussion, such as Manu Katché's *Third Round* [ECM], will quickly confirm that the only thing missing from the BDA-2's treble range is distortion. Every cymbal crash and delicate brush stroke shimmers and breathes with beguiling harmonic complexity and an open, airy, natural decay.

Intriguingly, the BDA-2's purity and "quietude" manifest in surprising, unexpected ways. On Santiago de Murcia's *Gaitas* [Linn Records], William Carter's baroque guitar was recorded in a large space, unfortunately shared with a particularly noisy air-circulation system. It is instructive to hear how the ambient sound of the room is conveyed by different components. The intrinsic "resolution floor" of

many USB sources obscures much of the sound of the room, in a manner that is acoustically analogous to what happens visually when someone opens a door in a darkened movie theater, allowing light to spill onto the screen, obscuring shadow details with an amorphous, undifferentiated gray haze. Through Bryston's BDP-1 and BDA-1, one can hear all manner of fluctuations in air pressure and reflections around the room, surrounding the small guitar.

I was quite startled when I first played this track through the BDA-2, wondering, "Hey, where's the noise?" However, after a few seconds of acclimation, I found that the ambient room sound was simply being "decoded" in an entirely different manner, intermodulating less with the direct sound of the guitar. Put another way, the BDA-2 was doing such a superior job of reproducing both the guitar and the air conditioner as familiar, identifiable, distinct sound sources, that the brain could more easily isolate the "subject" from the "background," and thus more effectively tune out the annoying air-conditioner noise, and focus on Carter's exquisite playing—just as we do when listening to live music in real spaces with similar ambient background noise levels. I smiled with appreciative recognition at this realization, since it paralleled my experience hearing the legendary Goldmund Reference turntable in the mid-1980s.

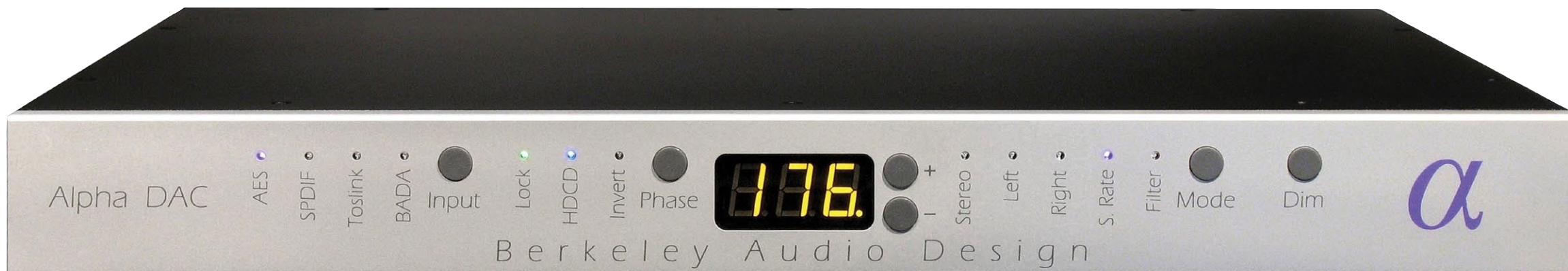
Most audio components tend to render the spatial dimensions of recordings with some degree of editorial perspective. For example, the Esoteric D-07X presents the listener with an upfront, immersive experience, emphasizing immediacy and expansive width. The Bryston

BDA-1 opts for a seat farther back in the hall, with correspondingly reduced size, but appropriate scale. The dCS Debussy paints an altogether larger, more illuminated picture than the BDA-1, albeit one viewed through a scrim of ultra-fine mesh. In direct side-by-side comparisons, I can easily understand why different listeners might prefer one of these interpretations over the others.

Here again, the BDA-2 just doesn't play by the same rules. I hear no intrinsic spatial characteristics whatsoever from this DAC. Instead of "throwing a soundstage" or "bringing the musicians into your room," the BDA-2 does something quite unlike anything that I have ever heard before. It is as if the end of my listening room behind the plane of the speakers has been removed, leaving an open-air view into the recording venue itself, with life-sized proportions, scale, and volume. Perhaps paradoxically, this absence of spatial coloration does endow the BDA-2 with a distinctive perspective. Because instruments and performers are rendered with a much more realistic sense of distance than we are accustomed to hearing, the surrounding space logically extends far beyond the listening room boundaries, especially in depth. Some listeners might initially find the BDA-2 "laid-back" or "recessed"; it takes a little time to move past our preconceived categorical constraints, and embrace the paradigm shift implicit in the BDA-2's radical advance in conveying spatial relationships. The sensation of being in the presence of live musicians is uncannily realistic, yet un-spectacularly natural.

As thrilled as I was to explore these

advancements in digital playback fidelity, I found that the crowning achievement of the Bryston BDA-2 can be described in the simplest of terms: It makes the best of every recording that you play through it. Late one night, I browsed through the BDP-1's music library, and selected one of my "desert island" discs: the eponymous 1993 debut release from October Project. This album is a delectable pop confectionery that I will never be able to assess objectively, as it has a special place in my heart. Alas, its densely layered studio production can become murky during complex passages, and some tracks suffer from a dull tonal balance. As much as I love the music, I usually end up playing only a few songs at a time, frustrated by the sonic compromises. What an unadulterated joy, then, to finally surrender to this cherished album's unabashedly romantic spell from beginning to end, enraptured by the BDA-2's magical ability to allow the music to transcend the recording's limitations. I have never enjoyed the music more, and have never heard more in the recording. I cannot think of higher praise, nor can I imagine living without the Bryston BDA-2. [tass](#)



Berkeley Audio Alpha DAC Series 2

A Great DAC Gets Even Better

Robert Harley

Few products in my experience as a reviewer have offered as much value as the Berkeley Audio Alpha DAC. Although not inexpensive at \$4995, the original Alpha DAC (reviewed in Issue 189) was nonetheless competitive with the best DACs available, regardless of price. Moreover, the Alpha DAC was tailor-made for playing high-resolution files because of its ability to accept a wide range of sampling frequencies and word lengths (up to 192kHz/24-bit), its capacity to drive a power amplifier directly, its remote volume control, and its front-panel HDCD indicator. This LED illuminates when playing an HDCD-encoded disc (or Reference Recordings' HRx file), but only if the data are uncorrupted, providing a sure-fire way of assuring that your music server is "bit transparent." (If the HDCD LED illuminates, the DAC is receiving a datastream that is bit-for-bit identical to the source.) The release of Berkeley's Alpha USB interface, which converts a computer's USB output to AES/EBU (or coax S/PDIF), further increased the Alpha DAC's appeal (see my review of the Alpha USB in Issue 214).

The Alpha DAC was not only functional and capable; it was also fabulous-sounding on both CD and high-res material. In fact, I've had one in my rack since I reviewed the product way back in Issue 189. The Alpha DAC has been at the front end of some of the world's best preamplifiers, power amplifiers, and loudspeakers, and never have I felt that it was the system's weak link. Instead, I've always thought that the Alpha DAC allowed me to hear these reference-grade components at their finest.

Now Berkeley has released an upgraded version, called the Alpha DAC Series 2. Admirably, the price remains the same despite some of the new

parts costing ten times more than the parts they replace. For those of you who choose a black front panel, the price has actually dropped from \$5095 to \$4995 (there is no longer a \$100 premium for the black cosmetics). Units that were shipped from Berkeley after June 2011 can be upgraded to Series 2 for \$350 plus shipping. Units made before that date cannot be upgraded. The Series 2 looks and operates identically to the original; the difference is purely in parts and the circuit refinements that Berkeley discovered in the three years since the original's launch. These include new clocking circuits and increased isolation between the digital and analog sections.

EQUIPMENT REVIEW - Berkeley Audio Alpha DAC Series 2

In playback, the Series 2 sounds very much like the original, with tremendous resolution of low-level detail, great transparency, freedom from timbral grain, a treble that is simultaneously smooth and resolving, and absolutely stunning dynamics. The Series 2, however, is significantly better in several key areas, most notably transparency, soundstaging, timbral liquidity, ease, refinement, and resolution.

The Series 2 exhibits a considerably more open and transparent presentation, with a greater sense of air surrounding images in the



soundstage. The overall spatial perspective is slightly laid-back compared with the original DAC, perhaps the result of greater bloom around images and increased soundstage depth. Instrumental and vocal images sound less dry and closed-in, and their decays seem to hang in space longer. The impression of precisely defined instruments existing in three-dimensional space is significantly improved in the Series 2.

In addition, timbres through the Series 2 are smoother, more liquid, and more refined. By contrast, the original DAC sounds a bit hard. Through the Series 2 massed strings are noticeably richer and more velvety in texture, with a more organic quality. The flugelhorn on a jazz quintet album I engineered has a purity and ease that are extremely lifelike. This increased bloom and timbral liquidity combine to produce a greater sense of relaxation and involvement.

The treble is equally improved, with more finely filigreed resolution and greater refinement to go along with smoother textures. The top end is more "delicate," not in the sense of greater fragility or less energy, but rather in its greatly increased finesse. Treble textures are finer and more intricate, which gives the

entire presentation a more sophisticated and nuanced character.

The Series 2 presents more information, but that information is, as noted, presented with increased ease. That is, the additional resolution doesn't tilt the overall sound toward the analytical, but rather toward the subtle and refined. This greater resolution conveys a heightened impression of the mechanism by which an instrument creates sound, fostering a greater sense of realism. For example, on drummer Joe Morello's *Morello Standard Time*, a rim shot that sounded like a transient event on the original DAC is more clearly defined by the Series 2 as a drum stick impacting the snare drum's rim. Listen also to how you can hear the rim shot's decay separate from the rest of the mix—and follow it way down in level. Note that I use this example to illustrate the Series 2's superior resolving power, not that I listen to such things when enjoying music. But it's these kinds of sonic characteristics that you don't notice overtly which contribute to realism and listener involvement.

The Series 2's improved resolution combines synergistically with its significantly better transparency, allowing me to hear fine details toward the back of the mix. The whole

presentation is lighter, airier, and more open, with a soundstage infused with a sense of transparent space.

Bass weight and bottom-end dynamics are very similar in these two DACs, but the nod goes to the Series 2 for its increased density of tone color in the bottom end. Acoustic bass is reproduced with slightly greater warmth and richness, coupled with a bit more definition and rhythmic agility. The original DAC had a slightly "looser" bottom end, with perhaps more weight but less definition.

The original Alpha DAC was a groundbreaking product, both in absolute performance and in its spectacular value. The Alpha DAC Series 2 is considerably better, and in musically significant ways. Berkeley Audio Design could have called the Series 2 a "Signature" edition, or even created a new model designation and commanded a higher price. That it improved the product so much yet kept the price the same says a lot about the company.

The Alpha DAC Series 2 would have received my highest recommendation had it cost \$15,000. (Yes, it sounds that good.) That it sells for \$4995 qualifies as a minor miracle.

tas

SPECS & PRICING

Input sampling rates: 32kHz-192kHz

Input word length: Up to 24-bit

Digital inputs: AES/EBU on XLR jack, SPDIF on BNC, optical on TosLink, BADA-encrypted RJ-45

Analog outputs: Balanced on XLR jacks, unbalanced on RCA jacks

Digital filtering: Multiple options

Analog output level: Variable in 0.1dB steps; Channel balance adjustment in 0.05dB steps

Dimensions: 16.5" x 1.75" x 10.4" (19" rack-mount option)

Warranty: Three years parts and labor

Weight: 9 lbs.

Price: \$4995

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dCS Debussy DAC

A Budget dCS?

Alan Taffel

In 2003, Bentley Motors shocked the automotive world by introducing the Continental GT. Until then, acquiring one of Bentley's bespoke motorcars would set the purchaser back several hundred thousand dollars. But the Continental GT cut in half the price of entry into those rarified ranks. Initial skepticism was short-lived; one look at the car's sumptuous interior and prospective buyers knew they were in the presence of a true Bentley. The GT became an instant success, neatly illustrating that value has appeal even at extravagant price points.

Now comes the Debussy DAC from dCS, the digital specialist whose products are every bit as top-shelf—and pricey—as those of its fellow Brits at Bentley. Prior to the Debussy's arrival, owning an "entry-level" dCS DAC was an \$18,000 to \$24,000 proposition. The new model, which carries an \$11,000 price tag, aims to be dCS' Continental GT.

Of course, while eleven grand may break new ground for dCS, it's still a lot of dough for a DAC. Still, no realistic consumer would expect dCS gear (or Bentleys) ever to be downright cheap. The real question is whether the Debussy measures up to dCS standards and, in so doing, confers true value to its buyers. To find out, we need to pop the hood.

There is a reason dCS products are expensive. While a Bentley is characterized by luxurious, hand-crafted materials, dCS gear is

crammed full of costly DSP chips, hybrid power supplies, discrete clocks, and gate arrays. Custom software harnesses this powerful coterie to execute a complex digital dance that comprises multiple stages of synchronous upsampling, conversion to dCS' proprietary 5-bit format, and finally processing by the firm's lauded Ring DAC, with a choice of in-house programmed filters on the side.

One might think a "budget" dCS would employ fewer custom parts and more off-the-shelf hardware and software. But that approach would not result in a true dCS, any more than badge-engineering a VW would yield a Bentley. Indeed, the more one examines the Debussy's innards, the more one comes away wondering how it can be sold at its price. Consider: The Debussy includes the *exact same* control board—responsible for everything from power

delivery, I/O, upsampling, clocking, and format conversion—as the universally acclaimed Paganini and Scarlatti models. Its Ring DAC and fully balanced Class A output stage, both discrete modules, are *identical* to those in the Debussy's expensive siblings, as are the software-based digital filters.

Nor did dCS skimp on features. Again, one might reasonably expect a loss of connection flexibility, but the Debussy will handle an RCA, BNC, and a pair of AES sources. (As usual, the BNC input was the best sounding.) Further, there are both single-ended and balanced outputs. Other welcome ingredients include a front-panel sample-rate display, the ability to accommodate an external word clock, and the world's heaviest remote control.

All this would be sufficient to justify excitement about the Debussy's debut, but dCS ups



the value equation considerably with the inclusion of a USB port. An easy, inexpensive add-on, you say? Not in this case. Elsewhere in the dCS line, adding a USB interface requires an entirely separate (and dearly priced) box (the \$4999 U-Clock). The Debussy is the company's first and only product to incorporate both the Ring DAC and USB in one box. Furthermore, this is no ordinary USB interface. It's good up to 96/24, and is of the asynchronous variety, which allows the DAC rather than the PC to control timing, resulting in far less jitter. This port is the icing on the Debussy cake.

So where, exactly, does the dCS newcomer cut corners? Mostly in areas that do not affect the sound. Much was saved, I am told, through the exclusion of an alphanumeric front-panel display. In its place are a series of LEDs that indicate input and filter selection, sampling rate, and volume when the Debussy is used as a linestage (more on this later). Personally, I found the LED array perfectly serviceable. Another limitation: The Debussy has only two filter options, whereas higher models offer

EQUIPMENT REVIEW - dCS Debussy DAC



more. This is another non-issue as far as I'm concerned; I was perfectly content with the recently released apodising filter, which I found significantly more natural than the standard version. In any case, future filters that dCS deems superior will be downloadable. One final omission was upsampling to DSD—a feature that impressed me mightily at the 2010 CES. This particular exclusion did disappoint me, and I'm still lobbying dCS to find a way to include it in the Debussy. Call me greedy.

Ultimately, of course, a car is judged by a test drive and an audio component is judged by listening (unless you're Julian Hirsch). So, does the Debussy's advanced and costly componentry deliver the sonic goods? I won't mince words: The Debussy is flat out fabulous. Let me count the ways.

This is not the first DAC I have reviewed that employs an elaborate processing scheme. For the most part, I have been unhappy with such units. The behind-the-scenes frenzy of digital calculating seems to find its way into the listening experience. That is, such DACs *sound* like they're working hard, which prevents the listener from relaxing into the music. DCS knows of and is careful to avoid

this phenomenon. The company uses more processors (oops, there goes the cost curve) so that each is taxed less. This explains, for example, why upsampling is performed in stages rather than all at once. Perhaps it also accounts for the fact that, despite all the binary manipulations taking place, the Debussy sounds unfailingly natural. Music winds out of this DAC like thread from a spool.

In virtually every way, the Debussy sounds terrific. Dynamics, depth, and detail are present in copious quantities. If the music so beckons, this DAC's tone is as ravishing as long, lustrous hair. Indeed, early in my time with the Debussy I identified a certain pervasive smoothness that was fine for some source material, but inconsistent with the more ragged elements of my CD collection (e.g. the MFSL remaster of the Pixies' wonderfully raw *Doolittle*). However, inserting some good cones underneath the chassis completely extinguished this minor coloration. So I settled down to some serious listening.

"On the Beach at Night Alone," from Ralph Vaughn Williams' choral *Sea Symphony* (Telarc) is an enthralling piece that whisks the listener on a journey from the solitude of

one man's thoughts to the "vast similitude" of the cosmos. I listened to this piece through the Debussy feeling that it could hardly be more engrossing. The DAC's sheer quantity of spatial, dynamic, and musical information added up to an all-encompassing, emotionally shattering experience.

By comparison, my Bryston BDA-1 reference DAC (a Golden Ear recipient, mind you) seemed restrained. The chorus lacked high-end extension, sounding almost muted. Dynamics were still excellent, yet the Bryston could not achieve the cataclysmic climax delivered by the dCS. Bass was nowhere near as thunderous. Finally, the Bryston buried some instruments in the mix, whereas the Debussy would never subject any player to such ignominy. In this respect, having a Debussy is like buying a new analog front end; in both cases you get to discover previously buried treasure within familiar tracks.

On smaller scale works, like the Stravinsky Suite from *l'Histoire du Soldat* (Pentatone), the gap between the dCS and the Bryston narrowed. Neither held an advantage with respect to pacing, and instrumental timbres were virtually indistinguishable. Still, the Debussy deliv-

ers more detail—you can hear the hall reverberate far more clearly right from the first note—and a deeper stage. And the Debussy not only unearths every musical line; it makes following all those lines concurrently an effortless task. Ivor Tiefenbrun would be well pleased with this DAC.

I should reiterate here that the Bryston to which I compared the Debussy is an excellent DAC, and at \$1999 represents a different sort of value. The above contrasts are not intended to denigrate the BDA-1, but to convey just how good the Debussy is compared to "run of the mill" reference gear. **tas**

SPECS & PRICING

dCS Debussy DAC

Inputs: Digital USB, RCA, AES/EBU (2), BNC, WORDCLOCK

Outputs: Analog balanced XLR and single-ended RCA, 2V or 6V user-selectable

Maximum resolution: 192/24 (S/PDIF), 96/24 (USB)

Dimensions: 17.6" x 2.6" x 15.5"

Weight: 1.4 lbs.

U.S.

Price: \$10,999

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AudioQuest DragonFly USB DAC

A Little Thing That Counts

Robert Harley

The high-end industry has long lamented its inability to appeal to regular folks who just like to listen to music. Part of the problem has been that we expect the would-be audiophile to make the giant leap from mass-market audio into our often-esoteric world. Being an audiophile often requires a lifestyle change, such as allowing the audio system to dominate the living room.

What the high end needs is a “bridge” product that brings our aesthetic to the ways in which ordinary people already enjoy music. Such a product would be affordable and require no special setup or change in living arrangements, yet deliver a far better listening experience than mass-market gear. It would be a “stealth” product in that everything about it appears normal save for the sound quality.

I can’t imagine a better realization of that ideal that AudioQuest’s new DragonFly USB DAC. This \$249 unit has the form-factor of the ubiquitous USB memory stick; just plug it into a computer and connect headphones or a line-level interconnect to the 3.5mm stereo mini-

jack. It can function as a USB DAC, headphone amplifier, or DAC and preamplifier when driving a power amplifier directly. So far so good for our non-audiophile listener. But the DragonFly wouldn’t be special if low price, cool form-factor, versatility, and ease of use were its only claims to fame. Fortunately, the unit is brimming with high-end parts and design techniques that reflect a real effort by its designers to deliver great sound (more on this later).

Setting up the DragonFly requires entering a couple of menus (Mac or PC) to tell the computer that audio output should be through the DragonFly. Although not as simple to set up as a true UPnP (Universal Plug ‘n’ Play) device that configures itself with no user intervention, installing the DragonFly requires no software downloads.

Once it is set up, operation is very cool. The dragonfly graphic lights up in different colors to indicate the sampling frequency it is receiving—blue for 44.1kHz, green for 48kHz, amber for 88.2kHz, and magenta for 96kHz.

The high-end parts and design I mentioned include the acclaimed ESS Sabre DAC that

incorporates a novel (and patented) technique for greatly reducing clock jitter where it matters. Many high-end DACs and disc players use this same chip. To provide even more stable clocking and lower jitter, the DragonFly employs dual master clocks, one for the 44.1kHz family of frequencies (44.1kHz, 88.2kHz) and one for the 48kHz family (48kHz, 96kHz). If you play files of a higher sampling frequency (176.4kHz or 192kHz), the DragonFly tells the computer what frequencies it can decode so that the computer can downsample the data. Note that you can also downsample 176.4kHz and 192kHz in a program such as Pure Music, which is a sonically superior solution to the computer performing the downsampling.

Despite its low price, the DragonFly’s USB interface is asynchronous. This means that the DragonFly is not forced to lock to the computer’s clock. Instead, it uses its own on-board precision clock as the timing reference for digital-to-analog conversion, reducing sonically degrading jitter. DragonFly’s asynchronous USB interface runs the same code found in multi-thousand-dollar DACs. In today’s world, any USB interface that is not asynchronous is a non-starter.

Rather than allow iTunes or another music-player program to adjust the volume in the digital domain (which reduces resolution), the DragonFly features a 64-step analog volume control. The volume slider in iTunes (or a keyboard’s volume up/down buttons) merely sends volume data to the DragonFly which implements the volume change in the analog domain. This is a better-sounding solution in part because digital-domain volume control reduces resolution by one bit for every 6dB of attenuation. The volume control comes into play

when driving a power amplifier, headphones, or powered desktop speakers. Those of you who use the DragonFly with a preamplifier will set the volume at maximum (indeed, you should bypass all DSP so that that data remain unchanged) and set the playback volume with the preamplifier. DragonFly’s output level for full-scale digital signals is 2V, the same as any full-sized DAC or disc player.

This is an impressive list of high-end design features. How the designers packed all of them into a device that weighs three-quarters of an ounce is beyond me.

I listened to the DragonFly in my reference system driving a Rowland Corus preamplifier through an AudioQuest Angel 3.5mm mini-plug-to-RCA interconnect. Although many listeners will use the DragonFly with a laptop and headphones or as part of a desktop-audio system with powered speakers, I figured that putting it at the front end of a system that included the \$108k plasma-tweetered Lansche No.7 loudspeakers would be the acid test.

Upon first listen, the DragonFly sounded remarkably relaxed, musical, and engaging. The overall tonal balance was just right—weighty in the bass and midbass without sounding thick, fairly smooth in the midband, with a treble that combined openness, extension, detail, and a real sense of ease. Frankly, for a \$249 DAC I was expecting a thinner tonal balance along with a hard metallic-sounding treble that sounded bright without any sense of air and openness. This kind of presentation would not be out of place even in a \$1000 DAC.

The more I listened to the DragonFly the greater my appreciation grew for just how well it does its job of communicating the music. It struck me that it gets the gestalt

EQUIPMENT REVIEW - AudioQuest DragonFly USB DAC

of musical involvement right. The sonic tradeoffs necessary in such a budget product have been cunningly balanced to deliver a surprisingly engaging listening experience. It finally occurred to me that what makes the DragonFly so enjoyable is that this DAC hits it out of the ballpark when it comes to music's dynamics, timing, and pace. Music reproduced through the DragonFly is upbeat, exciting, and involving, with a propulsive quality. Listen to a great rhythm section like the one behind Koko Taylor on "Can't Let Go" from the HDtracks 96kHz download sampler and you'll experience the full measure of this band's upbeat energy and drive. Or the powerful blues grooves of Robben Ford, Roscoe Beck, and Tom Brechtlein on Robben Ford and the Blue Line's *Handful of Blues*. It wasn't that the Dragonfly had the greatest slam, tightest bass, or most dynamic impact I've heard from digital. Far from it. Rather, the Dragonfly just had some sort of sonic alchemy that conveyed music's rhythm and drive in a way that made me forget about sonic dissection and just have fun. I can easily imagine someone whose frame of reference is an iPod or soundcard in the computer hearing the DragonFly and being completely blown away. It's exactly that experience that turns everyday music listeners into quality-conscious music listeners.

Conclusion

AudioQuest's \$249 DragonFly USB DAC is brilliant in every respect: form factor, cool factor, versatility, value, and sound quality. I can't think of a product that makes high-end sound more accessible to more people.

Want better sound? Here, plug this into your computer. Done.

I don't know if this was by accident or design, but the DragonFly hits just the right sonic buttons for fostering musical engagement. It's not the last word in timbral liquidity or soundstage depth, but it has a remarkable sense of ease and engagement. In addition, the DragonFly's exceptional ability to convey music's rhythm, pulse, and flow is key to its powerful musical appeal.

Although you wouldn't mistake the DragonFly's sound for that of a Berkeley Alpha DAC, that's not the point; most DragonFly customers would think that spending \$5000 for a DAC is completely insane. The DragonFly's genius is bringing the technologies, musical passion, and aesthetic of high-end audio to a product that all who love music can afford—and one that easily fits into the way they already access music. **tas**

SPECS & PRICING

Type: Asynchronous USB DAC	Weight: 0.77 ounces
Output: Stereo 3.5mm mini jack	Price: \$249
Output level: Variable (2V at full scale)	AUDIOQUEST
Sampling frequencies supported: 44.1kHz, 48kHz, 88.2kHz, 96kHz	2621 White Road Irvine, CA 92614 (949) 585-0111 audioquest.com
Dimensions: 2.5" x .75" by .4"	

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Micromega MyDAC USB DAC

The \$399 Miracle

Robert Harley

The term “USB DAC” is starting to become redundant the way “cell phone,” “digital camera,” and “flat-panel television” are anachronisms to one generation and “ink pen” is to those of us two (or more) generations further removed. Those under twenty years old may never have been in the market for a DAC that didn’t offer a USB input, just as they may never have bought a film camera or a CRT television. But to the more, shall we say “seasoned” music lovers, USB is a new-fangled contraption.

As USB DACs (er, DACs) proliferate prices have come way down, performance has gone way up, and products have gotten smaller. This welcome trend is exemplified by the new \$399

MyDAC from Micromega. The French company has a long history in digital audio, pioneering several cutting-edge products back in the early 1990s. Now with founder Daniel Schar back in the designer's chair, Micromega is again on a roll, producing an outstanding integrated amp/DAC with wireless streaming (the AS-400 reviewed by Neil Gader in Issue 222) among other forward-looking items. The new MyDAC represents by far the lowest-priced component the company has yet marketed, and is one of a full line of entry-level products.

MyDAC looks very much like an Apple AirPort Extreme (not by coincidence, I presume), with its white plastic chassis (black is available) and 5.5" nearly square and 1.4" high form factor. A front-panel wheel, reminiscent of the tuning

wheel on 1970s-era Marantz tuners, selects between the S/PDIF coaxial, TosLink optical, and USB inputs. An LED associated with each input blinks when that input is selected but not locked to the source. The LED turns solid when lock is achieved. Output is via a single stereo pair of RCA jacks. While many products of this size employ a wall-wart power supply, MyDAC's power supply is inside the chassis. An AC cord plugs into a small socket on the rear panel. In Standby, MyDAC consumes only 100mW of power.

We're right at the transition point when the USB interface is able to pass audio data with sampling frequencies higher than 96kHz—some products already have this capability. Surprisingly, so does MyDAC; it can be driven natively with sampling frequencies up to 192kHz with 24-bit resolution. Moreover, MyDAC's USB interface is asynchronous for lower jitter and better sound. Other technical details include dual master clocks, one for the 44.1kHz family of frequencies (44.1kHz, 88.2kHz, and 176.4kHz) and the other for the 48kHz family of frequencies (48kHz, 96kHz, 192kHz).

For Mac users, MyDAC requires no drivers or downloads. PC users need to download a driver from the Micromega Web site. I connected MyDAC to a Mac with no problems, and operation was simple. The only minor glitch was a faint high-pitched whistle emanating from the unit itself (not from the audio output) when the unit was turned on. This whistle was only audible when no music was playing and I was standing next to the unit.

LISTENING

It's often said that the true test of high-end

design talent is how much sound-quality the designer can squeeze out of the slimmest of parts-budgets. If that's the measure, then designer Daniel Schar is a genius. MyDAC knocks it out of the ballpark sonically, with spaciousness, bloom, ease, smoothness, and resolution that are good by any standard, but unbelievable from a \$399 product.

The main sonic quality that distinguishes MyDAC from the competition and makes it so musically compelling is its three-dimensionality. Inexpensive digital usually has a flat sound, with instruments sounding like cardboard cutouts stuck to one another on a flat soundstage. MyDAC somehow avoids this, instead conveying a real sense of body with instruments and a wonderful bloom around instrumental outlines, all presented within a spacious and well-defined soundstage. Although tonal balance and purity of timbre are very high sonic priorities, the ability to foster the impression of instruments in real space goes a long way toward musical realism. In this regard, MyDAC sounds like it should cost quite a bit more money.

MyDAC is also exceptionally clean and smooth in timbre, with very little grain and only a hint of hardness in the treble. Strings lack the steely edge often heard at this price level, and cymbals have a delicacy that you just don't get from entry-level digital. These qualities, combined with spaciousness and bloom, make MyDAC easygoing, pleasant, and non-fatiguing.

The bass is well defined and fairly deep, but this is the area in which MyDAC's budget orientation is revealed. The bottom end is full and satisfying, but not the overachievement that MyDAC's soundstaging, bloom, and timbral liquidity are. Bass lines aren't

EQUIPMENT REVIEW - Micromega MyDAC USB DAC

precisely defined, sounding just a bit soft and compressed. It seems churlish to criticize a product because in one respect it's not quite up to the lofty standards that it sets everywhere else. Nonetheless, I would be remiss in not mentioning it.

Compared with the \$249 AudioQuest DragonFly I reviewed in our last issue, the Micromega is smoother and more dimensional, but the DragonFly has a little tighter bass and is a bit more incisive rhythmically. The Micromega is more refined and resolved, sounding like a much more expensive product than it is. Although these products are very different functionally and don't directly compete with each other—the AudioQuest is portable, has a volume control, and can drive headphones or powered speakers directly—the sonic comparison shows just how good entry-level digital can sound nowadays.

To give you an idea of how exceptional the Micromega is I'll relate an incident. I turned on my music server to listen to music after having done some comparisons the night before between MyDAC and the \$4999 Berkeley Alpha DAC Series 2, which I've used as a reference for many years. I sat down and began listening, marveling at how good the sound was through the Magico Q7. After about 15 minutes I happened to look at the display on the Jeff Rowland Corus preamplifier and realized that I had been listening to the Micromega and not the Berkeley. This isn't to say that the two are equal by any means; the Alpha DAC is considerably more spacious and dynamic, better resolved, and purer in timbre, with much deeper and fuller bass. But the ability to enjoy the music,

and to consciously think about how good the system sounded, without realizing that MyDAC was at the front of the chain speaks volumes about this little product's amazing value.

CONCLUSION

Every so often in high-end audio a product comes along that shatters the price-to-performance ratio we've come to expect in a category. Think of the NAD 3020 integrated amplifier in the 1970s, the Adcom GFA amplifier in the 1980s, the PSB Alpha speaker in the 1990s, and the Cambridge Audio 840C CD player in the 2000s. You can add another future legend to that list: the \$399 Micromega MyDAC.

It's worth an audition even if you were planning on spending quite a bit more. You might find, as I did, that this level of performance for four-hundred dollars qualifies as a miracle. **tas**

SPECS & PRICING

Inputs: USB, TosLink, S/PDIF on RCA jack	AUDIO PLUS SERVICES
Resolution supported: 32kHz-192kHz, up to 24 bits (USB and S/PDIF inputs)	156 Lawrence Paquette Industrial Drive Champlain, NY 12919 (800) 663- 9352 audioplusservices.com
Output level: 2V	micromega-hifi.com
Dimensions: 5.5" x 1.37" x 5.5"	
Weight: 300 grams	
Price: \$399	

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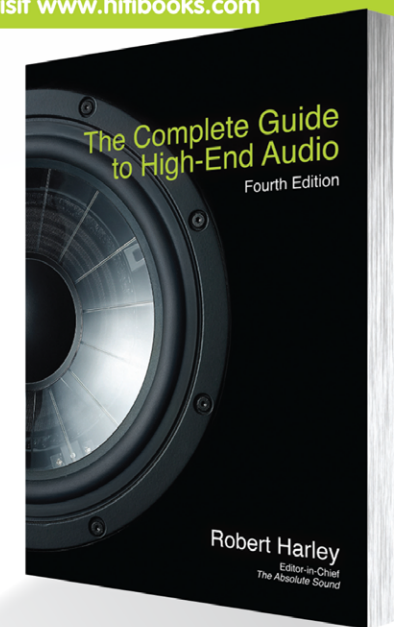
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Four DACs from \$699 to \$3600

Channel Islands Transient Mk II, Lindemann USB-DAC 192/24, NuForce DAC-100, Synergistic Music Cable DAC

Steven Stone

When the first DACs (digital-to-analog converters) appeared in 1985 they were big and expensive. Sony's first DAC, the Sony DAS-702ES, weighed over 11kg and was built to last a lifetime. Too bad the technology inside the DAS-702ES remained cutting-edge for less than a year. Digital technology has continued to march forward, evolving and improving to the point where the early "Perfect Sound Forever" digital components sound pretty groady by today's standards.

While I wouldn't be so rash as to state that any new DAC will sound better than even the most expensive ten-year-old model, it's not uncommon or surprising to find that many owners of older kilo-buck DACs are "trading up" to far less expensive DACs that provide superior performance compared to their outdated units. Combined with a computer-audio music library a USB-capable DAC can deliver a level of performance that a scant few years ago was available to only a few of the very-well-heeled.

Here are four DACs, ranging in price from \$699 to \$3600, that offer better performance than you could obtain at anywhere near their prices just a few years ago. All represent the current state of DAC manufacturing and design. And regardless of their price points, they all attempt to optimize their listeners' musical experience.

CHANNEL ISLANDS AUDIO TRANSIENT MARK II USB CONVERTER AND DAC (\$699)

The first DAC in our survey is from Channel Islands Audio. This small enthusiast-focused company specializes in high-value, made-in-the-U.S. audio components. Opened in 1997 and located on the central California coast in the town of Port Hueneme, Channel Islands Audio may be best known for its low-noise aftermarket power supplies for the Logitech Touch and SB3, but it also makes power amplifiers, preamps, DACs, and headphone amplifiers.

When I asked Dusty Vawter, chief designer at Channel Islands, whether the new Transient Mark II was principally a USB converter or a DAC, he told me, "I see it as a USB audio multi-tool. Its strength begins with the XM-2A board, making it a state-of-the-art USB to S/PDIF or I²S converter. We wanted a product that could

be totally portable and provide the industry-standard 2V analog output. After testing the available DAC ICs, we chose the Wolfson for its musicality. We've surrounded this circuit with very high-grade parts from Nichicon, MUSE, Takman, Vishay, and Wima."

Like the other audio components from CIA, the Transient Mark II exterior is simple and lacks the kind of cosmetic frills, such as 1/2"-thick front panels, that increase a component's cost without adding to its sonic performance. The front panel has six blue LED lights that indicate the current sampling-frequency and two buttons to control the volume. That's it. Since there's only one input there's no need for an input selector, and all outputs are always active.

The rear panel of the Transient has a USB input, one pair of single-ended RCA analog outputs, a BNC-terminated S/PDIF output, two I²S outputs (one HDMI and one five-pin mini-DIN), and a 5-volt DC power input for the optional VDC-5 Mk II high-current power supply.

The Transient II's volume is adjusted via a digital control. According to Vawter, "a side benefit to the Wolfson DAC IC is that it has a 24-bit digital volume, which can be accessed in software mode. In that we already required a micro-controller to run the sample-rate indicators, it made sense to make use of the built-in volume control. The high-resolution control works very well and doesn't have the L-R tracking error of potentiometers."

Starting with the very well regarded Wolfson DAC and XMOS chipset as the basis for its design, Channel Islands added its own ideas to the mix. "We developed our own USB-to-I²S board utilizing the XMOS processor. Our XM-2A daughter board uses a compact four-layer

EQUIPMENT REVIEW - Four DACs from \$699 to \$3600

PCB and dual ultra-low-jitter (<1 pico-second) oscillators, and can be powered by the USB or external low-noise supply. Then the low-jitter I²S signals from the XM-2A are fed into independent buffers for each I²S output, a low-jitter S/PDIF transmitter (for BNC output), and also into the on-board Wolfson DAC circuit.”

TRANSIENT PERFORMANCE

Since the Transient II is a USB-only DAC it spent most of the review period tethered to my MacPro desktop computer. It did not require loading any drivers, and the Mac Sound Control Panel immediately recognized the Transient by the name “CIAudio USB Audio 2.0” and showed support for bit-rates up to 192/24. I used the Transient with iTunes, Amara, Pure Music, Decibel, Audirvana Plus, Audacity, and Audiogate without a single compatibility issue.

How does the Transient II sound? Well, it sure doesn’t come across as a “budget” component. Used as a USB-to-S/PDIF converter the Transient rivaled the more expensive Human Audio Tabla (\$995) in S/PDIF when it was running into the April Music Eximus DP-1 DAC/preamp (the DP-1 has two S/PDIF and two analog inputs, so it’s ideal for real-time A/B comparisons). Although the latest Empirical Audio Off-Ramp 5 combined with the new Empirical Audio Short-Block iso-

lation filter did have a slightly larger soundstage and lower noise floor, I had to use my own live recordings to clearly discern the difference—on commercial recordings the two USB converters sounded almost identical.

For optimum performance Channel Islands recommends using the Transient II’s I²S outputs. Fortunately, the Wyr4Sound DAC II has I²S connections so I could hear the Transient II’s I²S performance for myself. It was easily the best sound I heard from both the Transient II and the Wyr4Sound DAC II. The improvement was principally in dimensionality. Not only did the front-to-back depth increase, all the instruments and voices gained additional solidity and edge definition. It was a lot like going from a very good solid-state power amplifier to a tube amp; the 2-D image morphed into 3-D. I used a PS Audio Perfect Wave 12-1 I²S cable for the connection. I also tried a generic HDMI cable, and while it, too, was superior to the S/PDIF connection, the imaging improvements were far less obvious. When I switched back to the Wyr4Sound’s own built-in USB implementation and compared it with the Transient II’s S/PDIF output, the dimensional presentations from the same USB source were virtually identical.

As a stand-alone USB DAC/Pre the Transient II gets high marks. If you can get by with one pair of single-

ended RCA outputs the Transient II can serve as the center of your computer audio system. I was impressed by the Transient II’s lack of electronic edginess. Especially on voices, such as Emma Kirkby’s delicate soprano on the live concert album *Time Stands Still* [Hyperion], the lack of grain and glare lets the music flow with relative dynamic freedom. Unlike some budget gear, which sounds clean yet sterile, the Transient II’s overall presentation had an ambience and bloom that were natural and relaxed, without the slow, thick sound of some vintage tube gear.

Listening to my own DSD-format live concert recording of the Boulder Philharmonic performing Brahms’ Double Concerto in A minor for violin and cello played back through Audirvana Plus’ real-time DSD-to-PCM converter at 176/24, I was most impressed by the Transient’s ability to preserve all the subtle spatial details that were present in the recording. The violin and cello soloists were so clearly defined in space that when the violinist turned his body, even slightly while playing, it was immediately obvious. The Transient also did an excellent job of retaining all its sonic virtues even on double-forte passages—the sound didn’t get harder or more aggressive during dynamic peaks.

Near the end of the review period Channel Islands sent me its \$329

SPECS & PRICING

CHANNEL ISLANDS AUDIO TRANSIENT II

Digital outputs: S/PDIF via 75-ohm BNC connector (galvanic isolated), I²S via mini-DIN connector (Audio Alchemy/Perpetual Tech/Camelot), differential I²S via HDMI connector (PS Audio/Wyred4Sound)
Sample rates supported: 44.1k, 48k, 88.2k, 96k, 176.4k, 192k up to 24 bits
Analog Output Level: 2V RMS maximum (single-ended RCA)
Dimensions: 4.45" x 2.9" x 5.25"
Shipping Weight: 5 lbs.
Warranty: Five year parts & labor
Price: \$699

CHANNEL ISLANDS AUDIO

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LINDEMANN USB-DAC 24/192

Inputs: USB-B, TosLink, coaxial
Supported sampling rates: 32kHz to 192kHz (USB 2.0, TosLink, coaxial)
Output voltage: 1.4V at full scale
Dimensions: 4.7" x 1.77" x 5.23"
Weight: 395 gm
Warranty: Three years
Price: \$1100

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NUFORCE DAC-100

Inputs: USB, TosLink RCA (x2)
Sampling rates supported: Up to 192kHz
Outputs: RCA, 6.3mm headphone jack
Recommended headphone impedance: 120-600 ohms
Headphone output level: 10.4V p-p, 3.7V RMS at 300-600 ohms
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Weight: 2.64 lbs.
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SYNERGISTIC RESEARCH MUSIC CABLE

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EQUIPMENT REVIEW - Four DACs from \$699 to \$3600

VDC-5 Mk II high-current power supply. While I didn't detect any improvement or sonic changes in the S/PDIF or I²S streams when I installed the VDC-5 Mk II, I did hear an improvement in the quality of the Transient II's analog outputs. Dynamic contrast improved with greater image stability and focus. According to Dusty Vawter, whether the VDC-5 Mk II makes a sonic difference will depend on a number of factors, such as the noise generated by your computer's video card and the noise on the USB connection. With some portable computers running on their battery supply the VDC -5 Mk II will make no sonic improvements. But if you run them plugged into AC, the VDC-5 Mk II will reduce the noise coming from the USB power supply. Given the VDC-5 Mk II's cost, I would strongly suggest trying it out on your own system since it may not be the most cost-effective upgrade for the Transient II, especially if you are using the Transient II primarily as a USB-to-S/PDIF bridge. If you have an I²S-compliant DAC I would recommend investing in a high-quality HDMI-type cable before springing for the VDC-5 Mk II power-supply upgrade.

MY TRANSIENT RESPONSE

To say I was impressed by the Transient II's combination of modest price and excellent sonics is something of an understatement. If you are contemplating spending \$700 or more for a USB-to-S/PDIF converter, you should consider the Channel Islands Audio Transient II. For a reasonable price it lets you keep up with the current state of USB 2.0-compliant audio, even if your DAC lacks USB capabilities. And while we wait for the next wave of products with USB

3.0 compliance, the Transient II will keep your music flowing beautifully.

LINDEMANN USB-DAC 24/192 CONVERTER AND DAC (\$1100)

The second DAC in this survey comes from Lindeman. Although in business for more than twenty years, Lindemann is a relative newcomer to the United States. Now distributed by One World Audio, this German company, formed by Norbert Lindemann, opened its doors in 1992. In 1999 Lindemann introduced the first upsampling CD player, and in 2002 the first German-manufactured SACD player. Releasing leading-edge digital products is nothing new for Lindemann, and its latest USB DAC is no exception.

Understatement in physical design is a hallmark of Lindeman products. The Lindeman USB DAC is a small 1-1/2" by 4-3/4" by 5" silver-tone box with a single circular pushbutton on the front. The rear panel has inputs for USB, TosLink, and S/PDIF, one pair of RCA single-ended outputs, and a power-supply connection. That's it. The only user adjustment is the source-selector button on the front. And while the Lindemann USB-DAC 24/192 may appear, at least from the outside, to be a modest entry-level offering, inside it's packed with Lindemann's current thinking on state-of-the-art digital technology. The USB interface is based on the XMOS DSP chip, and offers asynchronous "bit-transparent" resolution up to 192/24. The digital interface controller is the Wolfson WM8805, and the DAC chipset is the Wolfson WM8742. According to Lindemann's published specifications, the USB DAC 24/192's internal master clock produces less than 2.5 picosec-

onds of timing errors. The USB 24/192 also uses a "minimum phase" digital filter with an "apodizing" filter to reduce phase, timing, and group-delay issues.

For jitter reduction the 24/192 features an active jitter-reduction scheme that employs a digital PLL (phase locked loop) and memory buffering of the digital stream. According to Lindemann, "The remaining jitter of the signal (not the clock!) is below 50 picoseconds."

Although the analog outputs are single-ended RCA, the Lindemann DAC employs a fully balanced analog output stage with bandwidth that extends up to 200MHz. According to Lindemann, "As a result of the silicon-germanium technology used for the wafer, the module's supply voltage is limited to 5V. The result of this is an optimal output voltage of 1.4V RMS for OdBFS. Consequently, the USB-DAC 24/192 is quieter than competitors using standard operational amplifiers." As you would expect from a USB 2.0-compliant device, no additional drivers or plug-ins are needed for Mac use. For Windows machines Lindemann offers a certified driver and installation instructions.

SETUP AND ERGONOMICS

Given its level of internal sophistication, the installation, setup, and day-to-day operation of the USB DAC 24/192 were disarmingly simple. Once a USB cable was attached between the Lindemann and my Mac, the DAC was recognized in the Sound Control Panel as "Lindemann USB 2.0 Audio," and I could select it as my output device. Although the Lindemann has no volume controls, its volume can be adjusted in software via iTunes (or other playback

software). Since its full level is only 1.4 volts, and many fixed-output devices use 2.0 volts as their standard single-ended output level, in some installations such as those that use a passive preamp with no provisions for gain, the Lindemann might not have sufficient maximum volume. But in other systems this lower output level could allow users to employ the Lindemann without a preamp, using only minimal software gain attenuation. Another option for potential users searching for a minimalist solution could be attaching the Lindemann directly to a pair of powered speakers with gain controls, such as the Adam Artist 5x or PSI A-14M powered monitors.

The USB DAC 24/192 doesn't come with a remote, but chances are you'll never miss it. The only pushbutton on the front panel controls the input source, and if you have only one source, such as when the Lindemann is hooked up to your computer's USB, even that button will remain untouched.

Unlike many USB DACs, which offer the option of a digital output, the Lindemann has only analog outputs, so it can't be used as a USB-to-S/PDIF converter. While this may limit its appeal to some audiophiles looking for a USB converter as well as a DAC, it does keep things simple—it's the analog out or nothing.

THE LINDEMANN SOUND

From the first time I heard the USB DAC 24/192 at CES I thought it was a very fine-sounding DAC. My experiences with the 24/192 at Casa Stone have done nothing to change this opinion. With a musical yet revealing character, the USB DAC 24/192 produces a large and well-

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defined three-dimensional soundstage that sounds neither digital nor analog—on good recordings it sounds like a microphone feed.

Early in the review I tethered the USB DAC 24/192 analog outputs to the April Music Eximus DP-1 DAC/PRE. This setup let me compare the Lindemann's analog output to that of the Eximus DP-1. Since their USB interfaces are based on the same XMOS chipset I wasn't exactly shocked to find that the two USB/DAC sections had very similar sonic signatures when the Eximus DAC was set to 192/24 oversampling mode. The Eximus DP-1 delivered slightly better low-level resolution and dimensionality, but it had the advantage of one less interconnect in the signal chain. Both DACs also had a very similar harmonic balance and dynamic contrast when the DP-1 was in 192/24 mode.

When the DP-1 was set to non-oversampling native-rate processing the Lindemann USB DAC 24/192 sounded tighter with less harmonic bloom, but with more detail and low-level information. The fact that the differences between the Eximus DP-1's three processing modes were greater than the differences between the Lindemann USB DAC 24/192 and the Eximus DP-1 in 192/24 processing mode tells you how similar to each other these two DACs can sound.

Putting an \$1100 DAC against a \$3500 one would not be considered a fair fight under most circumstances, but to give you an idea of how well the Lindemann DAC performs, that is its competition. The April Music DP-1 DAC PRE has a lot more ergonomic flexibility with its excellent built-in headphone amp, pure analog pass-throughs, and high-quality analog volume

control, but based solely on sonic performance the Lindemann USB DAC 24/192 is certainly on the DP-1's level.

Since many users will also be hooking up an S/PDIF source to the Lindemann USB DAC 24/192, I spent time listening to music through the S/PDIF input. To supply the S/PDIF I used the Human Audio Tabla converter (\$995), which utilizes the M2Tech HiFace as the basis for its USB conversion. With its built-in battery power supply and automatic charging via USB, the Tabla doesn't complicate the computer-audio grounding scheme, thereby reducing the chance of ground loops affecting the sound quality. Using the Tabla also let me compare the Lindemann's XMOS USB solution with Human Audio's M2Tech HiFace.

On Alexis Harte's song, "Please Come Out" from his *Six Spoons of Honey* album, the similarities between the Human Audio USB interface and the Lindemann USB DAC 24/192 were far greater than the differences. Both created equally large, well-focused, and three-dimensional soundstages. After more than a half hour of going back and forth, the primary difference I heard between the two USB solutions was ever-so-slightly better solidity and fine detail through the Human Audio Tabla USB interface.

On my live concert recording of the Boulder Philharmonic performance of Ruby Fulton's "Deadlock," the sonic differences between the two USB interfaces were miniscule. During the beat-box solo passages I was impressed by the Lindemann DAC's harmonic neutrality and the analog section's transparency. Together they did a superb job of accurately rendering the dimensionality and dynamics of the live-to-DSD

recorded performance.

SIMPLICITY RULES

If you like simple ergonomics coupled with high performance, the Lindemann USB DAC 24/192 may be what you've been looking for. Connect a USB, S/PDIF, or TosLink input and get superb music from its single-ended RCA analog outputs. What's not to like? Well, it might not be a stand-alone unit, since you could need a preamp or volume attenuation method if you aren't using software to control volume. Also with its 1.4V maximum fixed output, passive preamp systems might lack sufficient gain to drive your system to full volume levels. But if you use the USB DAC 24/192 with an active preamp its output level won't be a problem, and if audio quality is your primary purchase criteria you'll be hard-pressed to find a DAC that convincingly beats it.

NUFORCE DAC-100 DAC/PREAMP (\$1095)

NuForce's emphasis on high performance at a moderate price has, in a few short years, transformed the brand from "Who dat?" to "Oh, them!" The NuForce DAC-100 marks its first foray into the product category of DAC/preamps. With a feature set that should work equally well in a computer desktop/headphone system or a small-room computer-based system the NuForce DAC-100 packs a lot of features and technology into its svelte chassis.

Although it is part of NuForce's home/desktop product line instead of its reference line, the DAC-100 is sonically and ergonomically a high-value product through and through. What you don't get, and don't have to pay for, is a

fancy case, thick front panel, or elaborate chassis. The DAC-100's dimensions are 9.5" by 8" by 2" high, putting it in a 1/2-width size category. And while it doesn't take up much space, it does produce some heat, so giving it adequate ventilation, both below and above, is important for optimal operation.

ERGONOMIC ELEGANCE

NuForce calls the DAC-100 a DAC/preamp, which means it performs the functions of a DAC and a preamp. As a preamp the DAC-100 only supports digital sources. It has four inputs—USB 2.0, TosLink, and two S/PDIF RCA digital. For outputs the DAC-100 includes one pair of single-ended variable-output RCA connectors and a headphone jack on the front panel. The DAC-100's headphone output is designed to support headphones with an impedance range from 120 to 600 ohms, so it may not be suited for all headphones, especially high-sensitivity low-impedance in-ear models.

The front panel of the DAC-100 contains a rotating volume knob, three bit-rate indicator lights, four input buttons, and a headphone jack. The volume knob also doubles as a standby switch by pushing it inwards. On the back panel are all the inputs and outputs, and the standard IEC AC connector. The DAC-100 comes with a credit-card sized remote that supports basic functions including on/off, volume level, input selection, and the all-important mute button.

Installation was simple: I merely plugged in a USB cable between the DAC-100 and my MacPro desktop computer and the Mac recognized the NuForce in the Sound Control Panel Attachment as "Nuforce 192k DAC-HS." For

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PCs you can download the newest driver from NuForce's Web site. I used the DAC-100 with a variety of Mac playback software including iTunes, Pure Music, Amarra, Audirvana Plus, Decibel, Fidelia, and Audacity with no compatibility issues.

One thing you can't do with the DAC-100 is use it as a USB converter since it lacks any kind of digital output. If you plan to use it in conjunction with NuForce's new DDA-100 digital integrated amplifier, the DAC-100 will be getting a digital feed from the DDA-100 via a TosLink connection, and since the DDA-100 will power the main speakers, the DAC-100 will be relegated to headphone-amplifier duties.

Since the DAC-100 only has one pair of line-level RCA outputs, using it in a system that has a subwoofer requires a wee bit of McGyvering. You can either attach Y-connectors to the RCA outputs on the back of the DAC-100 to give you two line-level feeds, or you can use the headphone output on the front panel. Most of the DAC/PREs I've reviewed, such as the April Music Eximus DP-1, mute their line-level output when you plug in headphones to their front panel, but the DAC-100 does not. Because both of the DAC-100 outputs are active and their volume levels are controlled by the same knob, you have a readily available source for the subwoofer feed; all you'll need is a 1/4" stereo-to-female-stereo RCA adapter.

For most of the review the DAC-100 was connected directly to a pair of PSI A-14M powered monitors and a Velodyne DD+10 subwoofer (using the Y-connector scheme), but near the end I used it with NuForce's DDA-100 (\$549) direct-digital integrated amplifier, an Accu-

phase P-300 power amplifier, and a Parasound A-23 attached to several of my reference desktop speakers, including the Role Audio Canoe, Aerial Acoustics 5B, Silverline Minuet, and ATC SC-7 speakers.

The only ergonomic issue I experienced with the DAC-100 was with its volume knob. It felt slightly loose and sloppy. Also it doesn't take very much pressure to push the knob in, muting the DAC-100, which may not have been your intention when you reached for the knob. I much prefer the volume knob on NuForce's DDA-100, which looks and feels better.

If you look inside the DAC-100 you'll find a very sophisticated audio instrument. With a 32-bit digital volume control instead of the more-common 24-bit variety, a single-ended 500-milliwatt headphone amplifier, and a non-oversampling 192/24 DAC, the DAC-100 delivers excellent published specifications for jitter, frequency response, and THD+N, as you can see on NuForce's site.

THE NUFORCE SOUND

The NuForce sound, or should I say lack of it, came as a pleasant surprise. I installed the DAC-100 just after reviewing the Lindemann USB 24/192 DAC. The first A/B comparison test I performed was with these two DACs running into the analog inputs of the April Music Eximus DP-1 DAC/PRE. After critically matching the output levels I was flummoxed to discover that I couldn't reliably identify one from the other. Both did a superb job of preserving all the subtle soundstage cues and both had equally expansive soundstages. Since they are priced within \$5 of each other, if I were forced

to choose I would make my decision based on their ergonomics rather than sound quality. If I already had a good analog preamp I'd opt for the Lindemann, but if I didn't own a preamp I'd chose the NuForce DAC-100.

Obviously the NuForce DAC-100 is sonically competitive with similarly priced DACs, but how does it rate versus higher-price DACs? I couldn't do any real-time A/B switches, since testing involved disconnecting and reconnecting interconnects, but after several hours of listening I could reliably identify several sonic differences between the DAC-100 and the April Music Eximus DP-1. First the DP-1 had slightly better low-level detail. In my live DSD recording of The Deadly Gentlemen from Salina Schoolhouse, mandolinist Domenic Leslie turns to fiddle player Mike Barnett and says, "I'll take the low part." It's easier to make out not only his words, but the direction he's facing through the DP-1 than the DAC-100. Also the DAC-100's soundstage is not quite as deep or three-dimensional as the DP-1. All the players seem to be closer to the wall behind them through the DAC-100.

To discover how good the DAC-100's USB implementation was I set up another A/B test, this time with the Human Audio Tabla USB interface box. I attached the Human Audio Tabla's S/PDIF output to one of the DAC-100's two S/PDIF inputs and used Audirvana Plus for playback because it has the fastest switchover between output devices. Once levels were matched I found it impossible to tell which input I was using. While one test isn't enough for me to state conclusively that the DAC-100's USB implementation is equal to the Tabla, I can

confidently say that adding an external USB interface did nothing to improve the DAC-100's performance.

I spent quite a bit of time, especially early in the morning while my wife was still sleeping in the bedroom right over my office, listening to the DAC-100's headphone output. With some headphones, such as the Grado RS-1 and AKG K-701, the DAC-100 headphone output is dead quiet. But with other headphones, such as the Audio-Technica ATH W-3000ANV or the Sol Tracks HD, I could hear a faint low-level hiss. Fortunately the hiss didn't get louder as the volume increased, but higher sensitivity earphones are more likely to have some background hiss from the DAC-100's headphone outputs.

A NUFORCE IN USB DACS

\$1000 to \$1200 seems to be a price that many manufacturers are aiming at with their latest high-performance USB-enabled DACs. NuForce's entry at this hotly contested price point delivers excellent sound combined with a useful feature set, making it one of the DACs that should be on anyone's "must audition" short list, if he's in the market for an under-\$1500 USB DAC.

SYNERGISTIC RESEARCH MUSIC CABLE DAC (\$3599)

It takes a certain amount of nerve (or cluelessness) to write that a \$3500 DAC with cables and a built-in power conditioner is a "value proposition." But that's exactly what the Synergistic Research Music Cable was designed to be. Synergistic Research practically gives

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you a 192/24-bit DAC for free with some of its very tricked-out cable. If you add up the cost for a 1-meter length of terminated Synergistic Research Active digital cable (\$1000) and a 1-meter length of Synergistic Research Active Tungsten interconnects (\$2000), a Powercell (\$1250), Galeleo universal interconnect cells (\$1500), and Precision A/C Basik power cord (\$250), it comes to \$6000, and that doesn't even include a DAC. By anybody's standards, getting \$6000+ worth of stuff for only \$3599 is a bargain.

THE SOUP-TO-NUTS SOLUTION

Setting up the Synergistic Research Music cable can be as simple as plugging one end into a digital source's S/PDIF output and the other end into the analog inputs on your preamp. The Music Cable supports up to 192/24 data streams and will automatically detect and set its DAC for the proper data transfer. BNC devotees will be happy to discover that the Music Cable comes with a BNC termination. If your transport or media server uses RCA hardware for its S/PDIF output, you will need to use a BNC-to-RCA S/PDIF adapter.

There are no adjustments on the Music Cable except for a pair of interchangeable Galileo universal interconnect cells. These cells come in three varieties, black, grey and silver, and are designed to affect the overall balance of the system. Synergistic Research, or its dealers, can make suggestions as to which of the cells would be best for a particular system, but Synergistic Research encourages owners to try all three to determine their own preferences. My preference during the review varied

more based on program material than basic system balance. Since switching the cells takes less than five seconds, using them as overall harmonic balance controls is about as easy as turning a knob or changing a low-hanging lightbulb.

I used the Music Cable DAC in a variety of computer-desktop and room-based systems. For computer use I needed to employ a USB-to-S/PDIF converter since the Music Cable accepts only S/PDIF. I used the Human Audio Tabla (\$995) as well as the Empirical Audio Off-Ramp 5 converter box when I employed USB sources. Synergistic Research makes a similarly priced USB-only version of the Music Cable, but it only supports up to 48/16 data files. And while I found its performance on Red Book and MP3s on a par with the S/PDIF version connected to the Tabla, (that was the conversion box I used for the A/B), its lack of support for higher bit-rates makes it less of a future-proof high-value purchase than the S/PDIF version.

During the review I only came across one compatibility issue. When connected to my MacPro system the Music Cable produced a low-level, but audible, hum at normal listening levels, on the right channel only. By repositioning the Music Cable I could lower the hum level, but I could never eliminate it completely. None of my other computer- or room-based systems produced a similar problem. In every other system the Music Cable was dead quiet.

THE SYNERGISTIC SOUND

During my tests the Music Cable DAC typically was connected to a stock Logitech Touch music server, but I also used it with a Lexicon RT-

10 universal transport, Oppo BDP-95 universal player, and Meridian 598 DVD/CD transport. Since the Music Cable only supports one input I suspect most users will want to hook it up to a music server or computer-audio source, for which a USB/SPDIF converter box may be needed.

The first A/B test I conducted after almost a month of break-in time was with the Wyred4Sound DAC II, where used Logitech Touch's S/PDIF output for the Synergistic Research Music Cable DAC and the TosLink output with the Wyred4Sound DAC II. Obviously this wasn't a completely fair test since the Wyred4Sound was saddled with a higher-jitter TosLink connection, but because the Music Cable won't accept TosLink it was my only option. At least both DACs were connected to my preamp via the same Synergistic Research Active Tungsten interconnects. Comparing a \$3600 DAC to a \$1500 one might not seem fair, but once the price of the interconnects are factored into the equation, the combos are similar in price.

Hooked up to the Touch the Music Cable produced a noticeably more three-dimensional image than the DAC II. Both DACs delivered equal amounts of detail, but the Music Cable's increased dimensionality located small details more incisively within the soundstage. Harmonic balance differences were miniscule, with the Music Cable delivering a slightly more relaxed and less mechanical presentation.

I did additional listening tests using the Lexicon RT-10 transport. Once more the Music Cable got the S/PDIF output, but this time the Wyred4Sound got an AES/EBU signal feed (where AES/EBU may be the RT-10's best-

quality digital output). Once more the Music Cable produced its usual remarkably three-dimensional soundstage. But unlike the first test, here the Wyred4Sound's soundstage wasn't left as far behind—in fact on some material such as the MA recordings *Wolfgang Amadeus Mozart—Works from His Golden Age—Yoko Kaneko: Fortepiano* I was unable to distinguish between the two DACs in matched-level tests. As a control I also listened to the analog output from the RT-10. After I reduced its output to match the two DACs output levels I was surprised to find how close it came in performance. Only in depth recreation did the Music Cable deliver noticeably superior results. On another MA Recordings release, *Nima Ben David—Resonance*, all three conveyed the same excellent transient response and immediacy of Ben David's viola de gamba. But the Music Cable preserved the best sense of depth and room bloom. The DAC II made the room seem slightly smaller, as if the back wall had been moved forward by ten or fifteen feet. The Lexicon RT-10 had the least depth, but wasn't too far behind the Wyred4Sound DAC II.

On some material (for example, Kelly Joe Phelps' *Brother Sinner & the Whale*) I couldn't hear any discernable sonic differences between the Music Cable and the DAC II. Both DACs did a superb job of capturing the grit in Kelly Joe's voice without adding any electronic grain or grit to the sound. Both also preserved the subtle dynamic nuances of Kelly Joe's fingerpicked resonator-style acoustic guitar. Finally, both DACs provided an equal number of spatial cues and the same degree of precise lateral focus.

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For a third round of A/B CD-source tests I used my own live concert recordings of the Boulder Philharmonic, down-sampled from DSD to a Red Book 44.1/16 CDR. Once more the Music Cable displayed the best spatial reproduction. The soloists in the Brahms Double Concerto for Violin and Cello were more firmly anchored in space and had a greater feeling of solidity and mass through the Music Cable than from the DAC II.

For my last listening tests I went back to the Squeezebox Touch, but with higher-resolution 96/24 and 192/24 music files (yes, with the addition of a third-party app the Squeezebox Touch supports 192/24). I used the same Boulder Philharmonic recording, but this time it was only down-sampled to 96/24 and 192/24. Again the Synergistic Research Music Cable created a more convincing and dimensional soundstage. On the Frank Zappa composition, "Be-Bop Tango," recorded in 2010, the Music Cable's superior depth recreation was readily apparent, especially during the contrapuntal final passages when the music became rock-n-roll frenzied.

For 192/24 sources A/B comparisons I had to do a manual disconnect, and reconnect the S/PDIF cables from the back of the Squeezebox Touch because the TosLink connection doesn't support 192 (96k limit). While this was less than ideal due to the lag-time during the changeovers, I still found that the Synergistic Research Music Cable DAC had slightly better depth recreation. The difference was not as pronounced as when the Wyred4Sound was getting a TosLink feed, but it was still noticeable.

IS A MUSIC CABLE IN YOUR FUTURE?

If you've read this far, obviously you're interested in the Synergistic Research Music Cable. And despite its ergonomic limitations, with only one non-switchable input, no volume adjustments, single-ended-only analog outputs, and five separate fairly stiff cables to manipulate in an orderly manner, the Music Cable's sonic performance sets it apart from any "convenience" DAC I've heard.

As I wrote earlier, I can easily see the Synergistic Research Music Cable DAC attached to a music server to form the front end of an ultra-modern high-performance music-reproduction system. Even coupled to the modestly priced Logitech Squeezebox Touch the Synergistic Research Music Cable produces a level of audio quality that emphatically checks all the audiophile boxes in double-black magic marker. If you want to keep it simple *and* high-end, the Synergistic Research Music Cable DAC may be all you really need. tas



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Wadia 121 Decoding Computer

Trickle-Down Technology

Steven Stone

Upon first look it's easy to see the Wadia 121's resemblance to other components in Wadia's "mini" line, including the 171i i-Pod dock and 151 PowerDAC. Like these other components, the 121 was designed for use in a computer-audio system where it functions as a digital preamp, DAC, and headphone amp. The 121 has multiple digital inputs for AES/EBU, S/PDIF (both coaxial and BNC), TosLink, and USB 2.0. It includes two sets of analog outputs—one set of single-ended RCA and one set of balanced XLR. The 121 also has a 1/4" stereo headphone output with its own separate amplifier and power supply on the front panel.

All control functions on the Wadia 121 are operated via its remote. In fact, without the remote there's little you can do with the 121 since it has no buttons, switches, or knobs on its front (or rear) panel. Only indicator LEDs and the headphone jack populate the faceplate of the 121. With no controls on the front panel, the unit is inoperable if you lose your remote. So, don't lose your remote.

The Wadia 121 is a completely digital device with no analog inputs. It uses a 32-bit digital volume control, so all attenuation is also done in the digital domain. Every digital volume control will truncate bit-length (and musical data) if it is used at its

very lowest settings. To reduce this effect the Wadia's maximum output level can be adjusted from 4.0V down to 2.0V or even 1.0V, so that at normal listening levels the volume control can be set near its maximum level. On my desktop the 1V setting (using the balanced XLR outputs) was just right.

Since both analog outputs are active simultaneously, hooking up a subwoofer is as easy as connecting a pair of RCA cables between the 121 and the sub. If you require a second, independent line-level output, you can use the front-panel headphone jack. Like many DAC/preamps with headphone jacks on the front panel, when you plug in a headphone the line-level outputs on the back of the unit are muted. But the Wadia goes one better than most DAC/preamps because the 121 stores and remembers the separate volume settings for the headphone and line-level outputs. This prevents the dreaded "Honey, I just blew out my ears when I plugged in my earphones" syndrome.

The Wadia 121 supports up to 192/24 PCM files via its AES/EBU, S/PDIF, and USB inputs. For Mac users the USB input is plug and play, but for PC owners a new driver must be installed to support USB 2.0 capabilities. Whether Windows 8 will support USB 2.0 via built-in drivers is yet to be seen. On a Mac, if you open up the MIDI control panel you will see the Wadia 121 listed as "Wadia USB Audio 2.0." Under "Clock Source" the control panel reads "Wadia Internal Clock." This last bit of info corroborates the presence of Wadia's internal asynchronous USB clocking. Combined with its proprietary "DigiMaster algorithm and filtering technology" Wadia claims "jitter-free playback" from all digital music sources.

In lieu of a detailed technical description of the 121, I asked Wadia's John Schaffer a series of technical questions about the 121. You'll find his detailed answers in a separate Q&A box.

What a 121 Does

For most of the review the Wadia 121 was tethered to my Mac Pro desktop computer via USB. I also employed

several outboard USB-to-S/PDIF converters connected to the 121's S/PDIF inputs. I used both sets of analog outputs, the balanced pair for my speaker amps and the unbalanced pair going to the subwoofer and a Stax headphone amplifier.

During the review the Wadia 121 proved to be stable and reliable. My Mac Pro never had any connectivity issues upon wake-ups or reboots. The only operational glitch I noticed with the Wadia 121 was a high sensitivity to static electricity. Merely getting up from my desk chair and walking several steps and then returning to my desk was sufficient to generate a click from the 121's relays when I touched my keyboard, headphones, or the Wadia itself. Sometimes, if music was playing, the static was sufficient to cause a momentary gap in the playback.

Given that winter in Colorado is a fairly dry, high-static environment, and the fact that the static discharges never caused anything more than momentary dropouts, I doubt most users will experience a similar problem. But if you do have static build-up issues, a static drain pad next to your computer will eliminate this problem.

How a Wadia 121 Sounds

Given the current state of the art in DACs, expecting a particular current-generation DAC to have a strong "sonic personality" that varies substantially from neutral is an exercise in futility. That doesn't mean that all DACs now sound the same, but the sonic variations between them, especially when given a signal with identical jitter and time-domain characteristics, is certainly far less than it was even a scant few years ago.

The first listening sessions I performed with the Wadia 121 were to compare its USB implementation with that of an outboard USB-to-S/PDIF converter box. I used both the Empirical Audio Off-Ramp 5 with the Short-Block USB filter and the Human Audio Tabla USB converters and found that the three USB streams did sound slightly different through the Wadia 121. My preference was the Off-Ramp 5/Short Block combo, which consistently pro-

EQUIPMENT REVIEW - Wadia 121 Decoding Computer

duced a slightly deeper and better defined soundstage. On the Punch Brothers' latest CD *Ahoy!* Chris Thile's Gibson Lloyd Loar mandolin's characteristic tonality and dynamic verve came through with the least amount of electronic grain with the Off-Ramp. The Tabla and Wadia's own built-in USB implementation were virtually identical, and they were a very close second to the Off-Ramp, lacking only the smallest amount of spatial precision and detail in comparison.

Obviously one of Wadia 121's prime competitors is the Wyred4Sound DAC 2 (\$1495), so for my next A/B test I connected two USB feeds from the Empirical Audio Off-Ramp to these two DACs and listened to the results. After several days of matched-level A/B tests (and switching USB inputs) I concluded that when fed the same signal from the Off-Ramp, the two DACs sounded virtually identical. Still, with certain input configuration the Wyred4Sound sometimes had slightly better edge definition, making trailing edges of transients more distinct.

But just because these two DACs sounded alike when fed the same signal doesn't mean they sounded indistinguishable. When I A/B'd the two DACs' own built-in "native" USB implementations I preferred the Wadia 121. It had a slightly smoother and seemingly more nuanced dimensional presentation with a less mechanical character. I noticed the differences more on classical recordings, such as Benjamin Zander's interpretation of Mahler's First Symphony on Telarc, than on pop or rock recordings. Both DACs

had equal amounts of inner detail and musical information, but the Wadia 121 did a better job of defining each instrument's outer edges and fleshing out its relative dimensions within the soundstage. When connected to the April Music Eximus S1 power amplifiers the Wadia 121 had almost as much detail and three-dimensional imaging specificity as the NuForce DDA-100 digital integrated amplifier, which is my reference for those particular performance parameters.

Speaking of NuForce, its DAC-100 (\$1095) proved to be a worthy competitor for the Wadia 121. Using their native USB implementations I thought the NuForce and Wadia were extremely close in sound quality with the edge going to the Wadia 121 (using its balanced analog outputs) due to its more incisive micro-dynamics. While the two units were quite similar in sound quality, their ergonomics were different—the DAC-100 lacked balanced XLR outputs, and had only four inputs, compared to the Wadia 121's five. Cosmetically, the Wadia looked and felt more upscale, like a miniature high-end component, while the DAC-100 looked and felt more budget-constrained in comparison.

Since Wadia devoted so much effort to designing and then tweaking the 121's headphone amplifier section, I spent quite a bit of time listening to it through a wide range of earphones so that I could, in the words of TAS's founder, "Take a full measure of its greatness." Even with the most sensitive low-impedance earbuds the Wadia's headphone amp was dead silent without

any hums, whistles, or whines. It was also a very-good-sounding headphone amplifier. Compared to the Fiio E17 portable headphone amplifier (\$150) the 121's headphone output was more robust with greater dynamic contrast, warmth, and inner detail.

To find a worthy sonic competitor for the Wadia 121's headphone amplifier I had to move up in price to the new IFI Micro iCAN from Abbingdon Musical Research (\$249). With both the Beyer DT-880 and Ultimate Ears In Ear Reference Monitors the Wadia 121 came out on top, but not by much. The Wadia created a slightly larger soundstage and had better dynamic contrast than the IFI amp.

To find a superior headphone amplifier I had to go to the headphone amplifier inside the April Music Eximus DP-1 (\$3495). But when you listen to the Wadia's headphone amplifier by itself, without the A/B comparisons, it's hard to fault its presentation.

121 and Counting

In my recent DAC survey in Issue 223 I noted that the \$1000-to-\$1500 arena has become one of the most hotly contested segments of the market for USB DACs. The Wadia 121 further complicates a potential purchaser's buying dilemma by adding one more excellent DAC/pre to the competition. While I can't say that the Wadia "blows away the competition," I can state confidently that few, if any, potential purchasers will be disappointed by the 121's sonics or ergonomics. I know that I could happily live with the Wadia 121—it's that good. **tas**

SPECS & PRICING

Type: DAC and headphone amplifier

Digital inputs: AES/EBU (XLR), coaxial (RCA and BNC), TosLink optical, USB B

Input data rates: 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz (up to 24 bits)

Analog outputs: One pair balanced (XLR), one pair unbalanced (RCA)

Dimensions: 2.7" x 8" x 8"

Price: \$1299

WADIA

1556 Woodland Drive
Saline, MI 48176
(734) 786-9611
wadia.com

ASSOCIATED EQUIPMENT

Source Devices: MacPro model 1.1 Intel Xeon 2.66 GHz computer with 16GB of memory with OS 10.6.7, running iTunes 10.6.3 and Amarra 2.4.3 music playing software, Pure Music 1.85 and Audirana Plus 1.35 music-playing software

DACs: Weiss DAC 202, April Music Eximus DP-1, Wyred4Sound Dac2, Empirical Audio Off-Ramp 5, Human Audio

Tabla USB converter,

Amplifiers: Parasound A23, Bel Canto M-300, April Music Eximus S-1, Accuphase P-300

Loudspeakers: Aerial Acoustics 5B, ATC SCM7s, Silverline Minuet Supremes, Quad 11Ls, Role Audio Kayaks, Velodyne DD+ 10 subwoofer

Headphones: Sennheiser HD 600, Grado RS-1, Ultimate Ears Reference Monitors, Beyer DT-880 (250 ohm), Audio-Technica ATH-W3000ANV, HiFiMan RE-272 in-ear monitors, Audio-Technica AD-900, Sol Republic Tracks HD, B&W P3, Etymotic Research ER-4P, Shure SRH-1440, Stax SR-5, Stax Lambda Pro, Stax SRM-1 Mk II

Cables and Accessories: Locus Design Polestar USB cable, Locus Design Nucleus USB cable, Wireworld USB cable, Synergistic Research USB cable, PS Audio Quintet, AudioQuest CV 4.2 speaker cable, AudioQuest Colorado interconnect, Cardas Clear interconnect, PS Audio PerfectWave I²S/HDMI cable, Crystal Cable Piccolo interconnect, and Audioprism Ground Controls

EQUIPMENT REVIEW - Wadia 121 Decoding Computer

Wadia's John Schaffer on the 121

TAS: What were the design goals for the 121?

JS: The primary goal was to create a true Wadia DAC. By that we mean a DAC that features our core technologies, ideas, and know-how, while still meeting our aggressive cost target. This was a blank-sheet, ground-up design effort, and we are very pleased with the result.

How much of the technology in the 121 was "trickle-down" from your more expensive models versus new technology developed specifically for the 121? The circuit is new and yet manages to feature our key design ideas. For example, historically we would use both a DSP processor and a Field Programmable Gate Array (FPGA) to implement our digital processing and DigiMaster upsampling algorithm. In the 121 we found a way to fit everything into an FPGA, reducing both circuit size and cost. Similarly we created a new streamlined version of our SwiftCurrent current-to-voltage stage.

Wadia mentions a new patented DigiMaster upsampling and filtering technology. Could you explain how this system works?

DigiMaster 4 used in the 121 is still a waveform reconstruction algorithm that utilizes our spline-based approach to upsampling and filtering. Incoming data samples are still reconstructed with emphasis on time and phase accuracy; however, what is new about this version of DigiMaster is that it is a 32-bit implementation with an all-new approach to managing dithering that we consider a breakthrough. Also this is the first time we have executed DigiMaster exclusively in an FPGA.

How does the Wadia 32-bit digital volume control avoid resolution loss at mid or lower levels?

The line-level output stage on the 121 is a new design, yet it is still capable of driving the input section of an amplifier directly, even through long interconnect cables. We call this ability Direct-Connect with Digital Volume Control, and it allows the user the benefit of bypassing additional interconnects and analog circuits used with a separate preamplifier.

Uniquely for this category of DAC, the output stage of the 121 can be adjusted to match the overall sensitivity of the installation. You select the optimal reference voltage setting (4V, 2V, 1V) and a relay will route the audio signal through a single high-quality 0.1% metal-film resistor to attenuate the full-scale output. Once the optimal output voltage is identified, further volume adjustments are made via a digital volume calculation based on a 32-bit scale. The key to high-performance Digital Volume Control is overall system resolution. The Wadia 121 has 64-bit processing and DAC resolution of 32 bits. As a result, a 24-bit signal from a digital source can be attenuated as much as 48dB without loss of the original information.

What is the SwiftCurrent technology used in the 121's headphone output stage?

The 121 features a high-performance headphone output stage fed directly by our SwiftCurrent current-to-voltage (IV) stage straight off the DAC. The headphone amplifier is a differential circuit based on the National Semiconductor LME49600 audio buffer placed inside the feedback loop of the precision wide-bandwidth operational amplifier. The buffer is very low noise and distortion ensuring optimum performance. This output stage further features a wide output power range (1mW up to 0.7W) and a wide output-voltage range, and can be set to either a high or low sensitivity mode via remote impedance-switching feature. This

allows the 121 be used with almost any headphone model available on the market.

Could you talk about your USB interface? Is it based on the XMOS chipset?

Yes, we elected to use the excellent USB receiver IC from XMOS and added our dedicated internal ClockLink. Our ClockLink technology positions the master oscillator as near as possible to the D-to-A converter chip to reduce transmission-induced jitter. With USB Internal ClockLink, instead of using a clock embedded in the incoming data stream (isochronous audio), a high-performance fixed-frequency oscillator located at the point of conversion to analog is used. In the case of the 121 USB input, the receiver is asynchronous. This means that the 121 is controlling requests for audio data from your computer. The 121 is managing a buffer and requesting data from the connected PC as needed to keep the buffer at an optimal level. Our fixed oscillator located at the DAC is controlling the rate that data is depleted from this buffer and in effect initiating the requests for additional audio data from the PC. The net result is that the jitter-laden source clock can be ignored and the 121 DAC oscillator is the only clock used.

Finally, what was the reasoning behind eliminating all front-panel controls?

It was quite challenging to meet our cost target with this product. Allocating all available dollars to the audio circuitry became the priority so that sonic performance could be maximized. Also, historically our Decoding Computers have not featured front-panel user controls so this was by no means a new direction. Our feeling is that most customers will be very comfortable using the remote as the means to control functionality.



iFi iDAC, iCAN, and iUSBPower

The Little Boxes That Could

Steven Stone

Ever hear of iFi Audio? Me neither. But at the 2012 Rocky Mountain Audio Fest, there was a quartet of miniature products bearing the iFi logo in the Avatar Acoustics room. Darren Censullo, head honcho at Avatar, was very excited about his role as U.S. distributor for iFi. He claimed that at their price its products were not merely outstanding values, but offered performance that would compete with any component with similar functions. He went on to tell me that one particular iFi product, the iPower, offered an entirely new and better-performing solution for devices that use USB power as their power source. Obviously I took his comments with a grain of salt. But I was intrigued enough to request the iDAC, iCAN, and iUSBPower for review (the fourth iFi product, the iPhono, was outside my primary area of expertise, so I passed on it).

After several months of putting this trio through its paces, I understand why Darren was so enthusiastic. All three devices offer a level of performance and ergonomics that a scant few years ago would have been impossible from a similar device, regardless of price. And even in today's highly competitive audio marketplace the iFi devices deliver an exceptional combination of performance, features, and value. That's not too shabby for a company's first efforts.

Three for the Road

A big reason for the iFi trio's exceedingly high level of performance is due to "trickle-down" technology. All of iFi's designs were created by Abbingdon Music Research, a U.K.-based high-end audio firm that's been making high-end components since 2000. AMR doesn't directly manufacture iFi products; instead AMR licenses the technology to iFi, which assembles the units at its own facility in China.

All three iFi devices share the same-sized silver-toned chassis which is approximately 158mm x 68mm x 28mm. Obviously iFi realizes substantial economies of scale with these components since they share one of the most expensive parts in most audio gear. Other shared parts are the external power supplies and the volume knobs. These volume knobs were nicely machined, but they do have one flaw—they are a pressure-fitted and can easily be pushed back too far so that their back edge touches (and scrapes) the chassis when you turn the knobs. Yes, you can eliminate the problem by pulling the knob out slightly, but chances are, the next time you use the iFi device, you will push them back in and the scraping begins again. Sure, this is a minor annoyance, but it diminishes the overall quality of the iFi products.

Given their size and weight (the heaviest is under 0.43 pounds), the iFi devices were created with the traveling audiophile in mind. Although not designed to be completely portable, since all but the iDAC require an external power source, they are aimed at "road warriors" and other frequent travelers who wish to have a compact, yet high-quality audio in their hotel rooms or vacation condos. The iDAC can be used with any device that has a powered USB-compatible output, including an iPad or laptop.

The iDAC

The \$299 iDAC, as you would surmise from its name, is a D-to-A converter. It also has a headphone amplifier, whose output is controlled by the volume control on its front panel. Although I wrote "front panel," in point of fact the iDAC doesn't really have a front and back like a full-sized component. On one end the iDAC has a volume control for its headphone output level, a mini-jack for headphone output, and a pair of fixed-level RCA outputs. The opposite end has a single USB input. When in use the iCAN will always have something plugged into the USB and at least one cable (either a headphone or pair of RCAs) plugged into the other side. That makes for a potential wire jumble. It's a shame there wasn't a clever way to have both the USB and RCA cables exit from the same side.

On the USB end the iDAC uses the same asynchronous interface as the \$5000 AMR DP-777. This employs firmware based on the XMOS processor, but with custom "turnkey" modifications developed by AMR specifically for the iFi iDAC. The "heart" of the iDAC is an ESS Sabre DAC chip, used directly "without additional filtering" according to AMR. The iDAC's designers paid special attention to the iDAC's power supplies for its digital devices. Instead of generic 3-pin regulators, the iDAC employs "more modern types" of regulators that have "300 times greater noise suppression" than the usual 3-pin types. Also the USB receiver, XMOS processors,

EQUIPMENT REVIEW - iFi iDAC, iCAN, and iUSBPower

and input/output circuits have their own separate power supplies. On the analog side iFi employs a "DirectDrive" technology for both its headphone and RCA outputs that is similar to a directly coupled output.

During listening sessions I used the iDAC both alone—powered by my computer's USB output—as well as connected to the iFi iUSBPower device. Performance, even without the addition of the iUSBPower, was startlingly good. Using the fixed-level RCA outputs, the lack of extraneous background noise and the essential silence of the iDAC was excellent. Unfortunately for the owners of some especially large-bore premium RCA cables, the iDAC's RCA outputs are situated so close together that employing these cables may be difficult, if not impossible.

The iDAC's headphone output drove a wide variety of full-sized headphones successfully, including the Sennheiser HD600, Audeze LCD-2, and Beyer-Dynamic DT-990 (600 ohm.) On the other end of the sensitivity spectrum, the iDAC's headphone output did produce some low-level hiss with the Shure SE500 in-ear monitors, but was virtually silent with the Etymotic ER-4P.

One small quirk I noticed was that with some brands of basic no-name RCA interconnects the headphone output was noisier than with well-shielded ones. With the Shure SE500s, the overall noise floor dropped precipitously when I disconnected the RCA cables (which were connected to a Benchmark DAC 2 HGC). When I connected the iDAC to the SicPhones high-current headphone amplifier, the noise when the RCA interconnects were connected

between the iDAC and the SicPhones amp was even louder and more pronounced. When I substituted the iUSBPower device for the stock AC power source, the iDAC's noise level remained the same until I flipped the ground-lift switch. When I lifted the ground the noise level dropped back down to almost as silent as when nothing was connected to the iDAC's RCA outputs. It seems that the iDAC is quite sensitive to noise or ground loops generated by whatever device is connected to its RCA outputs. I strongly suggest disconnecting the iDAC's RCA cables when doing any critical listening using its headphone outputs, even when employing the iUSBPower supply.

The iDAC's overall sound quality was noticeably superior to the Fiio E-17, both through its headphone and line-level outputs. In comparison the iDAC not only had more dynamic life, but a much greater sense of dimensionality. When I listened through ProAc Jubilee Anniversary Tablette, the iDAC's imaging precision (with the iUSBPower supply) was on a par with both the Benchmark DAC-2 and the Mytek 192/DSD DACs. I was also impressed by the iDAC's well-defined space between instruments and vocals, which certainly equaled these far more expensive DACs.

On my own 192kHz/24-bit live concert recordings I was especially impressed by the iDAC's ability to portray the recording space accurately with all dimensional and spatial cues intact. My recording of Richard Stoltzman with the Boulder Philharmonic performing Copland's Clarinet Concerto captured all the lushness of Stoltzman's impeccable tone while

preventing it from blending with the woodwind section, even during the loudest passages. The words "dynamically implacable" came up often in my listening notes, be it my own classical recordings or bombastic pop such as Toy Matinee's "Last Plane Out," where the gunshot 2:36 into the cut pushes the limits of any DAC.

Yes, the iDAC is a very good USB DAC. In point of fact, so good that it could be used in a system where you would usually be sorely tempted to "move up" to a far pricier USB DAC solution. If your budget for a USB DAC is above the combination price of \$448, I strongly advise you to listen to the iDAC/iUSBPower solution before climbing the price-point ladder.

The iCAN

The \$249 iCan, like all the iFi devices, shares the same case as the iDAC, but it definitely has a front and a back. On the backside of the iCAN you'll find its power supply input as well as a single pair of RCA inputs. On its front there's a volume control knob, 1/4" full-sized single-ended headphone output, and a pair of three-way toggle switches. The first of these switches is iFi's XBass control. It has three settings, "direct" (no bass boost,) "average," and "for bass-shy headphones." According to iFi's Thorsten Loesch, "The XBass boost is 3dB/7dB at 50Hz relative to 1kHz. However, this number does not as such describe adequately the operation of XBass. XBass is not intended as a traditional tone control or loudness circuit (nor is it based on these). The response is rather different and is intended to compensate suppressed bass and excessive LF phase-shift found with many headphones."

Most "bass enhancement" schemes and circuits I've heard have, at best, been merely "fun" features rather than anything of value to audiophiles. The iFi XBass is different. While I still preferred most of my reference headphones in the "direct" mode, I found that with one particular pair of in-ear monitors (Shure SE500s converted by Fisher Hearing

SPECS & PRICING

iFi iDAC	Dimensions: 68 x 28 x 158mm
Device type: USB DAC/headphone amp	Weight: 0.43 lbs.
Input: USB Audio Class 2.0	Price: \$199
Output: RCA (single-ended), minijack for headphone	iFi iCAN
Output power: 150mW (headphone amp)	SNR: >117dB (A-weighted)
Signal-to-noise ratio: 97dB(A)	Frequency response: 0.5Hz to 500kHz (-3dB)
Dimensions: 68 x 28 x 158mm	Dimensions: 68 x 28 x 158mm
Weight: 0.43 lbs.	Weight: 0.48 lbs.
Price: \$299	Price: \$249
iFi iUSBPower	US DISTRIBUTOR
Device type: USB power supply	AVATAR ACOUSTICS
Input: USB (Type B)	545 Wentworth Court
Output: USB (Type A) power only, USB (Type A) power + music	Fayetteville, Georgia 30215
	(678) 817-0573
	avataracoustics.com
	dcensullo@avataracoustics.com

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EQUIPMENT REVIEW - iFi iDAC, iCAN, and iUSBPower

into custom in-ears) the “bass shy” setting provide just the right amount of bass to turn what were solely bass-deficient in-ears into well-balanced cans. I’ve tried to accomplish the same bass augmentation using iTunes, Pure Music, and Amarra’s EQ functions with much less satisfactory results. If you have a headphone that you love that lacks the last bit of bass punch and impact, the iFi XBass might be just what your audio doctor ordered.

The second toggle switch on the iCAN controls iFi’s “3D Holographic sound” circuit. The three settings are “direct,” “3D for flat recordings,” and “3D for recordings with excessive stereo effect.” According to Thorsten Loesch, “Our 3D Holographic Sound circuit is not based on the Linkwitz crossfeed. We did not find the Linkwitz circuit adequate to provide even a crude first-order approximation of the time and frequency domain responses needed. Further, for both operations the sets of coefficients are based on internal research and listening tests and in part derive from work I was involved with in the 1980s at the RFZ (then East Germany’s equivalent of the IRT). The coefficients are fairly complex and not simply expressed by a simple number of XdB at YHz.”

I found the iCAN’s 3D options less useful than XBass. The 3D setting for “flat sounding recordings” introduced a slight lift to the midrange and lower treble that changed harmonics in ways I did not find appealing. The “excessive stereo” correction setting was better, but very few recordings seemed to benefit from the reduced soundstage width of this setting. Most of the time, I came back to the “direct” setting.

Like the iDAC the iCAN employs iFi’s “DirectDrive” circuitry, which Loesch says, incorporates two sets of features. “First a negative voltage is generated on board to allow a ground-referenced, direct-coupled output and greater output levels, while still operating with a single low supply voltage. In most cases headphone outputs require substantial ‘build out’ resistors to ensure that the amplifier remains stable. We are able to dispense with these, so the output resistance of our headphone amplifiers is mostly down to the contact resistance in the socket and a little bit for PCB traces. This means the damping factor is maximized and excessive source resistance does not alter headphone response. All this together is what we call DirectDrive.”

Traditional wisdom is that good headphone amps are big, heavy, and expensive. The iCAN makes a strong argument against such generalizations. Not only did it have the raw power to drive high-impedance headphones such as the 600-ohm version of Beyer-Dynamic DT-990 with ease, but it also delivered a black, low-noise background to the high-sensitivity Shure SE500 in-ear monitors. Even the Bryston BHA-1 couldn’t generate as little noise with these high-sensitivity earphones as the iCAN.

My favorite headphones with the iCAN were the Audeze LCD-2 (version 2.2) with upgraded Cardas headphone cabling. The combination produced a high-resolution, yet full-bodied presentation that rivaled my reference Stax setup, which consists of the SR-X Mark 3 and SRM1 Mark-2 amplifier. The LCD-2/iCAN combo matched the Stax in low-level detail and immediacy, and beat the Stax when it

came to low-frequency impact and dynamics. The Stax SR-X Mark 3 headphones still had an edge when it came to high-frequency air and detail. But in the critical midrange both setups delivered a level of finesse and musicality that distanced them from all the other headphone/amp combinations I’ve heard recently. For the price, the LCD-2/iCAN combo makes an unbeatable pairing.

The iUSBPower

Aftermarket power solutions are nothing new, but iFi’s approach to the problem of cleaner USB power is unique. Instead of resorting to a battery and some sort of battery-charging scheme, iFi has opted for regulating, isolating, and cleaning up the USB power supply itself. The \$199 iUSBPower has a single USB 2.0 (it will also take 1.0) input with an AC power input on one end and a pair of USB outputs on the other. One USB output is designated “power only” while the other passes both power and audio signals. For most applications the power and audio combination USB output will be the one used, but if you have a USB device in need of 5.0V power the iUSBPower can supply it via its “power-only” output.

In my nearfield desktop system replacing the stock AC power supply with the iUSBPower lowered the iDAC’s already low noise floor to the point where it sounded very much like what I’m used to hearing from a live microphone feed. Micro-dynamics seemed more pronounced when the iUSBPower was attached and the smallest details buried in the mix were easier to hear.

The only glitch I experienced with the iUSBPower device was when connected to my

Mac it “took over” as an über USB connection—the other two USB DACs connected to my Mac disappeared from my sound devices selection box, leaving the “AMR USB audio 2.0” as the only selectable sound device. To add additional sound devices I had to disconnect the iUSBPower from my computer and perform a reboot. If you don’t use a Mac or only have one sound device connected to your system (most setups) you won’t experience this problem.

Is There an iFi in Your Future?

I suspect that many audiophiles will purchase iFi products with the intention of using them in a portable, traveling, or desktop system. But after trying any one of these little wonders, you might be tempted to move them into your main system. That could be a mistake. Why? Because once you hear the iFi iDAC, iCAN, and iUSBPower in your main system, you may be forced to buy a second set, because they won’t be coming back out. That’s how well the iFi gear performs. tas



Meridian Explorer USB DAC

High-End Emissary

Neil Gader

When I think of British digital electronics, the first name that comes to mind is Meridian. Designers of complete digital systems from transports to fully active DSP-controlled loudspeakers, it makes products that are exquisite, refined, and priced accordingly. Dreams of a true budget-level item from this firm would seem as unlikely as high tea without finger sandwiches. But this was before I was pulled aside in the Meridian room at CES to check out a fresh-off-the-production-line, portable streaming DAC, the \$299 Explorer.

Packaged in a chic, ovular, four-inch-long extruded-aluminum case, the Explorer is an asynchronous, USB-powered, Class 2, high-resolution DAC/streamer. Equipped with a PCM5102 DAC it's

capable of streaming files up to 24-bit/192kHz resolution. A series of tiny LEDs along the outside of the case indicate incoming resolution. Also provided are a fixed/variable analog mini-plug output with an OS-driven, analog gain control for headphone use, and an optical digital output. Inside this nifty capsule there's little room to spare considering the space required for the headphone amp, a six-layer PC board, XMOS "L1" processor, plus caps and resistors in key circuitry derived from Meridian's full-scale 800 Series. A short USB/mini-cable completes the package.

Setup was glitch-free as I suspected it would be with a product aimed at a youthful on-the-go market. I attached the USB2 mini B socket of the Explorer to my MacBook Pro (Pure Music software/Memory Play setting, and 8 gigs of

RAM) and then ran a stereo miniplug-to-stereo-RCA cable (I use an AudioQuest) into the analog inputs of the recently reviewed Hegel H300 (Issue 233). After checking the Mac's MIDI and Sound settings I booted up Pure Music/iTunes.

High-end sonics? Heck, yeah. Tonally, the Explorer supplies smooth touches of analog-like warmth and fluidity. Just as impressive was the lack of soundstage constriction. This is a problem that dogs the portable DAC segment. During Vaughan Williams' *The Wasps* Overture with Michael Stern and the Kansas City Symphony [Reference Recordings], the Explorer conveyed the wide expanse of the orchestra with a rewarding sense of depth and air between instruments, and an impressive ambient bloom that opened up the ceiling of the venue rather than holding it down. The music was spacious, detailed, and transparent, inviting comparisons to the more expensive DACs I've been listening to of late.

The Explorer also brings expressive midbass to the streamer segment, with sturdy timbres and purer, cleaner dynamic punch. On higher-res material, such as the 24-bit WAV file of Rachmaninoff's *Symphonic Dances* from Reference Recordings' 24-bit/176kHz HRx Collection, it shined even more brightly. Strings soared more effortlessly; the acoustics of the venue were more immersive.

Sonic subtractions? Sure, but no major complaints. The Explorer's spectral balance is moderately light. Thus, low bass could be weightier and more precise. On Holly Cole's "I Can See Clearly" the Explorer can't quite achieve the pace, muscle, and drive behind Cole's vocals the way more upscale DACs like the mbl CD31 or dCS Puccini can. Even so, perspective please! This is high-res "to-go" for less than the price of a decent power cord.

Of the streamers I've heard recently, the Explorer is neither the smallest (that distinction goes to the AudioQuest Dragonfly) nor the least expensive (HRT's microStreamer gets that honor). In fact of the three it's the priciest by a slight margin. Sonically all are impressive—mini-miracles if you will—yet the Meridian is a little more intrepid dynamically with a dimensional complexity that makes it stand apart. The Explorer marks a shrewd opportunity to spread the gospel of high-quality portable sound to a much broader (read: younger) audience. Meridian couldn't have chosen a better emissary than this little USB DAC. Highly recommended. **tas**

SPECS & PRICING

Type: Asynchronous USB DAC

Input: USB Mini Type B

Input resolutions supported: Up to 24-bit/192kHz (44.1/48/88/96/176/192kHz)

Outputs: 3.5mm stereo mini-jack variable level headphone output (130mW into 16 ohms); 3.5mm fixed-level (2V) analog output; mini-TosLink digital optical, 96kHz maximum

Dimensions: 4" x 1.25" x 0.7"

Weight: 1.76 oz.

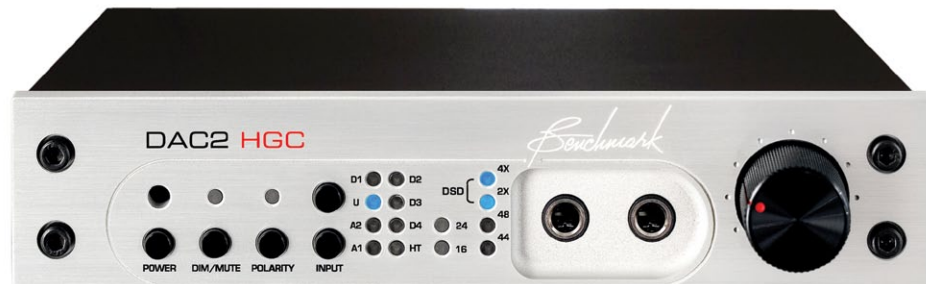
Price: \$299

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Three New DSD-Capable DACs

Mytek Stereo192-DSD DAC, Benchmark DAC2 HGC, and Lynx Hilo Reference A/D D/A Converter

Steven Stone

During the years that J. Gordon Holt and I made recordings together he often complained about the lack of “pro” audio gear being reviewed in consumer audio publications. Many times he found a particular piece of gear that he wanted to review, but because it was sold and marketed principally to professional audio engineers, it was deemed by his editors to be inappropriate. He found this so irritating that he didn’t write as many reviews in his later years as he might have, if given freer rein. Gordon’s last reference speakers, the ATC SC-40s, were just such a “prosumer” product.

Flash forward ten years; computer audio has reduced the gap between pro and consumer gear to the point where they are almost interchangeable. This convergence of current-generation consumer and pro gear is a result of parallel technical paths. The latest computer-audio pro and consumer products employ the same DACs, software/firmware solutions, and circuit-topology concepts. Nowadays differences in input/output options, routing flexibility, and cosmetics have become the primary differentiators separating pro from consumer devices.

The latest generations of state-of-the-art DAC chips from Cirrus Logic, Wolfson, and ESS have the built-in capability to natively support the DSD format. The first DACs to utilize this added capability are from companies whose prime focus has been the pro market: Mytek, Benchmark, and Lynx. But the \$1595 Mytek Stereo192-DSD-DAC, \$1995 Benchmark DAC2 HGC, and \$2495 Lynx Hilo all bridge the gap between pro and consumer so completely that, except for where they are purchased, the difference is moot. I have no doubt that this would have pleased J. Gordon Holt immensely.

The Mytek Stereo192-DSD-DAC

Manufactured in Poland, the Mytek Stereo192-DSD-DAC was designed by Michal Jurewicz, who is also the founder of Mytek Digital. Mytek opened its doors

in 1992, and its first products were A/Ds and D/As for the pro recording market. According to one of Mytek’s background papers, “The ADCs and DACs prototypes designed by Michal have been used to record many now classic albums of David Bowie, Lou Reed, Mariah Carey, James Taylor, B52’s, and many more.” In 2005 Jurewicz was commissioned to design a DSD master-recorder for Sony’s SACD division. And while SACD’s moment in the audio sun was distressingly brief, the experience put Jurewicz in an ideal position to make a DAC/pre that supports DSD.

The Mytek Stereo192-DSD-DAC comes in three versions. The differences involve ergonomics and cosmetics. Fortunately for consumers, all three have the same price. The “standard” version is available in two finishes, silver and black. The black-chassis 192-DSD-DAC has front-panel volume-level LEDs below the LCD panel, while the silver version has none. Input and output options on the black and silver 192s are identical. The “Mastering” Stereo192-DSD-DAC has a front panel similar to the black standard version, but instead of an analog pass-through it substitutes a dedicated DSD input for 128x (5.6MHz) files (currently only accessible by a PC-based computer). For audiophiles who want to use an analog source, the standard version with its analog inputs will be the more useful option. Having the “idiot light” level-meter LEDs on the front panel makes the blackface version my preference over the silver face.

Mytek sent me two Stereo192-DSD-DACs, a black standard as well as a mastering version. For the review I used the standard version. I did listen to the mastering version near the end of the review period, primarily to see if the 400-plus hours of playing time I had put on the standard version had any effect on the sound compared to a brand-new unit with no playing time. There was a profound difference. The unused mastering version had a midrange glare and harder edge that was not present in the broken-in sample. Anyone evaluating a Mytek Stereo192-DSD-DAC that has not been thoroughly

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broken-in hasn't really heard how a Mytek Stereo192-DSD-DAC can sound. I recommend at least 200 hours with an active signal. I left my review sample tethered to a Logitech Duet tuned to my local public radio's Internet feed for nearly two weeks before I placed it into my desktop system.

Setup and Day-to-Day Use

Installing the Mytek Stereo192-DSD-DAC in my desktop system was easy and straightforward. It has a single pair of balanced XLR outputs as well as a single RCA single-ended output. The balanced output went to my power amplifier while the unbalanced output went to both a Stax SRM-007T headphone amplifier and Velodyne DD10+ subwoofer. The Mytek is unique among the three DAC/pre's in this review because it has a FireWire input in addition to its USB inputs. I connected both the FireWire and USB connections from my computer as well as a S/PDIF feed from an Empirical Audio Off-Ramp 5 USB to S/PDIF converter.

The Stereo192-DSD-DAC has two USB inputs, one for 1.0 USB and the other for 2.0. For both Macs and PCs you need to download and install a driver to support USB 2.0. If you don't have the proper driver, you can use the 1.0 USB input *sans* driver. Given how easy it was to install the Mytek driver, I can't think of any reason besides being completely cut off from the Internet for not downloading and installing the Mytek drivers. Once USB and FireWire drivers were installed, both the USB 2.0 and FireWire outputs were recognized and visible in my Mac's Audio MIDI control panel.

The Mytek's front panel has only one knob, three pushbuttons, a 3" by 1/2" LED front-panel display, a 1/4" stereo headphone output, and an on/off switch. The knob does quadruple-duty, serving as

an independent volume control for both rear-panel outputs as well as for the headphone level. Also by pushing the volume control in slightly it converts to a mode selector that turns to select different options within each mode. A push while in a mode selects whichever choice is displayed in the front panel LED read-out. This multi-function control-design does require some "user training." But after using the Stereo192-DSD-DAC exclusively for a week or so the logic of Mytek's nested menu options becomes second nature. The Stereo192-DSD-DAC also supports a remote control, an Apple remote to be exact. Any Apple remote can be coupled to the Stereo192-DSD-DAC, as can an RC-5-style universal remote. Two of the small buttons on the front panel are function buttons. They are both user-programmable to serve as a specific input selector, a mute, a phase inversion select, a mono select, an L-R select, an M/S decode, or for instant -20dB volume reduction.

Unlike many DAC/preamps which have their volume controls for the headphone and main outputs ganged together, the Mytek supports separate volume control adjustments from a single volume knob. Merely push in the knob to switch from headphones to line level. The front panel LED displays a -99 to -0 volume scale, making it easy to see exactly what your volume level is at a glance. It also makes matched-level A/B comparisons easy and accurate. If you already have a line-level analog preamp, you can set the Mytek Stereo192-DSD-DAC for fixed-level analog output.

The only control on the front panel that I did not find of value was the on/off switch. Every device needs an on/off switch, right? True, but perhaps a smaller or rear-mounted on/off would have been better. Why? Because when the Mytek is turned on

SPECS & PRICING

Mytek Stereo192-DSD-DAC

Conversion: 32-bit, PCM up to 192k, 64x DSD, 128x DSD

Digital inputs: S/PDIF, AES/EBU,

TosLink, all up to 192k single wire (64xDSD and 128XDSD SDIF DSD

interface on Mastering Version)

Analog inputs: One pair single-ended RCA

Outputs: One pair balanced XLR, one pair unbalanced RCA, one headphone output

Dimensions: 8.5" x 1.72" x 8.5"

Weight: 6 lbs.

Price: \$1595

MYTEK DIGITAL

148 India Street, 1st Floor
Brooklyn, NY 11222
(347) 384-2687
mytekdigital.com

Benchmark DAC2 HGC

Conversion: 32-bit, PCM up to 194kHz, 64x DSD

Analog inputs: One stereo pair

Digital inputs: One USB, two optical, two coaxial

Outputs: One pair balanced XLR, two pairs unbalanced RCA, one headphone output

Dimensions: 9.5" x 1.725" x

9.33"

Weight: 3 lbs.

Price: \$1995

BENCHMARK MEDIA SYSTEMS, INC.

203 East Hampton Place, Suite 2

Syracuse, NY 13206

(800) 262-4675

(800-BNCHMRK)

sales@benchmarkmedia.com

Lynx Hilo

Conversion: 24-bit, PCM up to 192kHz, 64x DSD

Analog inputs: One pair balanced XLR

Digital inputs: One AES/EBU, one S/PDIF coaxial, one TosLink, one USB

Outputs: One pair balanced XLR, one pair single-ended RCA, one headphone output

Dimensions: 8.50" x 3.25" x 10.00"

Weight: 6.75 lbs.

Price: \$2495

LYNX STUDIO TECHNOLOGY, INC.

190 McCormick Avenue
Costa Mesa, CA 92626-3307

(714) 545-4700

sales@lynxstudio.com

ASSOCIATED EQUIPMENT

Source Devices: MacPro model 1.1 Intel Xeon 2.66 GHz computer with 16 GB of memory with OS 10.6.7, running iTunes 10.6.3 and Amarra 2.5 music playing software, Pure Music 1.85 music playing software, and Audirana Plus 1.35 music playing software

Amplifiers: April Music Eximus S-1, Accuphase P-300, Parasound A-23

Speakers: Aerial Acoustics 5B, ATC SC-7, ProAC Anniversary Tablettes, Role Audio Canoe, Golden Ear Aon 2, Silverline Miuet Plus, Velodyne DD+ 10 subwoofer

Cables and Accessories: Wireworld USB cable, Synergistic Research USB cable, AudioQuest Carbon USB cables. PS Audio Quintet, AudioQuest CV 4.2 speaker cable, AudioQuest Colorado interconnect, Cardas Clear interconnect, and Crystal Cable Piccolo interconnect

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or off it emits a rather loud transient thump. Obviously, best practices indicate that you should always turn your power amplifier and subwoofer on last, and turn them off first. This will eliminate the possibility of the turn-on and turn-off noise damaging anything downstream from the 192-DSD-DAC. But, “things happen.” The DAC/pre’s in my desktop system are situated below my desk at approximately knee height. Several times during the review my knee came in contact with the on/off switch. The results were loud and not pretty. Also, once during the review I had a power outage and my power amplifier exhausted its power reserves, generating a prodigious thump. Knowing “best practices” and being able to employ them in the real world are two different things.

Sound

The first thing that impressed me about the Mytek’s sonics was the lack of any additive harmonic colorations. Conversely, the Mytek didn’t sound harmonically thin; instead there was a clarity and speed to its presentation that gave everything played through it the lucidity of live music. If your system relies on your DAC or preamp to warm up or harmonically enrich the overall tonal balance, the Mytek Stereo192-DSD-DAC won’t be much help. Like the other two prosumer DAC/pre’s in this survey, the Mytek DAC was created to be as neutral and transparent as possible. And in my system, it achieved this goal.

Although the Mytek is extremely neutral, it does have more than one sonic personality. The upsampling option, as well as the two PCM filter choices, made a noticeable difference in

how the Mytek sounded. With lower-bit-rate sources, such as MP3s and audio from video streams, upsampling delivered superior low-level definition, image solidity, and better pace. But with higher-resolution digital files I generally preferred the non-oversampling native rate. Sampling rates of 44.1 and higher sounded more organic and analog-like. The same tracks with oversampling activated were too tight and sounded overdamped. The two selectable PCM filter slopes, fast and slow, were far more program-material dependent than bit-rate dependent. The only way to determine which filter sounded best with a given piece of music was to listen to both filter options.

The Mytek also supplies three different high-frequency filters for DSD–50, 60, or 70kHz. Frankly I didn’t hear any appreciable differences between the three filters on my own DSD recordings, but they were all recorded at 5.6MHz with the high-frequency noise that these filters are designed to filter out was already absent from my recordings. On the few commercial DSD recordings in my library I did notice some very subtle differences, which seemed to primarily affect soundstage size. As to which DSD filter was best, that once again was dependent on the source material.

Speaking of source material, I found the Mytek was among the most dynamically mercurial DACs I’ve encountered. With low-contrast, “volume wars” commercial pop, such as the audio from Carly Rae Jepsen’s “Call Me Maybe,” the Mytek sounded flat and lacking in dynamic contrast. But when fed something with actual dynamic contrast, such

as my own live concert recordings, the Mytek reproduced the recording’s full dynamic range and power with ease. During especially high-dB passages, such as the peaks on my recording of “A Woman’s Life” by Richard Danielpour performed by the Boulder Philharmonic with soloist Angela Brown, the Mytek did a superb job of delineating the penetrating power of Ms. Brown’s impressive mezzo-soprano.

The Mytek’s headphone output proved to be up to the task of driving the most power-hungry headphones in my collection with no issues, including the Audeze LCD-2 and Beyer Dynamic DT-990 600-ohms. High-sensitivity in-ear phones were also handled well by the 192-DSD-DAC. The 16-ohm-impedance, 110dB-sensitive Meelectronics A161P lacked any sort of additional electronic noise or hiss, and had excellent bass and treble extension. The Mytek dual volume control was especially handy when I was comparing my Stax headphone rig with dynamic headphones plugged into the Mytek’s headphone output, since it allowed me to critically match the levels of the headphone with the Stax being fed by the line-level outputs.

Is a Mytek Your Tech?

Although the Mytek is the least expensive of the three DAC/pre’s in this survey, its combination of features and sound puts it on equal footing with the other two units reviewed. If you want or need a DSD-capable DAC with a FireWire interface (which can be attached to any Thunderbolt connection via an adapter) the Mytek is the only game in town, so far. For most prospective buyers the blackface

standard version with its analog pass-through will be the most useful, but if you have a PC and a hankering for 128x DSD and don’t need an analog input, the “Mastering” version will fill the bill nicely.

Benchmark DAC2 HGC

When Robert Greene reviewed the Benchmark DAC1 in 2009, he concluded his review by saying, “The Benchmark DAC1 Pre is not only an excellent device for the money; it is excellent compared to anything that I have encountered at any price. To my mind, it is the beginning of a new era in audio, in which the regeneration of the recorded signal has become a solved problem.” His review generated quite a bit of controversy, with some audiophiles agreeing that the DAC1 was utterly transparent, and others finding it to be overly matter-of-fact and lacking in air, pace, and ambience retrieval.

Except for hearing a DAC1 briefly at several audio shows I haven’t spent much time listening to the DAC1 so I wouldn’t venture an opinion on its ultimate sonic quality. But after more than three months with the Benchmark DAC2 HGC I can’t help but think that it will convert Benchmark naysayers into fans.

Going From DAC1 to DAC2

How does the Benchmark DAC2 HGC differ from its predecessor? It looks very much the same to the casual eye since it has a similar physical footprint and front-panel layout. According to the DAC2 HGC’s owner’s manual, “New features have been added to extend the versatility of the product, and improve the listening experience. These features include: native DSD conversion,

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asynchronous USB 2.0, asynchronous USB 1.1, home-theater bypass, digital pass-through, polarity control, word-length display, sample-rate display, a bi-directional 12V trigger, and additional I/O options." Additional "performance improvements" include using four balanced 32-bit D-to-A converters that are summed to make each balanced output channel. According to Benchmark this reduces noise by 6dB. Overall the DAC2 is 10dB quieter than the DAC1. The DAC2 also includes 3.5dB of digital-processing headroom above 0dBFS, which reportedly eliminates the clipping that can be caused by inter-sample overloads.

The DAC2 HGC employs new high-efficiency, low-noise power supplies with each subsystem using its own dedicated low-noise regulation. The UltraLock2 digital clock replaces the older UltraLock clock that was used in the DAC1 for jitter attenuation. Like most current-generation DACs, the DAC2 uses an asynchronous interface, which Benchmark, with a knack for verbal invention, calls its "multi-mode asynchronous USB."

The HGC moniker stands for "hybrid gain control" which is a "dual domain" attenuation system that combines digital with analog gain controls for an optimal result. By using a 32-bit digital system along with a servo-driven analog potentiometer, Benchmark claims that the HGC design "outperforms traditional analog or digital volume controls, including the two-stage DAC1 HDR system."

The expanded input options for the DAC2 HGC include two pairs of unbalanced analog stereo inputs, two optical digital inputs, two coaxial S/PDIF inputs, and one USB 2.0 input. Output

options comprise two pairs of unbalanced RCA stereo outputs, one balanced XLR stereo output, and two 1/4" stereo headphone outputs on the front panel. All the outputs are attenuated by the front-panel rotary volume control. The DAC 2 HGC's second coaxial S/PDIF digital input can be reconfigured to be a digital output, so that any digital source that comes into the DAC2 HGC can be rerouted to any additional external digital devices you have on hand, such as another DAC or digital recorder.

Most of the front panel's operating adjustments are duplicated on the DAC2's dedicated remote control. Looking very much like the remote that Bel Canto used several years ago for its PRE-3 analog preamp (the Bel Canto was plastic; the Benchmark die-cast aluminum), the DAC2 HGC remote handles volume, input switching, LCD levels, and on/off functions. The only control not duplicated on the remote is polarity reversal. To invert the polarity you must push a small button on the DAC2 HGC's front panel or the remote control's On button.

Like its predecessor the DAC1, the DAC2 has a pair of 1/4" stereo headphone outputs on its front faceplate. Benchmark calls its headphone amplifier circuit the HPA2. Benchmark claims it is "one of the most transparent headphone amplifiers available" with a "near 0-ohm" output impedance for optimum damping with a wide variety of headphones.

Setup and Day-to-Day Operation

Setting up the DAC2 HGC was straightforward with few surprises. For my desktop system

I connected the balanced XLR outputs to my power amplifier and one of the single-ended RCA outputs to my subwoofer, while the other RCA single-ended output was connected to my Stax SRM-007t headphone amplifier, which was daisy-chained to a Sicphones headphone amplifier.

Inside the DAC2 HGC Benchmark included a pair of jumper-enabled passive attenuators for the balanced XLR outputs. This switch lets users choose either 0dB, 10dB, or 20dB of attenuation. The purpose of the attenuators is to match the DAC2 HGC's output levels to your amp and speaker sensitivity. Benchmark recommends that for optimal performance the volume control should be set above 11 o'clock. The DAC2 came with the jumpers set for -10dB, which I reset for -20dB. For desktop use I found that -10dB was far more gain than I needed with the amps and speakers I had on hand.

DAC/preamps that include a headphone amplifier usually operate one of two ways—either all the other outputs are muted when a headphone is plugged into the front panel or they remain active. Both schemes have their adherents and detractors. Benchmark came up with a clever compromise. If you use the left-hand jack the DAC2 attenuates its other outputs, but if you use the right-hand jack all outputs remain active. Benchmark's solution is hard to fault.

Since the DAC2 HGC uses a servomotor to control its remote volume adjustments, volume changes aren't as instantaneous as they are with an all-electronic volume control. Once you release the volume control button on the remote the DAC2 volume continues to travel

for a fraction of a second. Also the volume knob has no detents (or numerical equivalents on an LED readout), so recreating exact volume levels can only be done "by eye" using the small red dot on the volume knob and the dot markings around the outside circumference of the knob. I found turning the control manually rather than relying on the remote worked best for achieving critically matched volume levels.

The DAC2 Sound

Although the latest generation of DAC chips and circuits claims to have achieved that elusive goal of bit-perfect sound reproduction (still debatable), different approaches to digital signal processing and analog circuitry create more than enough variations in sound quality to give most DACs their own unique sonic personalities. Benchmark says that the DAC1 and DAC2 use nearly identical analog circuit. The difference is the DAC2's ESS Sabre conversion and DSP headroom. The company says that in the DAC1 the analog circuit outperformed the DAC by a wide margin, but in the DAC2 the superior DAC and DSP allows the conversion stage to approach the limits of the analog circuitry. Most of the negative comments I've read about the DAC1 revolved around its lack of dimensionality and dynamics, rendering its presentation overly left-brained and emotionally uninvolved. The DAC2 is quite different. The DAC2 sounded dynamically wide open with superb dimensionality and tonal color. Over the course of my listening sessions using the DAC2 HGC I was hard-pressed to come up with any easily identifiable additive or subtractive colorations or sonic personality that I could identify as intrinsic to the DAC2's

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core sound that veered from the center path of neutrality.

The one sonic characteristic that I was constantly aware of when listening through the DAC2 was the quality of the recording itself. Whether it was a lowly 320bps MP3 or a 64x DSD file, I was continually reminded of how the recording was made and how well or poorly executed the original recording session was. Excessive or inappropriately applied reverb was immediately obvious, such as on the otherwise musically superb duet album by Chris Thile and Mike Marshall *Into the Cauldron*. Through the DAC2 the reverb sounds so obviously overdone that it's actually easier to listen around it because the DAC2's lack of grain and electronic texture separates the original signal from the awful afterthought reverb.

Low-level resolution through the DAC2 was exemplary. On my own live Boulder Philharmonic Orchestra DSD recordings the little extra amusical noises from chairs and the more than 700 humans in the room during a concert were easier to discern and separate out from the music. Depth cues were also slightly more coherent on my DSD recordings played back through the DAC2, especially when compared to my 44.1 conversions from the same DSD masters.

I should mention that although the DAC2 plays back 2.8MHz files (64x) it does not yet support 5.8MHz (128x) DSD files. All of my live DSD recordings were made at 128x, so for playback I must convert them to 64x. I've used two programs for the conversion. Most of the time I use AudioGate, but Daniel Weiss suggested I try his Saracon software, which is a

dedicated stand-alone program created solely to convert files from one format to another. When I compared the PCM 192/24 conversions done with both programs they did not sound identical. The Saracon program's overall output levels in default mode were different. I needed to spend quite a bit of time tweaking the settings in Saracon to get the two programs to create files that had similar levels, since AudioGate has no level adjustments. When levels were as critically matched as possible, I found that the Saracon files did sound as if the black space between instruments was ever so slightly blacker, but the effect was very subtle and only really noticeable on especially quiet passages.

I'm bringing up the issue of format conversion because I found that how a file has been converted from one format to another had a far more profound sonic effect than any of the electronics in my playback chain. And anyone who's doing comparisons between DSD and PCM versions of a file needs to give greater consideration to his conversion methodology. If a reviewer doesn't know or hasn't bothered to control how a DSD file was converted to PCM, his conclusions about sonic quality and differences between PCM and DSD are highly suspect. Anyone who says that a particular DAC is "better" than another at playing back PCM or DSD files based on someone else's file conversions needs to reevaluate his methodology, because the sonic variations created by file conversion are, in my experience, greater than the differences in hardware and software being compared.

Here's an example of what a major part file

conversion can play in sound quality. When I played back two different files from the same session, one the "native" 128x file and the other a 64x file that was made through a Saracon conversion, I preferred the sound on the 64x DSD file. Why? Perhaps because the 64x DSD file was played back in native mode via DSD over DoP 1.1 while the 128x file was being converted, on the fly, by the Decibel playback program into a 176.4 PCM file. The native DSD file playback was more relaxed, natural, and, dare I say it, analog-like in presentation.

Benchmark made some bold claims about the quality of the headphone amplifier in the DAC2. With all the headphones I had available the DAC2 headphone amp rivaled the sonics of the stand-alone iFi iCan headphone amplifier I reviewed recently (Issue 233). On all the commercially-available recordings I tried the DAC2 had enough gain to handle the most power-hungry and inefficient headphones such as the Beyer Dynamic DT-990 600-ohm version and the Audeze LCD-2. With my own recordings and the DAC2's default headphone amplifier gain setting, I would have liked a bit more gain for these lower-efficiency cans, but with more efficient cans, such as my Beyer Dynamic DT-880 250-ohms, the DAC2's headphone amp had ample gain. Note that the headphone gain range is internally adjustable in 10dB steps (0dB, -10dB, -20dB), with the factory default at -10dB. This variable gain optimizes the headphone amplifier's gain structure for the highest signal-to-noise ratio.

On high-efficiency low-impedance earbuds, such as the Meelectronics A16P balanced-armature earbuds, there was no low-level hiss,

spurious noise, or other signs of excessive gain. After many hours of headphone listening I had to conclude that the headphones themselves, rather than the DAC2 headphone amplifier, were the most colored and least neutral part of the DAC2's headphone output reproduction chain.

Another Perfect Benchmark DAC?

While I would never be so brash as to even suggest that further improvements in DACs, USB interfaces, and analog circuitry aren't possible or won't result in better sound quality, the Benchmark DAC2 does make a strong case that the current-generation digital-to-analog interfaces are no longer the weakest link in the reproduction chain, if indeed they were in the past.

For me the bottom line on the Benchmark DAC2 HGC is that is it not only good enough to live with long-term, it's good enough to use for any mastering or recording projects that might come up. The DAC2 HGC is easy to listen through, highly revealing, and with well-recorded material astonishingly three-dimensional.

Lynx Hilo

Lynx Studio Technology was founded in 1998. Its first offerings were PCI sound cards for computer-audio interfaces. While PCI cards still play a prominent role in Lynx's lineup, its latest devices have been stand-alone digital interface gear such as the Hilo Reference A/D D/A Converter System. The Hilo incorporates a number of firsts for a pro audio device, including a full-color 480x272 LCD touchscreen and upgradable firmware that controls all of the

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Hilo's primary functions. My review sample Hilo was on its fifth firmware version.

The Hilo combines a unique feature set with one of the most flexible signal-routing systems I've seen in any DAC or digital preamp. This flexibility stems from its FPGA (field programmable gate array). Virtually any input can be routed to any output. Also any input can be routed to play from any of Hilo's three outputs—line, monitor, or headphone. Hilo simultaneously supports eight digital channels at 192/24 or sixteen channels at 96/24. With the addition of Lynx LT-USB L-Slot, the Hilo also supports USB 2.0 inputs at bit-rates up to 192/24 for PCM and 64x (2.8MHz) for DSD.

The Hilo includes a built-in two-channel analog-to-digital converter, so analog sources can easily be brought into the digital domain. To get an idea of how flexible the Hilo can be and how it can be used, Lynx has over a dozen downloadable fact sheets on its site that cover how to employ the Hilo for overdubbing, mastering, location recording, and archiving vinyl records.

Setup and Day-to-Day Use

Given the Hilo's level of flexibility, new users should expect a learning curve when they begin. I recommend reading the manual thoroughly before trying to set up the Hilo. I didn't follow my own advice and paid the price. Unlike most digital preamps I've reviewed in the past, the Hilo's "line out" was a fixed-level output, while the "monitor out" was a variable-level output controlled by the volume knob on the front panel. If you assume, as I did, that the "line out" would be the variable-volume

output, while the "monitor out" would be fixed-level, as is standard on most consumer audio devices, you stand a good chance of blowing up your speaker drivers when the first signal goes through the Hilo.

I had two seconds of panic when a pair of ProAc Tablette got exposed to full-scale output from an Accuphase P-300 before I turned off my power amplifier. Phil Moon, Lynx's VP of sales and marketing, explained to me that in order to make the "line out" the "alpha" best-quality output, Lynx decided to bypass the volume controls. Perhaps on subsequent versions Lynx could change its labeling from "line out" to "fixed-level line out" to avoid subjecting overeager users to the sonic blast I experienced.

If you wish to use the Hilo to directly drive a basic power amplifier or active speakers that lack their own volume adjustments, you must use the "monitor out" outputs. Since the "monitor out" uses stereo 1/4" terminations, some kind of adapter will be needed for use with either RCA or XLR termination. For my primary desktop set-up I used a 1/4"-to-RCA adapter and a splitter to connect to my power amplifier and subwoofer. I connected the "line out" to a Stax SRM-007t headphone amplifier.

Once all the physical connections were sorted out it was time to work through the set-up options via the Hilo's front-panel touchscreen. The first option is what kind of level meters you would like to see. The Hilo offers three options—analogue, horizontal, or all I/O. Four additional control screens cover all of Hilo's other options, whose descriptions could easily fill up the remainder of the review. Suffice it to

say that you can do far more with the Hilo than merely output two channels of audio. You can, if you so desire, send different signals to each output or compare two different mixes over the same output for A/B comparisons. The Hilo also has an internal sample-rate converter to upconvert or downconvert a digital signal and then send it to any of the Hilo's three digital outputs.

One feature that you won't find on consumer DSD DACs is the Hilo's "Scene" feature. Imagine a "save" function that preserves all your current settings and lets you recall them with one button push. The Hilo has six savable "scene" options, which can be used for matched-level A/B switching (as I did) or special setups.

Once dialed in the Hilo performed flawlessly throughout the review period. It recognized DSD streams with no stuttering or glitches and switched easily and automatically from one format and bit-rate to another. Unlike other DACs I've reviewed that require the user to choose the active input source, the Hilo automatically defaulted to whichever input was currently passing signal. When I switched from the Hilo's USB to the Empirical Audio Off-Ramp 5 USB converter via my MAC's MIDI control, the Hilo automatically and almost instantaneously switched from USB to S/PDIF with virtually no interruption.

Unlike both of the other DSD DACs in this review, the Hilo does not come with a remote. For some potential users this could be a "fail" moment, but given the feature-rich nature of the Hilo's LCD touchscreen interface, it makes far more sense to use the Hilo in a physical

setup where it remains within arm's reach.

The Down-Low on the Hilo Sound

The Hilo DAC/pre has a very similar sonic character to the Benchmark DAC2 HGC and Mytek 192-DSD-DAC—that is to say, not much. Its variations from neutrality were far less apparent than other parts of most systems into which it was inserted. The sonic differences I've heard between various brands of state-of-the-art speaker cables or power amplifiers in my system were greater than between all three DACs in this review. Can you say, dead heat, boys and girls?

Many times what a casual listener might attribute to the sonic character of a component is actually the result of interactions between components rather than a particular component's own intrinsic sonic characteristics. I've found that room-based systems, due to their longer cable runs, as well as the myriad of environmental interactions, tend to be more harmonically colored and "bloomy" than my desktop system. Room bloom, which creates both harmonic and dynamic variations away from neutrality, isn't nearly as much of a sonic factor in a nearfield listening environment because the room doesn't get as excited by or involved in the reproduction process. Maybe that's one of the reasons that most recording engineers do their critical mixing and EQ adjustments on a nearfield system.

Since the Hilo automatically switches to whichever digital input is currently active, doing A/B tests between the Hilo's USB and an Empirical Audio Off-Ramp 5 with Short-Block USB de-coupler was fairly straightforward and

EQUIPMENT REVIEW - Three New DSD-Capable DACs

the changeover was nearly instantaneous. All I had to do was change the output device in the Audio MIDI control panel and the Hilo switched source inputs as well. After comparing the two USB sources on a wide variety of material I was forced to conclude that with the amps and speakers I had on hand I could not reliably tell a difference between the two USB inputs. Differences between recordings and bit-rates were far more profound than differences between these USB solutions. The Lynx USB interface is good enough that, at least for the time being, the need for a "better" external USB interface was non-existent.

The Hilo's headphone amp proved to be more than equal to the task of successfully driving all the headphones in my earphone menagerie. High-impedance, low-sensitivity headphones such as the Beyer Dynamic DT-990 600-ohm version and Audeze LCD-2 required nearly full output level for my own recordings, which are in general recorded at lower level than commercial releases. But with commercial releases the Hilo had more than enough horsepower to drive them past comfortable listening levels. With high-sensitivity low-impedance ear-buds such as the 16-ohm, 110dB Meelectronics A16P balanced-armature earphones, there was no background hiss or other signs of a sensitivity mismatch. With every set of headphones I tried the Hilo provided a very quiet environment for the headphones to work their magic.

The Lynx Hilo's feature set is far more extensive than any two-channel playback-only audiophile will ever need. Because it is the most expensive DAC/pre of the three reviewed, some audiophiles might assume that it's also

the least cost-efficient. They would be wrong. If you have any plans to do any transfers from original vinyl or tape sources or want to try some high-quality digital recording, the Hilo's inclusion of a 192/24 analog-to-digital converter and eight-channel capabilities make it far more useful and cost-effective than the other DACs in this survey and more flexible than any consumer DAC/Pre I know.

Three Great DSD DAC Options

Back in J. Gordon Holt's day no "serious" audiophile would think of putting together a system based around pro audio gear. But that was then, and this is now. Computer audio has made the practical differences between pro and consumer products moot. All three of the DSD-capable DACs in this survey will elevate a computer-based audio system to a very high "professional" standard. Personally, I could live happily with any of them. The Mytek 192-DSD-DAC, Benchmark DAC2 HGC, and the Lynx Hilo are all sonic and ergonomic winners in my book. **tas**

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EQUIPMENT REVIEWS

Music Servers & Accessories

EQUIPMENT REPORT



AudioQuest Diamond USB Cable

Robert Harley

The replacement of the S/PDIF interface by USB as the *de facto* standard for transmitting digital audio has been surprisingly rapid. Even more surprising is how variable in sound quality USB can be. No two implementations of the USB interface sound the same, with a huge performance gap between the best and the worst. The good news is that some talented high-end designers are addressing the problem, raising the bar in USB performance. The very best implementations are now very good indeed.

All of these observations about USB also apply to USB cables. There are, in fact, larger sound quality differences between USB cables than between S/PDIF or AES/EBU cables. Generic USB cables designed for connecting computer peripherals are so bad that even a \$29 designed-for-audio USB cable offers a huge leap in performance.

So how good can a USB cable get? I discovered

the answer when I replaced an excellent \$80 USB cable with a 1.5m run of AudioQuest's top-of-the-line Diamond USB (\$549 for .75m, \$695 for 1.5m) in my music-server system. (I use an iMac running iTunes and Pure Music, a Berkeley Audio Design Alpha USB Interface, and a Berkeley Alpha DAC, later replaced by an Alpha DAC Series 2.) It turned out that the state-of-the-art in USB cables combined with a state-

of-the-art USB interface sounds absolutely spectacular. My music server system took a significant leap in sound quality. Diamond USB may be quite expensive, but in the context of my system, it is well worth the price.

The Diamond cable is built from solid silver conductors—what AudioQuest calls “Perfect-Surface Silver” (PSS)—terminated with silver-plated connectors. AudioQuest’s 72V Dielectric Bias System (DBS) applies 72V across the dielectric via a battery attached to the cable. A wire attached to the battery’s negative terminal runs down the cable’s length. The battery’s positive terminal is connected to a shield around the conductors. Note that the battery’s + and - terminals are not connected together, so no current flows, which is why the battery will last for years. The idea is to saturate and polarize the dielectric so that it performs optimally at all times, and with no break-in required.

AudioQuest’s Diamond USB delivers exceptional resolution of detail, but at the same time is relaxed and easy-going. The cable presents a huge amount of information, from very low-level spatial cues, to inner timbral information that conveys the mechanism by which instruments create sound, to micro-dynamic nuances. For example, I’ve been listening to Rachmaninoff’s in 176.4kHz/24-bit via Reference Recordings’ HRx format for two years and know it well. After putting Diamond USB into the system, I heard even more very low-level information, particularly very quiet instruments at the back of the soundstage. This increased density of detail expanded the soundstage, particularly in depth, heightening

the sense of a large acoustic replacing the acoustic of my listening room. The increased resolution also made timbres more richly saturated and lifelike.

Concomitantly, the presentation became gentler and smoother. The treble, in particular, was revelatory. Thanks to the elimination of hardness and glare, I could listen at higher volumes without the sound bothering my ears. The presentation became more musically vivid without becoming more sonically vivid—a rare feat that I greatly value. It is this combination of resolution and ease that makes Diamond USB special.

When critics of premium audio cables complain about cable pricing, I suggest that they perform a simple test: Listen to the system for a couple of weeks with the expensive cable installed, and then replace the expensive cable with what they had been using before, or with a lesser-quality cable. They should then ask themselves: “Am I willing to live without the qualities the better cable delivers?”

I suspect that anyone who performs this test with Diamond USB won’t want to take it out of his system. **tas**

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NAD C 446 Digital Media Tuner

How NAD Saved My Radio

Neil Gader



I was raised on radio, and I still enjoy its unpredictable mix of music, features, and news. In fact, there was a time when no self-respecting audio system was considered fully dressed without a good tuner. Lamentably you don't hear a lot of chatter about FM/AM radio anymore. In spite of some marvelous programming it's become a victim of portable digital media, downloads, and satellite services—essentially relegated to the car, and counted on mostly for traffic reports and talk radio. Still I remain a stalwart. As does NAD Electronics, which to its everlasting credit remains one of the few high-end electronics companies that hasn't turned its back on this admittedly shrinking segment of the market. Its latest effort, the C 446 Digital Media Tuner, continues the tradition; yet it does so with a considerable and calculated twist over the traditional tuner.

Nifty, Thrifty, and Thorough

The \$800 NAD C 446 is, indeed, an FM/AM tuner, but as part of its mission as a Digital Media Tuner it also gives you access to the near-infinite world of Internet radio, plus the ability to stream a music library from network storage devices, and most significantly to wirelessly stream from a computer, Android

phone, Apple iOS device, or network hard-drive using Universal Plug-and-Play (UPnP). As is the norm today, wireless streaming is limited to conventional 16-bit/44.1kHz resolution.

The C 446 offers support for many popular digital formats including WAV, AAC+, and FLAC, and outputs them via its 24-bit/192kHz DAC. Other features include the ability to digitize FM/

AM for output as S/PDIF and a front-panel USB input for thumb-drive playback. The C446 also supports cloud music services so that you can access your music library from multiple devices. Adding NAD's optional IPD 2 Dock permits iPod/iPhone docking/charging via a back-panel input. About the only thing the C 446 doesn't have is a USB DAC—even a company as resourceful as NAD has budgets to meet after all. But don't fret; NAD wasn't napping. NAD has several USB-DAC solutions that can always be added down the road. Even so, the C 446 is a veritable digital crock-pot for music delivery.

Visually the C 446 is definitively NAD—minimalist, elegant, and carefully laid out for ease of setup and control. The large central LED screen is readable even from a modest distance. The back panel is clearly organized, and the remote control is well laid out and intuitive. Kudos to NAD's pictorial Quick Start guide, which goes a long way toward reducing the connection jitters. It calmly walks networking-phobes like yours truly through wireless or wired Internet setups, and believe me I'm a fumbler. Windows users have it easy, since UPnP is built into that OS. For Mac users it's slightly more complicated. Recognizing this, NAD has partnered with Twonky.com as its UPnP client. A quick download from the Twonky site, some legwork in the C 446 set-up menu to create a wireless handshake, and, *voilà*, a familiar fully searchable music library with full playlists appears on the front-panel display. All in all, a relatively straightforward setup. Not as elegant or foolproof as Micromega's iTunes-based AirStream technology—the Cadillac of its kind—but to be fair the C 446 is a fraction of the Frenchman's cost. Tip: Keep in mind that it's not a bad idea to compile music playlists with

material in formats that the C 446 can decode. It won't do AIFF, for example.

Turning to tuner performance, channel selectivity was very good and noise was minimal on all but the weakest stations. Even without a signal-strength meter, it was easy to get a good lock on most stations. The memory feature is useful particularly if you don't want to start all over again spinning the tuning knob. I wish there were a scan feature, or that the numerical keypad could be used to locate stations via their identifying call numbers, but never mind. Channel separation and signal-to-noise were perceptibly very good, and more than competitive in this price range. Being a big fan of dedicated tuners like the superb Magnum Dynalab MD106T (Issue 152), I was more than impressed with the immediacy and the smooth, almost buttery musicality of the C 446. On one of my favorite classical stations it threw a wide and vivid soundstage, with solid dimensionality, nicely resolved images, accurate timbre, and a spirited sense of air and hall ambience. Keeping in mind that the FM radio standard has its own well-known limitations in bandwidth, the C 446 did a good job minimizing these shortcomings. In head-to-head comparison with compact-disc playback, the most obvious shortcoming of tuner reproduction will be a truncation of dynamic range. While low-level resolving power is enough to keep you on the edge of your seat, larger dynamic swings lose some energy. In order to maximize performance, a decent antenna is key—an omni rooftop or attic unit like Magnum's reasonably priced ST-2 whip-pole model. You'll likely realize that there's more life left in the venerable tuner than you thought.

But of all the tools in the C 446's digital arsenal, wireless is the star. Its performance

EQUIPMENT REVIEW - NAD C 446 Digital Media Tuner

was nothing short of startling over my home network. Startling in this context is that wireless has come to mean more than merely unwired convenience. It's become a performer. The C 446 joins this group. And I say this after spending considerable time with the Micromega's AirDream technology. Like the Micromega, the NAD sonically rivaled compact-disc sources as well as a couple of USB DACs that I had on-deck for review. Key among its performance virtues is how it sheds some of the unyielding hardness I hear in average digital and replaces it with a more supple and I think more natural expression of transient attack. It has a liquidity that I normally regard as the territory of more expensive digital reproduction. Low-level resolving power was very good as well, as I noted during Judy Collins' cover of Jimmy Webb's "The Moon is a Harsh Mistress" from *Judith* [Elektra]. On this track there is an underlying resonance from the accompanying cello that is expressed as if just "under its breath." But in this instance it was distinct and the instrument was reproduced with its full character. Equally informative were the clarity and warmth of the solo violin on this cut. During *Appalachian Spring* [Reference Recordings], the delicate opening segment and the thematic burst of strings were uncongested and open, with a soft lilt in the upper register that seemingly lifted harmonics upward on a bed of air.

There is a small subtraction of transparency that lightly veils the music. The rendering of spatial cues, of hall boundaries, of specific image placement is just a little more ephemeral than the AirDream or Lindemann USB. In addition,

a light amount of granularity seeped into the brass section during *Fanfare For The Common Man*. Also, as I listened to the harmonics of Evgeny Kissin's heavy trills on the concert grand it seemed to me there was a very small bit of smudging. The same track from the CD version was decidedly better defined. Yet the CD was also something of a trade-off, as the disc had a drier, more brittle signature, a trait that can itself create an impression of greater definition. So, yes, I still have some minor quibbles, but wireless is definitely moving into primetime.

The rewarding C 446 Digital Media Tuner fills a critical gap seen in many audio systems today. Straddling two worlds, it's something old and something new from the company that seems to intuit a market's sweet spot. The NAD is a welcome addition in a rapidly changing audio landscape. **tas**

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Outputs: Analog on RCA, S/PDIF on TosLink

Interface: Ethernet, Wi-Fi

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Channel D Pure Music Software

Pure Heaven

Steven Stone

In Issue 202 I concluded my review of the Amarra software program with, "If you want to hear how good a quality Mac-based system can really sound, you *have* to use Amarra. In the end, it's that simple." Time and the latest version of Channel D's Pure Music software may make me eat those words. Priced at only \$129, Pure Music promises to improve not only iTunes' sonics, but also adds high-resolution capabilities along with a host of other advanced sonic and ergonomic features.

Pure Music is such a powerful program that reading its "User Guide" is a must. I daresay that you will be reading this informative tome more than once. I recommend keeping Pure Music's User Guide PDF open on your desktop for the first week or so of operation, especially during initial setup. While nothing in Pure Music's preference panels is completely inscrutable, without the User Guide anyone not familiar with Pure Music's many options could screw up its settings in a myriad of ways. Don't say I didn't warn you.

PURE FEATURES

Like Amarra, Pure Music's principal function is to bypass iTunes' signal processing and substitute a more direct and powerful 64-bit processing program. In addition Pure Music offers automatic rate-switching from 44.1/16 all the way up to 192/24, gapless playback of files that have been designated as gapless files, memory play, real-time high-resolution

upsampling of CD tracks, a 64-bit internal signal path, dithered volume control, phase inversion, a subwoofer crossover, multichannel support, support for audio-processing plugins, Core Audio HOG mode playback, high-resolution audio streaming, precision signal metering, reverse play, and more. Some of these features, such as HOG mode and memory play, may sound like gibberish to the uninitiated, but these two features alone make Pure Music capable of elevating even a lowly Mac Mini into a formable music-delivery device.

I could easily fill many pages with a detailed description of individual preference panes and the various options these panes offer, but you can download the User Guide along with a demo version of the software from Channel D's Web site. The free demo offers 15 days of full-featured usage, and I daresay that once you've used Pure Music going back to ordinary ol' iTunes will be tough, unless you're listening through a Dixie cup.

Although a novice user, the sort of person who feels intimidated by anything labeled "preferences," can simply download and run Pure Music, to hear its full potential does require optimizing it for your particular system's capabilities. But even when it is used "plain vanilla" without any system optimization, I could hear differences between iTunes and Pure Music.

Among Pure Music's "must use" features is memory play. This loads your music file's stream into an adjustable RAM buffer before it's sent to your rendering device or DAC. It usually takes a few seconds for the buffer to fill and music to begin playing, but you can select a "Hybrid buffer" setting which will play the first couple of seconds of a track without buffering while the data is loaded into the buffer and then automatically switches to buffered mode once the buffer is filled.

Pure Music's upsampling capabilities allow

it to turn a 44.1/16-bit file into a higher-res file. Among the options are "power-of-two" upsampling. According to Pure Music, "this operation is more efficient than factored upsampling, and in the case of Red Book CD, 88.2kHz is, all things considered, a better target than 96kHz." If your DAC will support it, a Red Book CD can be upsampled all the way to 192kHz. With the Weiss DAC 202 I was able to set up Pure Music so it upsampled 44.1/16 files to 192/24 before sending them to the DAC.

Another unique feature of Pure Music is the HOG mode. According to the User Guide, "this option reserves the audio device for Pure Music's exclusive use while Pure Music is running. To use this feature, the audio device selected in Audio MIDI Setup should be set to a different device than the one used by Pure Music, to allow iTunes to fully access an audio device if necessary. Accordingly, by default, HOG Mode cannot be used for the audio device



EQUIPMENT REVIEW - Channel D Pure Music Software

selected in Audio MIDI setup.” This feature is best used on a dedicated music system. On a full-service computer it means that any time you want to use any program that requires an audio stream it will have to go to an alternative audio device, such as your internal speakers or a second DAC.

My final preferred HOG setup was pretty clever, if I do say so myself: I used the Weiss DAC 202 in FireWire mode for my Pure Music feed and the Empirical Audio Off-Ramp 3 for all other audio tasks. To change from Pure Music to other audio sources I only needed to select the DAC 202’s RCA-S/PDIF input.

Pure Music also allows the use of third-party plug-ins, and comes with 18 plug-ins already installed and waiting for activation. A plug-in is a small application program that runs within Pure Music. Installed plug-ins include a peak limiter, graphic EQ, high-pass and low-pass filters, compressors, reverb, and shelf filters. Since each plug-in takes up processor time, Pure Music monitors the total CPU load so that you don’t overload your computer by using too many plug-ins all at once. On my Mac Pro with 12 gigs of memory I was able to run quite a few plug-ins simultaneously. But the best way to use plug-ins is with restraint. You can, if you’re so inclined, use up to 14 plug-ins at the same time, but that would be a wee bit excessive.

With the right hardware you can even have Pure Music handle crossover settings for a multi-amped speaker system. To utilize this feature you will need a multichannel output device such as a Lynx AES-16 or Apogee Ensemble. Each channel can be selected and modified by Pure Music. For a two-way speaker

system, channel one could be right tweeter, channel two the right woofer, channel three the left tweeter, and channel four the left woofer. You can choose either 6-, 12-, 18-, or 24dB-per-octave slopes for both the high pass and low pass. You can also adjust individual levels for each channel and the delay for each channel, making this a very powerful and flexible way to configure your crossovers.

While earlier versions of Pure Music had some small ergonomic quirks such as reading out “Paused” while it was playing, the current version, 1.6.3, proved to be exceedingly well-behaved. The only problem I experienced was with the Wyred4Sound DAC 2. During the silences between cuts I heard low-level crackling. Since this DAC uses its own proprietary driver, I suspect that was the culprit. I alerted Wyred4Sound of the problem and they added it to their bug-fix list for the next version of the driver.

One ergonomic issue I was glad to see Pure Music doesn’t have is Amarra’s death-grip on the computer’s CD/DVD drive. If you rip a CD via your internal ROM drive while Amarra is running it won’t let you eject the disc. You have to shut down Amarra (which shuts down iTunes) before you can remove the disc from your drive. That gets old pretty fast.

PURE SONICS

How does Pure Music sound? Better than iTunes alone, that’s for sure. Compared to iTunes Pure Music is more dimensional, dynamic, detailed, and involving. iTunes sounds flat, not pitch-wise, but in its overall presentation. It is like going from a 128kbs MP3 file to a 320kbs

file. Pure Music delivered substantially more musicality and information than iTunes did.

I found I got the best sound from Pure Music when I used both memory play and HOG mode. This combination delivered a subtle improvement in both overall soundstage depth and dimensionality. The spaces around and behind individual instruments were better defined. The amount of improvement will vary depending on your particular hardware configuration. Although I heard the improvements through the Wyred4Sound DAC 2, the improvement was more pronounced through the Weiss DAC 202.

Naturally, I compared Pure Music with Amarra, which meant I had to shut down each program *and* iTunes when switching from one program to the other. With real-time A/B comparisons not available, I tried longer, slower A/B comparisons and found I couldn’t hear any differences between Pure Music and Amarra, though noth were clearly better than iTunes,

Given that sonic differences between Pure Music and Amarra were negligible, and Pure Music costs approximately 25% of Amarra’s price, does that make Amarra obsolete? For budget-conscious audiophiles the answer is yes, but for those who are using one of the professional DACs that Amarra supports, Amarra still may be a better option. Also, given Sonic Studio’s rapid rate of innovation, it’s possible that Amarra will in time enjoy evolutionary improvements of its own.

I’m sure many readers would like to know how a Pure Music-enabled Mac system stacks up against a top-flight transport. Sorry, but you won’t find any answers here. To be completely

forthright, I don’t listen to CDs through CD players or transports anymore. For me a CD is merely a way to get digital files. When I receive a new CD, I “play” it exactly once, when I add it to my digital library. Then it goes onto a shelf to collect dust. Transports are as useful in my world as a capo on a mandolin.

PURE PLEASURE

Pure Music is a great piece of software at a price that even a flea-market-scrounging audiophile hobbyist can afford. Combine Pure Music with any recent Mac computer and you have a front end that will play back any digital file (except FLAC) from lowly MP3s up to 192/24 high-resolution with ease. Mate this front end with a top-flight DAC such as the Weiss DAC 202 and you have a digital playback system that will catapult you to the forefront of the new computer-playback revolution. Dare I say it? If you want to hear how good a quality Mac-based system can really sound, you *have* to use Pure Music, at least for now. tas

SPECS & PRICING

Hardware platform: Apple Macintosh OS 10.5 or later with iTunes

Price: \$129 (free 15-day trial with all features available)

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Naim Audio SuperUniti "All-in-One Player"

Versatile, Capable, Musical

Wayne Garcia

As a certain scruffy young bard once sang, "The times they are-a changin'." Although many aspects of our hobby remain constant, especially the continuing health of analog and two-channel sound, there's no doubt that digital-audio reproduction is on a pathway of serious change. CD sales, while not dead, diminish every year; more and more streaming devices are hitting the market; and this very magazine devotes serious coverage to the evolving world of computer-driven digital-audio playback and HD downloads. And not just upstarts but iconic manufacturers—and at this point in the company's history England's Naim Audio certainly qualifies as the latter—are embracing this new world order. The latest in Naim's now three-year-old and frequently augmented Uniti series, the \$5995 SuperUniti joins the NaimUniti 2 (\$4695, with built-in CD player) and UnitiQute (\$2695, no disc drive), along with two versions of Naim's UnitiServe Hard Disc/Server (\$3695 and \$3995). I can't think of another audio company with such a long track record that has so firmly and expansively embraced the word of computer audio. Nor of another one that's done it so gracefully.

Like the UnitiQute, the SuperUniti contains no disc drive. You can, of course, as I did, hook up a CD player via analog inputs, as well as a turntable, and I suspect that many users may do just that. But I imagine a whole other, and dare I add younger, flock of SuperUniti customers will be drawn to this sleek model's streaming audio and other digital capabilities because, after all, Naim calls the SuperUniti an "all-in-one," music player that simply needs speakers—and externally generated sources—to make music.

The heart of the SuperUniti, however, is firmly grounded in Naim's classic componentry, most specifically the 5 Series amplifier found in the 80Wpc SuperNait integrated amplifier, from which the SuperUniti's guts derive. But as Naim points out, in addition to the SuperNait the SuperUniti also draws inspiration from the UnitiQute, the NDX network music player, and the Naim DAC. Like the latter, SuperUniti employs Naim's "Zero Jitter" buffering technology, which clocks incoming digital signals into the unit's buffer memory, before then clocking them out to provide a stable conversion stream. Proprietary digital filtering provides up to 16x oversampling, and D-to-A conversion is via the same Burr-Brown DACs found in Naim's NDX and HDX. Naim also boasts of the SuperUniti's newly designed, digitally driven, analog volume control, which uses discrete resistors for the highest sound quality.

To encapsulate the SuperUniti's features, here's what this handsome and cleanly arranged component comprises: An integrated, wireless, UPnP-network stream player able to stream audio files from any hard-disc server—such as Naim's UnitiServe, HDX, network attached storage (NAS), or laptops/computers via a home network; a front-panel USB port that accepts direct digital files from iPods and iPhones using Apple Lossless encoding; a multi-format tuner for iPod and USB-stored audio featuring FM/DAB/Internet radio; a ten-input digital and analog preamplifier with six S/

PDF digital inputs for external digital sources, including three back-panel optical inputs and a fourth front-panel optical input; internal architecture for high-res audio playback up to 24-bit/192kHz over the network—a Naim first; a digital-to-analog converter; and, of course, the 80Wpc power amp, which makes this the strongman of the Uniti series. Should the amp's 80 watts be less muscle than you need, you can drive an external amp via a preamp output, and there is also a dedicated subwoofer output.

Moreover, the SuperUniti offers a variety of control options—conventionally from the neatly arrayed front panel, from a standard remote control, as well as from Naim's N-Stream app for Apple's iPhone and iPad. As of now SuperUniti does not support Apple Airplay, but that is said to be in the works. Although its wireless capability is a cool feature, Naim recommends Ethernet network connectivity for both reliability and the best sound quality. As to the formats supported, SuperUniti plays/streams WAV, FLAC, Apple Lossless, AIFF, MP3, Windows Media-formatted content, AAC, and Ogg Vorbis from any suitable UPnP device or USB-connected storage device. And gapless playback is available on all supported file formats. Super, indeed.

Luddite that I am, I began my time with the SuperUniti in a rather conventional way, by playing back LPs and CDs via the unit's pair of analog inputs. It also gave me the clearest chance to hear how the SuperUniti sounds compared to other Naim components I'm familiar with over my years of reviewing them.

As I guessed, the SuperUniti's sonic style is Naim through and through. It has the same exceptional sense of dynamic ebb and flow and rhythm and pace one expects from Naim gear, along with a low noise floor, and a fine sense of transparency to the recorded event. For instance, on Harmonia Mundi's terrific CD *Gershwin by Grofé*, the SuperUniti created an impressively large soundstage with a good display of air around each instrument. During *Rhapsody in Blue*

EQUIPMENT REVIEW - Naim Audio SuperUniti "All-in-One Player"

the opening clarinet theme was rich but nice and reedy, too, while the brasses were creamy, fat, and throaty. The piano was convincingly life-sized, with great clarity to each note and fine percussive power. Cymbals had notable sizzle and snap, and when the orchestra busted loose you felt a good sense of weight and power. And though Naim's 80-watt rating is relatively conservative, the amp did a decent job powering my Maggie 1.7s, although I can see how that preamp-out connection might, for users with either power-hungry speakers such as these, large rooms, or both, feel the need for a larger power amplifier.

More intimate music was likewise well served by the SuperUniti—be it the haunting beauty of Antony and the Johnsons' *The Crying Light* [Secretly Canadian LP], where Antony's one-of-a-kind voice weaves an otherworldly web from strands of tenor and falsetto harmonies, or the recently reviewed Analogue Productions SACD of *Getz/Gilberto* (Issue 224), which found the Naim SuperUniti practically drawing me into the speakers with the sheer beauty and subtle artistry of this near-perfect record. This a component that invites you in, rather than bludgeoning you with power.

With the invaluable help of Chris Morris, who works for U.S. importer The Sound Organisation, I was able to download Egalto's EyeConnect UPnP AV Media Streaming software, which allowed me to transfer my (currently small) iTunes library on the network so the SuperUniti was able to access it. I also downloaded Naim's N-Stream app onto my iPad. This is a super-cool free app that lets you access your iTunes library, control volume, and so forth.



Since this is something of a new world for me I consulted the Downloads section of TAS' music review department, where I know I can count on the recommendations of my colleagues Alan Taffel (pop) and Andy Quint (classical). Intrigued by Taffel's high praise for Cat Stevens' *Tea for the Tillerman* (Issue 223), and his comparison of different formats, I downloaded both the 96/24 and 192/24 versions of the album. Whoa, Alan was right on—the 96/24 is indeed outstanding, with great clarity, a lovely sense of detail, tonal richness, and immediacy beyond anything I'd heard before from this classic recording (note that I have not heard the latest Analogue Productions vinyl edition). Taffel was right again when he said the 192/24 rendering was better, cleaner, more immediate and detailed. This was one of those jaw-dropping experiences, and I admit hearing digitally reproduced music in this way, over a fine component such as the SuperUniti, is a new thing for me, and one that will take a bit of getting used to. It's simply a different experience from hearing CDs. Certainly not the same as analog, but something rather different from any disc format.

I was also intrigued by Andy Quint's review in the same issue of Albéniz's *Iberia* played by Peter Schaaf. This was another eye-opener, and

a truly great-sounding recording of a piano—life-sized, full, percussive yet harmonically rich, dynamically explosive as well as intimate as the music dictated.

These are but two examples of the many fine recordings I've started to enjoy in what is for me a new fashion (yes, I know I'm behind the times). And while I'm not ready to give up my LPs, and doubt I ever will be, with the help of the SuperUniti and knowledgeable friends on this magazine I am thoroughly enjoying listening to music via these new formats. Bravo to Naim for making it fun, easy, and so very musically compelling. (Chris Morris says that the SuperUniti's ultimate performance is achieved with Naim's own UnitiServe. I'm getting a review sample, so watch for my follow-up report. **tas**)

SPECS & PRICING

Type: All-in-One Streaming Audio Player

Power output: 80Wpc into 8 ohms

Formats supported: WAV, FLAC, Apple Lossless, AIFF, MP3, Windows Media-formatted content, AAC, and Ogg Vorbis from any suitable UPnP device or USB-connected storage device (gapless playback available on all supported file formats)

Maximum sample rate: 192kHz (coaxial) 96kHz (optical)

Maximum bit depth: 24 bits

Analog inputs: One 5-pin DIN, two RCA pair, one 3.5mm front-panel jack

Digital inputs: Six S/PDIF (one coaxial BNC, one coaxial RCA, three optical TosLink, one 3.5mm front panel mini-TosLink)

Analog outputs: Preamp output (4-pin DIN), subwoofer output (RCA pair)

Digital outputs: S/PDIF (coaxial BNC 75-ohm)

Dimensions: 17" x 3.4" x 12.33"

Weight: 28.2 lbs.

Price: \$5995

THE SOUND ORGANISATION

159 Leslie Street
Dallas, Texas 75207
(972) 234-0182
soundorg.com
naimaudio.com

ASSOCIATED EQUIPMENT

TW-Acoustic Raven One turntable; Tri-Planar Ultimate VII 'arm; Benz Gullwing, and Transfiguration Phoenix moving-coil cartridges; Sutherland 20/20 phonostage; Cary Audio Classic CD 303T SACD player; Apple MacBook Pro and iPad; Magnepan MG 1.7 loudspeakers, Tara Labs Zero interconnects, Omega speaker cables, The One power cords, and BP-10 Power Screen; Finite Element Spider equipment racks

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Audirvana Plus Music Playback Program For Mac

Improving the Sound Quality of iTunes

Steven Stone

In the past TAS has reviewed and awarded Golden Ears Awards to two Mac music-playback programs, Amarra and Pure Music. Now there's another Mac playback program worthy of readers' attention, Audirvana Plus. Priced at only \$50, Audirvana Plus offers several unique features combined with stellar sound quality. As a result, it's become the de facto leader of budget-priced Mac playback software.

In TAS Issue 218 I surveyed Mac playback software, which included Audirvana, a free program that served as a precursor to Audirvana Plus. Both programs share a similar look and some ergonomic functions. Both support memory play (where the entire

track is loaded into computer memory and played back from that location rather than from the original drive), gapless playback, device driver optimization and integer mode, automatic sample-rate switching, configurable oversampling or upsampling, and device hot-swapping. Both programs can handle MP3, ACC, Apple Lossless, WAV, AIFF, and FLAC files, but Audirvana Plus also supports DSD, SACD ISO images, DSD-to-PCM real-time playback, and native DSD playback through compatible DACs.

The free version of Audirvana supports 32- or 64-bit internal resolution, while the Plus version uses full 64-bit resolution. Both have "no limit" on maximum sample rate, but Audirvana uses an open-source sample-rate

converter, while Plus employs the Benchmark iZotope 64-bit SRC sample-rate converter, which has advanced sample-rate-tuning parameters. Both offer DAC remote control of volume (if supported by the DAC), but the Plus includes a dithered volume control option and three different noise-sampling algorithms.

From an ergonomic viewpoint Audirvana offers the best of both worlds—you can use iTunes as a playlist or make your own independent playlists. I have about a dozen special "review playlists" of high-resolution and specialized music files that I can load and use with one click. But the one ergonomic feature that has endeared me to Plus is its device-switching feature. Unlike Amarra and Pure Music, which must be shut down and re-opened if you switch DACs, Audirvana Plus can instantly switch from one DAC to another in less than five seconds. With this feature you can do real-time matched-level DAC comparisons with ease. If you are trying to decide between two DACs, you need Audirvana Plus to make a completely educated sonic decision.

Sonically I found Audirvana Plus to be equal to both Amarra and Pure Music. In matched-level A/B listening sessions of Red Book 44.1/16 files, the differences among the three programs were minor and not reliably attributable solely to software. On higher-resolution files I quickly developed a preference for Audirvana Plus due to its ergonomic ease, but once more sonic differences were harder to reliably identify. The only thing that was clear was that all three programs are substantially more transparent than iTunes.

One area where Audirvana Plus shines is playing back native DSD files. Not only can Audirvana Plus handle 2.8Mbps DSD, but also raw 5.6Mbps files from the Korg MR-1000 DSD recorder, which is something that even Amarra can't do. (Amarra can play 2.8Mbps DSD, however.) For playback through the Wadia 121, Audirvana Plus converted the 5.6Mbps DSD files to a 176/24 PCM format. For audiophiles with large SACD collections Audirvana Plus also offers an easy way to play them through your computer audio system. Merely rip them into your computer (you will need a third-party Blu-ray drive as Apple doesn't officially support Blu-ray hardware) and then add them to the Audirvana Plus playlist and push "Play."

If you have resisted buying any third-party music-playback software for your Mac, Audirvana offers some compelling reasons to reevaluate that decision.

Especially if you use multiple DACs or listen to higher-res files and DSD, Audirvana Plus offers a more ergonomically elegant and sonically superior alternative to iTunes.

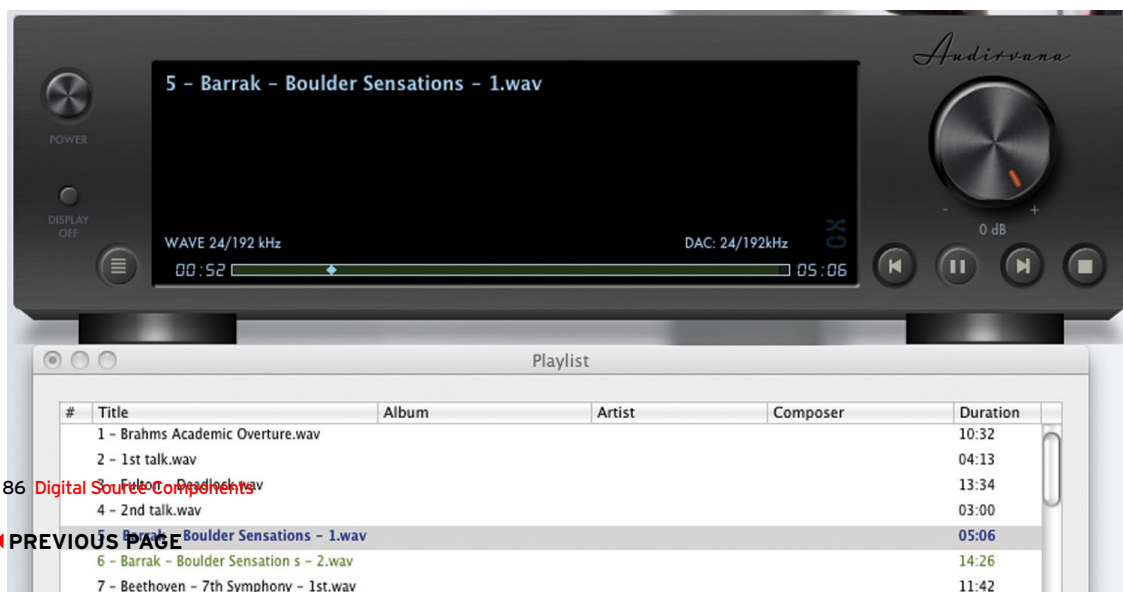
And for readers who need to see and hear for themselves, you can download the trial version of Audirvana Plus for free. For fifteen days you can use the full version with no restrictions. I'd be very surprised if, by the sixteenth day, you haven't anted up that \$50 to become a licensed user. TAS

PRICING

Type: Macintosh music playback software

Price: \$50

audirvana.com





PS Audio PerfectWave DAC II, PerfectWave Memory Player, and eLyric Music Player

A Different Breed of Music Server

Anthony H. Cordesman

Let me begin with the bottom line: The PS Audio PerfectWave DAC II and PerfectWave Memory Player have evolved into a cutting-edge digital front end. They have competition, but competition that rivals them in quality is substantially more expensive or lacking in the same features. The DAC II has an outstanding ability to play back the highest sampling-rate material and get the best out of the older CDs that contain almost all of the world's best performances. Most strikingly, the DAC II joins a handful of more expensive units in reducing traces of hardness in digital sound to the point where even the most demanding acoustic instruments like the violin, flute, and piano sound as musical as the recording permits.

Sound Quality

I fully recognize, however, that what I find a near-breakthrough in sound quality is dependent to some extent on personal taste. To me, however, the sound quality of the PS Audio PerfectWave DAC II and PerfectWave Memory Player has some overwhelming advantages I've only heard from a few digital front ends. I really don't want female voice to slightly harden unless the vocalist is seeking that effect. I want the clarinet to remain as musical as it does in a live performance, and the flute to provide energy and musical detail without becoming even slightly shrill. I want the full range and energy of the stringed instruments with all of their natural warmth and without the slight edge I have heard all too often in digital equipment in the past.

Again, recording permitting, I want to hear the piano as that particular brand and model of piano sounds live, without the same slight hardening of the upper octaves and with the full warmth of a given make of grand piano clearly coming through. If the sound engineer is good enough to get the trumpet right, I want to hear that sound and not some slight change in sound character. I'll settle for the soundstage actually on the recording—if there is one—rather than having the DAC add a bit of its own soundstage character to every recording played through it.

Moreover, if you happen to be a serious music collector—and I'm up to around 9000 albums on both my computer and my Sooloos—I don't want a front end that highlights the strengths in one kind of recording at the cost of exaggerating or creating weaknesses in others.

After listening to several hundred recordings, it is this balanced, natural musicality that makes me praise the PS Audio PerfectWave DAC II so much, regardless of whether I listen to CDs through the PerfectWave Memory Player, or music streamed through my computer using PS Audio's eLyric music player or my Sooloos. It does reveal the recording-warts and all—but never at the cost of musical realism or favoring one approach to recording over another.

The PerfectWave DAC II and PerfectWave Memory Player not only met all of the above tests; they were excellent in handling recordings of full orchestra, large bands, and grand opera. They got the best out of recordings from the softest to the loudest passages without softening forward recordings to more of a mid-hall sound and without brightening up recordings that had a natural mid-hall acoustic. If you have one of those days where you really want to hear a Beethoven symphony at full natural volume—or to thoroughly depress yourself by wallowing in Mahler while he leads you into a mass fog of high-volume schmaltz—the DAC II is a real pleasure at either extreme of volume and dynamics.

I should also stress the extent to which the PerfectWave DAC II and Memory Player get the best out of older recordings as well as the new high sampling rates available from CD, or downloadable from some DVDs. You can find pages worth of technical explanation of why these products minimize the problems with jitter and filtering on the PS Audio Web site, but the key lies in their effect. Many DACs and CD players are less than kind to the first decade or so of CDs, and some seem to have trouble even with the streamed versions of Klemperer, Reiner, Walter, Von Karajan, and recordings dating back to the 1940s and 1950s. The same with jazz. The older Armstrong and Ellington recordings can suffer as much as their classical counterparts. The PS

EQUIPMENT REVIEW - PS Audio PerfectWave DAC II, PerfectWave Memory Player, and eLyric Music Player

Audio PerfectWave DAC II and Memory Player are as musical with older recording as possible without being forgiving.

They also do a superb job of reproducing the most advanced stereo digital recordings. If you are experimenting with higher sampling rates, you will hear the differences between given bit and frequency rates if they actually exist. With the exception of a few firms like AIX, Chesky, Channel 2L, and Reference Recordings, this often is not the case. Yet, I do find the best 96/24 recordings sound consistently better in every respect, and that some 176/24, and 192/24 recordings sound even better.

The PS Audio PerfectWave DAC II did as good a job of resolving the sonic differences between the same recordings at different sampling rates. You can hear this for yourself if you download 2L's free special bit-rate evaluation files from its Web site. The DAC II made it all too clear, however, that simply raising the frequency and bit rate do not, by themselves, increase sound quality and they can be a real rip-off at prices that almost beg for audio piracy.

PerfectWave Memory Player

Turning to the technical side, the easiest product to review is the PerfectWave Memory Player that sells for \$3995. This is a CD and DVD (not DVD-A) transport with a range of digital outputs, including a special I²S connection to provide the best possible sound quality into the PerfectWave DAC II. The Bridge is a slide-in board that allows you to connect the PerfectWave to a network (wired or wireless) to decode streaming audio. You

can find all of the tech specs on the PS Audio Web site, but I asked Paul McGowan, the head of PS Audio to try to put its advantages and features in simpler terms and he came up with the following explanation:

"Put in a CD, start to play a track. As it is playing, press the eject icon and remove the CD or DVD. It will continue playing for up to about 30 seconds without the disc in. You can even remove it and put it back in and it'll carry on without hesitation.

"Why does this matter? Because every CD player that isn't a memory player is basically streaming off the disc directly and this means two things: The player must use predictive error correction on the fly, and the clock, which eventually runs the DAC, is not fixed (and cannot be fixed) and therefore jittered. Only a fixed, low-jitter clock will give you the zero-jitter results you want. CD transport clocks must be variable because the data coming off the disc in real time is varying in speed by many parts per million faster and slower—otherwise you would have data under-run and over-run.

"In the PWT Memory Player that is never an issue because you are never streaming directly from the disc. Instead, the data are taken from the disc and placed into a large buffer called the Digital Lens. It is large enough to make up for any over-run or under-run situations and therefore can be outputted by a fixed, low-jitter clock. Add to that our I²S output and you have a jitter-free transport.

"Lastly, error correction: Because of the built-in Digital Lens, we have the ability to read many times to get it right. This is the same method used when EAC [*Exact Audio*

Copy, a CD ripping program] is incorporated to rip a CD with perfection not using predictive error correction. The PWT can read up to 80 attempts to get a valid block comparison of the data before going to the next block. Once a perfect match is achieved, the approved data are sent to the memory buffer and the next block of data is read. This read-many-times error correction method is only possible with a memory player."

Sound Quality of the PerfectWave Memory Player

I used the XLR and coax digital outputs of the PerfectWave Memory Player into a wide range of DACs, including top of the line products from EMM Labs and Meridian. I used both test CDs and a wide range of music on both CD and high-sampling-rate DVDs, including the superb DVDs [*the HRx format that stores high-res WAV files on DVD*] from Reference Recordings and some 192/24 direct copies of masters from a friend who records music professionally. I got sound quality equal to the best competing transport outputs I have heard at any price, although I scarcely can claim to have surveyed anything like the full range.

Accordingly, I recommend the PerfectWave Memory Player on an "as good as I've ever heard," and a "perfect match for the DAC II" basis. I also like the fact it can download the album cover, and there is much to be said for the ability to play high-resolution WAV files directly from DVD if they ever are marketed in any numbers.

The sound of the CD transport of my EMM Labs XDS1 was as good with CD, however, and

SPECS & PRICING

PerfectWave DAC II

Inputs: Two I²S over HDMI, one USB, one TosLink optical, one coax S/PDIF, one XLR AES/EBU, one optional Ethernet

Outputs: One RCA, one XLR balanced

Resolutions supported: 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4 kHz, 192kHz, 32-bit asynchronous all inputs

Dimensions: 17" x 4" x 14"

Weight: 22.4 lbs.

Price: \$3995

PerfectWave Memory Player

Inputs: One Ethernet, one DC power trigger, one RS232 control

Outputs: One XLR AES/EBU, one coax S/PDIF, one TosLink optical, one I²S over HDMI

Formats supported: CD Red Book, DVD WAV up to 192kHz 24-bit

Dimensions: 17" x 4" x 14"

Weight: 22.4 lbs.

Price: \$3995

Network Bridge

Price: \$799

PS AUDIO

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EQUIPMENT REVIEW - PS Audio PerfectWave DAC II, PerfectWave Memory Player, and eLyric Music Player

digital streaming out of my computer was as good in listening to stored CDs using the DAC II and the PS audio eLyric music system. My Sooloos Control 15 output was also as good with CD, and the sound of CD using the digital output of an Oppo player into the DAC II came close. I'd buy the Memory Player if I had the money, but the sonic differences are usually small, and I've found that the different sound character of different DACs often completely masks the difference in the sound of digital transports unless I use a defective CD.

PerfectWave DAC II

The PS Audio PerfectWave DAC II is a different story. My reaction to the original PerfectWave DAC was "very good but scarcely outstanding" in that it did not provide a solution to the problems I still heard in playing back my recordings and favorite music on most other top digital front ends. As should be clear from my previous praise, however, the DAC II is an outstanding buy, even at \$3995, and is one of the most musical front ends available at any price. It also can handle 24/192 hi-res recordings with ease, is a full digital preamp with a volume and balance control, and has both RCA and XLR outputs

From a practical viewpoint, the PerfectWave DAC II is capable of giving you a musical streaming and storage system using eLyric that allows you to use your computer and any hard drive to store your music, as well as access to a world of digital "radio" stations via Internet Radio. You can use an iPad as a smart control device, and your computer to edit the metadata on your music library.

You can read your own way through the technical data on the PS Audio Web site, but I again asked Paul McGowan to provide additional detail to help you understand both the design rationale behind the DAC II and the reasons for its sound quality.

"The original goal of the PWD was to build a new class of product in a crowded world of traditional products left over from the CD world of Red Book audio—some great but none addressing the brave new world approaching of high-resolution network-based media and beyond. The world would soon need something entirely new, a product we call a Media DAC, and the PWD showed the high-end community where it needed to go—and continues to do that today.

"The PWD was a state-of-the-art DAC differentiated by several new concepts that created this new class of product: high-resolution audio, jitter-free performance without the use of a sample-rate converter, and two new jitter-free high-resolution inputs—i²S through HDMI and TCP/IP over Ethernet. The sonic advantages of these three radically new concepts would be apparent quickly when coupled with our 20 years of knowledge of how to build DACs and analog output stages.

"Our first step was to design a state-of-the-art DAC. To accomplish this we divided the innards into three separate disciplines: digital input board, analog output board, and power supply. Digital inputs are tricky devils and need to be handled with a lot of care and respect. One of the core tenants of PS digital products is our attention to the details when it comes to managing and routing digital signals

before they are converted to analog. On the Mark II digital input board we focused on three primary areas: power supply—there are 11 individual low noise/high-speed regulators on the digital input board alone; low-noise, low-jitter signal-travel—we use analog gates and switches throughout all digital audio paths eliminating the inherent jitter and noise caused by traditional saturated logic gates; and timing—the PWD is asynchronous through the use of multiple low-jitter low-noise fixed clocks and intelligent buffers throughout the digital signal path.

"Once you get a proper low-noise, low-jitter signal available for decoding and conversion to analog, the majority of sound quality issues are all left to the DAC and the analog process at the output. Over the years we have learned that even the best DAC chips in the world sound great only if coupled to output analog filters and amplification chains that enhance and complement the DAC chip's strengths and weaknesses. Designing such analog stages is a complicated dance that can only be achieved through careful listening and years of empirical design experience.

"The last step is the PerfectWave Bridge and its associated eLyric Controller and eLyric Server, the components of which form the final leg of the Media DAC category we introduced. All digital-audio schemes require the same four basic elements: a player, controller, server, and source. Even the traditional CD player has the same requirements, they are just built into the CD player because of its mature status in development and not quite so apparent as separate elements—but they are there. The

infancy of streaming audio in the high-end—and the resulting disparate immature elements that need to be cobbled together to make it work—is what blinds us to the similarity in technological requirements.

"The Bridge was one of the very first of its kind. Simultaneously with the launch of the Bridge, only Linn Audio had a product that could stream high-resolution audio (high-resolution defined as 96kHz and above)—and even today, there aren't many products and system out there that fully support 192kHz/32-bit audio. The Bridge is rare among those that can.

"To make sure the Bridge provides the expected level of performance, convenience, and sound-quality expectations our customers (and we) have, it was necessary for us to design and supply at least two more of the four necessary elements, the controller and the server. These products are part of our software services called eLyric."

OVERVIEW

The complete PerfectWave system comprises the PerfectWave Memory Player, PerfectWave DAC II, PerfectWave Network Bridge (a slide-in card for the DAC that turns the system into a network-connected music server), and eLyric server software. Together, the PerfectWave Music Group is capable of playing back bit-perfect high-resolution digital audio from hard disk, USB flash, NAS, the Cloud, CD, and DVD media. Audio data up to 192kHz/32-bit can be delivered to the system via WAN, LAN, i²S, S/PDIF, USB, and AES/EBU.

EQUIPMENT REVIEW - PS Audio PerfectWave DAC II, PerfectWave Memory Player, and eLyric Music Player

I am not endorsing Paul's comments. I lack the technical and manufacturing expertise to do so. It should be clear to any reader of TAS that Boulder, Meridian, EMM Labs, and other top DAC designers and manufacturers make different choices, but it should be equally clear that these choices really matter. At a minimum, they illustrate in depth just how complicated getting the best sound out of digital equipment really is, and why taking a high-end approach is so important.

As for practical details, I had no problems in using the DAC II, no glitches in linking it to other digital transports, and no problems in hooking it up to my home Ethernet system. Break-in was minimal, although it did improve slightly in sound quality over time. I did find the front-panel display and controls to be a bit counterintuitive, but I also found this to be irrelevant; the remote control is self-explanatory and very easy to use.

More importantly, I found the DAC II had a sonic advantage I did not anticipate. It has both a volume and a balance control. As long as the gain is set above the halfway mark, the digital volume control does not affect sound quality, and its impact was minimal even at lower volume settings. Moreover, the balance control can be set with extreme precision, and used to help lock in imaging and soundstaging from the listening position with ease. In short, the DAC II can act as a full digital preamp.

This won't help analog fans—at least until someone makes a truly neutral phono-to-digital preamp. It does, however, allow you to eliminate the preamp and at least one set of interconnects, and this really does make a

difference.

It will scarcely come as a shock to any experienced TAS reader that everything you put into the system has a coloration. This coloration can be extremely low with equipment as good as the Pass XP-20 preamp or the new EMM Labs Pre-2 preamp, which is one of the most transparent units I've ever heard. The same is true of using an extra set of top-of-the-line AudioQuest and Kimber interconnects. Taking the preamp and a set of interconnects out of the chain of components, however, did provide slightly more detail and better low-level contrasts. The DAC II is one of the few DACs that allows you to do this, which also makes it a special bargain to anyone who does not need phono. You also can spend a lot more on a DAC or the rest of your system if you don't have to buy a preamp.

eLyric Music Management System

The DAC II and its Bridge allow you to use the DAC II as part of a full computer-music system. This capability is critical in today's high-end world. I could not recommend the PerfectWave DAC II and PerfectWave Memory Player if they did not provide the ability to load and manage a large collection of music on my computer system.

In fact, I now regard any DAC or expensive CD player that does not have such features as a museum piece. There is a case for keeping your existing CDs until it is clear that some better way of loading them onto your computer isn't in the offing, but there is no case for buying a digital front end that does not provide the option of streaming your music, of being

able to use your DAC in a carefully integrated computer-music storage system, and of being able to manage your music with an iPad or similar device.

I don't have the space to get into all of the features of eLyric. Once again, your can search it out on the Web. The practical punchline is that a combination of the DAC II, eLyric, and a control device like the iPad can manage an extremely large music collection with ease. I used it with a library over 9000 CDs, DVDs, and downloaded "albums" on a regular 4TB hard drive.

The system provided easy setup and was consistently reliable. However, eLyric is still evolving in some respects. Minor problems did include a few false identifications of the "cover art" to given "albums," some rare dropouts of given bands on recordings with really bad metadata, and infuriating pop-up instructions for eLyric that I could not print out or turn into PDFs.

The ability to edit the metadata on classical and older recordings was good, however, and the eLyric is designed so that reviews and background data on the recording become available in a number of cases. (This editing ability is crucial with large collections.)

If you are serious collector, the metadata for many recordings are so bad that you are going to do a lot of editing to store your collection in ways where you can easily retrieve them and use your entire collection with maximum flexibility. If you cannot edit the metadata easily, you will face a particularly serious nightmare in properly storing recordings of opera and on multi-disc sets. This, however, is the fault of

an incredibly negligent recording industry. No storage system can correct for the large number of digital recordings with missing or false metadata, and the fact I have yet to find a single major label that seems to check its metadata with any care or consistency.

The benefits of storing your music also massively outweigh the inconveniences. eLyric, Sooloos, and the other better music storage-and-control software offer you incredible ability to search by conductor, orchestra, composer, and type of music once you do store your collection. There is no risk of physical damage if you back up your collection once you store it, and you not only can instantly access your entire collection and create your own music collections for background listening, you can become an instant "musicologist."

You can compare performances down to listening to individual movements or key songs and passages with increased ease once you have organized your collection to taste. Throw in instant access to much of the world's history of recorded music on-line in anywhere from 44.1k/16-bit sampling up. (It is all too clear that CD's future is limited. In fact, the sooner CD dies, and is replaced by hi-res on computer, the better!)

Summing Up

To go back to where I began, I have no hesitation in recommending the PS Audio PerfectWave DAC II and PerfectWave Memory Player as some of the best-sounding and most functional high-end equipment I've reviewed. But there are some tradeoffs involved. The eLyric music storage-and-streaming system is

EQUIPMENT REVIEW - PS Audio PerfectWave DAC II, PerfectWave Memory Player, and eLyric Music Player



fully functional, but its features are still being revised. The PerfectWave Memory Player does play hi-res WAV files directly from DVD but does not play DVD-As or SACDs. The preamp features of the DAC II make it an excellent digital preamp as well as a DAC, but it has no analog input for phono, and PS Audio is just beginning to think about a digital phono front end.

Moreover, if price is no consideration, I would still prefer the ergonomics of my Sooloos system. I use the Sooloos 15 with the EMM Labs XDS1 as a DAC as my primary reference. This is, however, an extremely expensive system, and the sound quality of the PerfectWave DAC II and PerfectWave Memory Player using eLyric comes very close, and is sometimes better with hi-res recordings.

At the same time, PS Audio PerfectWave DAC II is so great an improvement over the original DAC that it highlights the fact that digital front ends, software, and firmware

are evolving so fast that no reviewer can be sure that the product he or she reviews isn't improved by the time the review is printed, and there is no way to firmly know how to rank a given digital front end against the others.

The key point from a consumer viewpoint is that PS Audio PerfectWave DAC II and PerfectWave Memory Player are superb sounding products. They demonstrate that the days when CD dominated digital music, and digital sound was "impure and imperfect forever," are long over. I would make listening to these units an essential part of buying a digital front end at anywhere near their price range—or even at prices twice their cost or more. **tas**

Analog ...



Or Digital ...



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Bel Canto mLink, uLink, and REF Link USB Converters

Three Compelling New Solutions for Computer Audio

Steven Stone

When I reviewed the Bel Canto DAC 3.5 VB in Issue 216 I found it to be an outstanding full-featured DAC/preamplifier that only lacked a USB interface. Bel Canto's thinking was that USB interface technologies were advancing so rapidly that any USB solution included in the DAC 3.5 VB would soon be eclipsed by the next generation of external USB interface devices. So Bel Canto offered an external 96/24 USB converter.

During the intervening time period, Bel Canto's thinking was proven correct—USB interfaces have continued to improve—and now that the technological dust has settled somewhat, Bel Canto has introduced three separate USB interface boxes. While they all share the same core design, the three boxes differ in interface options and power-supply implementations.

Bel Canto's least-expensive USB interface device is the \$375 mLink, which has a USB input and a lone BNC-terminated S/PDIF output. Like all the Bel Canto USB converters, the mLink supports up to 192/24 PCM via USB 2.0. The \$675 Bel Canto uLink is also USB buss-powered and includes an AT&T ST-Type glass optical output as well as a BNC S/PDIF. The top-of-the-line \$1495 REF Link is the only Bel Canto USB device that uses a dedicated low-noise external power supply and adds an AES/EBU output in addition to a BNC S/PDIF and ATT glass optical.

Both the mLink and uLink share the same size enclosures, and except for the differences in color (the mLink is black and the uLink is silver) and outputs, the two units appear identical. Since they both get their power from USB and weigh well under a pound, they are ideal for someone looking for a completely portable USB interface. The REF Link is substantially larger and has the same footprint as Bel Canto's other half-width components. The Ref Link also has a knob that lets you change the display from bit-rate to firmware version to off. Due to its size and integral AC power supply (the mLink and uLink are powered through the USB buss), the REF Link is the only Bel Canto USB box that is not readily portable.

Shared and Proprietary Technologies

After spending some time with the Bel Canto units I had some technical questions for John Stronzer, Bel Canto's designer. My first was how much technology was common to all three devices. According to John, "The 500MHz USB processing core daughter-card is shared on all three Links as well as the S/PDIF output circuitry. The mLink and uLink are very similar in sharing buss power and overall power-supply architecture. The real difference is in the quality of the clocks. The mLink uses Low-Phase-Noise clocks, while the uLink uses the new Ultra-Low-Phase-Noise clocks. The REFLink also uses Ultra-Low-Phase-Noise clocks and adds further isolation and low-noise internal power supplies, plus

galvanic isolation between the USB processing core, the clock, and output electronics. No power is drawn from the USB buss."

The Bel Canto Web site has several technical papers and FAQs about the USB Links. The published graphs show exactly how low-noise Bel Canto's clocks can be. The three Bel Canto USB boxes also meet USB 3.0 specifications.

The Sonics Inside

The primary issue for these USB boxes (or any new component) is whether they deliver superior sonics compared to other similarly priced solutions. I found the answer depended as much on the DAC used with the Bel Canto uLink, mLink, and REF Link as on the devices.

I used the Bel Canto USB converter boxes in four different setups for this review. The first was based around the April Music Eximus DP-1 DAC/pre. Since it has two S/PDIF inputs I could hook up two different USB converter boxes and do rapid, real-time, matched-level A/B comparisons. The second setup utilized Bel Canto's DAC 3.5 VB, which also has provisions for two S/PDIF inputs (as well as AT&T glass optical). The third DAC/pre I used was the Wyred4Sound DAC 2 because it has an I²S HDMI digital input. This allowed me to use the Empirical Audio Off-Ramp 5's lowest-jitter output. Finally I tried a NAD C 390DD digital integrated amplifier to see how USB converters affected a direct-digital amplifier.

The first thing I wanted to do was compare the various Bel Canto USB boxes to each other, but that was not as easy as I'd hoped. Since they share the same driver, when you connect more than one Bel Canto USB converter to a Mac, the Mac defaults to the most recently plugged-in device. To A/B two Bel Canto boxes I had to unplug and then re-plug their USB cables, which took too much time for rapid comparisons.

During longer listening sessions using the new

EQUIPMENT REVIEW - Naim Audio SuperUniti "All-in-One Player"

ProAc Tablette Signature monitors I felt that the REF Link consistently delivered the best sonic results, especially on 192k material using its AT&T optical connection. The REF Link's soundstage had an extra dollop of solidity and edge definition when compared to its siblings. I also felt the REF Link delivered a blacker, more silent background.

When I compared the uLink with the mLink S/PDIF outputs in matched-level listening tests through the Eximus DP-1, I was hard-pressed to hear much difference. But when I used the uLink's AT&T optical connection tethered to the DAC 3.5 VB, differences did emerge. The uLink's optical connection provided depth recreation and image specificity that almost equaled that of the REF Link. If you have a DAC with an AT&T optical input I'd recommend gravitating toward the uLink's AT&T glass connection. If your DAC only has S/PDIF, the mLink remains the most cost-effective high-performance option.

I compared the Bel Canto's least expensive box, the mLink, with the Musical Fidelity V-Link USB converter (which has been replaced by the V-Link II). While the V-Link still sounds quite good, the mLink was simply better in every way. The mLink had superior focus, a slightly larger soundstage, and a more lively dynamic presentation. In comparison the V-Link lacked a bit of life, giving it a less involving character.

Since I got my first copies of Pure Music and Amarra playback software for the Mac, one of my standard tests for new hardware has been to compare the sound of stock iTunes with the sound of Pure Music and Amarra. Through the Bel Canto USB links the improvements wrought by both Pure Music and Amarra were quite ob-

vious. Regardless of which DAC/pre they were hooked up to, all the Bel Canto USB devices' sonics improved when using Pure Music or Amarra. Depth, image solidity, soundstage focus, and low-level detail were all better than stock iTunes.

I spent the majority of my listening time with the Bel Canto REFLink, comparing it to my current reference, the Empirical Audio Off-Ramp 5 with a Short-Block USB dongle. And as I discovered during the review, the "best" USB solution depended on which DAC the USB device was attached to and which digital interface methodology was used. For all my A/B tests I used identical 3-meter lengths of AudioQuest Carbon USB cable between my Mac Pro and the USB converters and identical lengths of Wireworld S/PDIF cable between the USB converters and the DAC.

For my first comparison I used the April Music Eximus DP-1 DAC/pre and connected the Empirical Audio and Bel Canto USB devices via S/PDIF. After several consecutive days of listening I was unable to discern any noticeable sonic differences between the two USB converters. Both delivered slightly more precise soundstaging and imaging than the DP-1's own USB interface, but I could not consistently distinguish one from the other in "blind" tests.

Next, I replaced the DP-1 with the Bel Canto DAC 3.5 VB. Once more I had two S/PDIF inputs for A/B comparisons, as well as Bel Canto's AT&T glass optical connection. Once more, during blind comparisons between the Empirical Audio Off-Ramp and REF Link using the S/PDIF, I could not reliably tell one from

SPECS & PRICING

mLink

Input: High-speed USB type-B receptacle

Output: Coaxial S/PDIF on BNC 75 ohms

Supported sampling rates: 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, and 192kHz

Supported word lengths: Up to 24-bit
Compatibility: Native MAC USB 2.0 compatible on OSX 10.6 and later, custom Windows USB 2.0 driver

Power Requirement: USB Bus 5VDC

Dimensions: 4" x 1.2" x 4.75"

Weight: 1 lb.

Price: \$375

uLink

Input: High-speed USB type-B receptacle

Output: Coaxial S/PDIF on BNC 75 ohms, LightLink ST Fiber

Supported sampling rates: 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, and 192kHz

Supported word lengths: Up to 24-bit
Compatibility: Native MAC USB 2.0 compatible on OSX 10.6 and later, custom Windows USB 2.0 driver

Power Requirement: USB Bus 5VDC

Dimensions: 4" x 1.2" x 4.75"

Weight: 1 lb.

Price: \$675

REFLink

Input: High-speed USB type-B receptacle

Output: Coaxial S/PDIF on BNC 75 ohms, balanced AES on XLR 110 ohms, LightLink ST Fiber

Supported sampling rates: 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, and 192kHz

Supported word lengths: Up to 24-bit
Compatibility: Native MAC USB 2.0 compatible on OSX 10.6 and later, Custom Windows USB 2.0 driver

Power Requirement: 120VAC/60Hz or 240VAC/50Hz set internally

Dimensions: 8.5" x 3.5" x 12.5"

Weight: 14 lbs.

Price: \$1495

ASSOCIATED EQUIPMENT

Source Devices: MacPro model 1.1 Intel Xeon 2.66 GHz computer with 16 GB of memory with OS 10.6.7, running iTunes 10.6.3 and Amarra 2.4.3 music playing software, Pure Music 1.85 music playing software, and Audirana Plus 1.35 music playing software
DACs: April Music Eximus DP-1, Wyred4Sound Dac2, Empirical Audio Off-Ramp 5, Bel Canto DAC 3.5 VB, NAD C

390 DD digital integrated amplifier
Amplifiers: Parasound A23, Bel Canto M-300, April Music Eximus S-1, NAD C 390DD
Speakers: Aerial Acoustics 5B, ATC SCM7s, Silverline Minuet Supremes, ProAc Tablette Signatures, Role Audio Kayaks, Velodyne DD+ 10 subwoofer
Headphones: Sennheiser HD 600, Grado RS-1, Ultimate Ears Reference Monitors, Beyer DT-880 (250 ohm), Beyer DT-990 (600 ohm), Audio-Technica ATH-W3000ANV, HIFIMan RE-272 in-ear monitors, Audio-Technica AD-900, Audio-Technica A-700, Sol Republic Tracks HD, B&W P3, Etymotic Research ER-4P, Shure SRH-1440, Stax SR-5, Stax Lambda Pro, Stax SRM-1 Mk II headphone amplifier
Cables and Accessories: Wireworld USB cable, Synergistic Research USB cable, AudioQuest Carbon USB cables, PS Audio Quintet, AudioQuest CV 4.2 speaker cable, AudioQuest Colorado interconnect, Cardas Clear interconnect, PS Audio PerfectWave i2s/HDMI cable, Crystal Cable Piccolo interconnect, and Audioprism Ground Controls

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the other. But when I compared the Rifling's AT&T optical with the Off-Ramp's coaxial I could consistently hear differences between the two converters. The AT&T glass optical input rendered depth more convincingly with greater image solidity and dimensionality than the either unit's S/PDIF.

The last conventional DAC/pre I tried with the Ref Link and Off-Ramp was Wyred4Sound's DAC2. On their S/PDIF connections both USB boxes once more I could not reliably identify which USB converter I was listening to. But when I connected the Off-Ramp 5 via its I²S HDMI input I noticed a change that noticeably increased the Off-Ramp's fidelity. Through I²S the Off-Ramp had a slightly increased image size, as well as greater solidity. Also when I used the I²S' connection with the Off-Ramp, my own live 192/24 concert recordings sounded more relaxed with a better sense of individual harmonic textures and greater spatial cohesion.

The last system I used for A/B comparisons was the NAD C 390DD digital integrated amplifier. Once again I compared the two units' S/PDIF feeds and once again was unable to tell the two units apart during blind listening sessions. But I could readily tell the difference between them and the NAD's own internal USB connection. Both the Empirical Audio and Bel Canto USB were better.

USB Made Simple?

So what sonic conclusions could be drawn from all this listening? The changes and sonic improvements wrought by a USB converter are not merely a function of the device, but also of how it interacts with the DAC that

it is connected to. I obtained the best sonic results from the Bel Canto REF Link when it was coupled to Bel Canto's own DAC 3.5 VB via its AT&T glass optical connection. The only situation where the REF Link failed to equal or surpass the Empirical Audio Off-Ramp 5 was when the Off-Ramp 5 was connected to a Wyred4Sound DAC 2 via its I²S connection. In both situations when one of the USB converters sonically excelled, it was because it was hooked up via its "best" connection to a device that supported that kind of connection.

Three Choices

With the introduction of the mLink, uLink, and REFLink, Bel Canto has successfully added the missing parts to create an all-Bel Canto 192/24-capable computer-audio system. If you already own a Bel Canto DAC/pre equipped with AT&T glass optical, adding a uLink is almost a no-brainer way to upgrade your system's sonics. For Bel Canto DAC 3.5VB owners, the REF Link's AT&T glass connection makes for an exceedingly synergistic combination. Even if your DAC is limited to AES/EBU or S/PDIF inputs, the Bel Canto Links can deliver a low-jitter stream that should improve the sound from all computer-audio sources. **tas**



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Plinius Tiki Network Audio Player

Excellent Sound, Drop-Dead Looks

Vade Forrester

Computer-audio music files are the hot topic in audio magazines these days. To listen to this form of recorded music, you'll need two items: 1) a server, which displays the music in your collection, lets you pick which music you want to listen to, and then plays that music for you; and 2) a digital-to-analog converter, or DAC, which converts the digital PCM stream from the server to an analog signal that your amplifier can handle. Like most anything in audio, there are a variety of ways the server and the DAC can be implemented. One area that has several possible configurations is where your music is stored. Some servers store it on internal hard-disk drives, some store it on solid-state drives which have no moving parts, some store it on external hard-disk drives, while others store it on a network, where it's available to all devices which can access that network. In its \$4495 Tiki server, Plinius has opted for the network-storage option, which is why they call the Tiki a network audio player.

Plinius cites its reasoning for picking network storage for the Tiki as isolation, clock configuration, simplicity of design, cable lengths, and multi-room capability. I would add that using network storage for your music files lets you load and retrieve those files from any device attached to the network.

Like any design choice, there are tradeoffs. First, you must have a wired Ethernet network in your home as well as Wi-Fi, and second, you need a network attached storage unit (or NAS for short) connected to your network. From Wikipedia: "A

NAS unit is a computer connected to a network that provides only file-based data storage services to other devices on the network." If you have to buy a NAS to use with the Tiki, it can be a sizeable additional expense, depending on the number of drives involved and the size of the drives.

The Tiki follows traditional Plinius styling motifs with a front panel that curves back into the sides of the unit. You can have any color Tiki you want as long as it's black or silver. Except for a large engraved "Plinius" label and a blue pilot light, the Tiki's front panel is blank. The Tiki's bright blue rear panel is fairly austere, too; there are left and right channel outputs (balanced XLR and unbalanced RCA jacks), a ground-lift switch, an Ethernet input, an IEC power connector, and the on/off switch.

The Tiki combines the player part of the server with an internal DAC. I suspect that many audiophiles will appreciate that configuration, since it eliminates the need for two separate components, as well as a cable to connect them. It also eliminates the need for a separate shelf on your equipment rack. There is no remote control; you'll need a tablet computer or smart phone for that. You probably have one or more of those already, so a separate remote would be a waste of money.

What's missing from the Tiki? For one thing, there's no S/PDIF or AES/EBU digital output. That means you're limited to the Tiki's internal DAC. I'm not suggesting it's not a quality unit, but no matter how good it is, eventually a better DAC will come along. Also, there's no volume control, so you can't use the Tiki to directly drive a power amplifier. And except for the RJ-45 Ethernet network input, there's no digital input, so external digital sources like a CD transport can't use the internal DAC. I find a CD transport still comes in handy for playing CDs brought by visiting friends, or when I want to play a CD checked out from our local library. If you want an optical drive, Plinius makes a device called the Toko, which looks like a Tiki with a slot-loaded drive. The Tiki has no indicator to tell you what digital sampling rate is being

played—useful, if not essential, especially if you have several copies of a song with different sampling rates. But maybe that's something only reviewers or other nut-cases would care about.

The Tiki will play music files in the following formats: FLAC, WAV (which it calls LPCM), AIFF, and MP3. Except for MP3s, files up to 192kHz/24-bit will play for all formats. The Tiki can't play DSD files, and while it's uncertain whether that format will become widely popular, a few servers do offer that feature. With a 100-ohm output impedance, the Tiki should be compatible with any well-designed preamplifier or integrated-amplifier input and capable of driving long interconnects. The Tiki uses the ThreadX real-time operating system. I had not heard of ThreadX; see *Wikipedia* if you want more information about it.

Physically, the Tiki is a full-width component, measuring 17.75" by 3.5" by 15.75", and its solid build feels like it weighs more than its 12 pounds. It should fit on virtually any equipment rack shelf and won't cause a hernia when you pick it up.

In my experience, a server's success depends largely on the quality of the user interface that controls its operation. Plinius offers an app for iPads called Arataki Media Controller, which is the Tiki's user interface. That means it shows you the music you've loaded on the NAS, lets you select which music you want to hear, and then creates a playlist of songs for the Tiki to play. At the suggestion of Frank Gazzo, Sales Manager of Plinius USA, I also downloaded PS Audio's eLyric Controller app for iPad. Although not written specifically to control the Tiki, eLyric does that nicely, providing a different interface than Arataki. Arataki costs \$7.99 from Apple's App Store, eLyric, \$9.99.

Setting Up and Using the Tiki

As I mentioned earlier, the Tiki requires a network attached storage, or NAS, drive to store music files. There's no way you can plug in an external USB drive or

EQUIPMENT REVIEW - Plinius Tiki Network Audio Player

use some other form of storage. The NAS must be connected to the Tiki via a wired network. For purposes of the review, Plinius USA loaned me a 1TB NetGear ReadyNAS Ultra 2 unit, already loaded with 273GB of music, and a NetGear wireless router. Since there are a number of other NAS's available, each with its own set-up process, I won't go into set-up details for this one. Setting up servers on a network can be very challenging, but the Tiki was almost plug-and-play. If you run into a snag, your Plinius dealer should be able to help you set up the Tiki. The NetGear NAS was so quiet I put it on a shelf of my equipment rack. Several visitors complained that the NetGear's blue pilot LED was too bright, but I figure that's what duct tape is for (no, I didn't try it). If I planned to have a NAS around on a long-term basis, I'd put it near my desktop computer in a separate room.

Once the network was established, I installed Plinius' Arataki remote control app. The first version I installed was version 1.1, which I later updated to version 1.2. Arataki's screen layout has two windows. The right window shows the cover art for each album installed on the NAS, so you can use it to select the music you want to play. To select an album, touch the cover art thumbnail and drag or flick it towards the left window, where a playlist is built. To play songs on the playlist, touch the Play button at the bottom of the left window, and Arataki will play the playlist in the order created. If you don't want to play an entire album, touch the cover art thumbnail and Arataki will show you all the songs on the album, and you can flick or drag the songs to the left window to create a playlist. There's a trash can icon in the left window; when

you're through with the playlist, touch the trash can icon, and the playlist is cleared.

Sounds easy, doesn't it? It was, but there were a few glitches. First off, not all of the albums on the NAS had cover art, and those that didn't had only a couple of musical eighth notes displayed as a cover art placeholder. There's no text to tell you what the album is. You have to touch the cover art placeholder thumbnail on the screen to view a song list, which also shows you text that tells you what the album title is and who the performers are. Since you can't tell what the album is, it will probably take several trial-and-error iterations to find the album you want to play. To make things tougher, Plinius has chosen a color scheme for Arataki's control buttons—black symbols on a dark grey background—that makes it very hard to see what function a button performs. And Arataki's screen layout wastes lots of screen space for cosmetic purposes, space that could make the information displayed easier to read. For example, there's a "+" border around the two windows that comprise the app. Even on a 10" iPad3 screen, I found it difficult to read Arataki's information. Also, some of the albums I loaded onto the NAS just didn't show up at all in the album view window. To be fair, this problem sometimes occurs with other servers' album views. Several servers provide folder views, which lets you view the files like a folder on your computer. This view shows all the music files on the drive. So I had a problem: To evaluate the sound of the Tiki, I needed to listen to music with which I was familiar, and, after I copied the music files to the NAS, some of those files didn't show up on Arataki's screen so I could select them.

eLyric to the rescue. Its user interface was more fully developed than Arataki's, on a par with other control apps I've used. Thankfully, eLyric has a folder view that let me see most, though not all, of the files I loaded onto the NAS. So I wound up using eLyric for most of my critical listening. I also found eLyric's operational controls more flexible, although that's a personal reaction. The eLyric app has a few quirks of its own; after you make a playlist and start it playing, when the iPad turns off its screen to conserve battery power, the playlist stops working. You'll need to set your iPad to never turn off its screen, which rapidly drains the battery. Be sure to reset the iPad to turn off after a short wait when you finish using it as remote control. Even though I use a PC with Windows 7 installed as one of my servers, I usually rip CDs to Apple's AIFF format. Unfortunately, eLyric didn't display the AIFF files I had uploaded to the NAS, so even though the Tiki will play those files, eLyric can't queue them up in a playlist. Arataki will display and play AIFF files—if it can find them.

I placed the Tiki on a shelf on my equipment rack. I connected the analog outputs of the Tiki's internal DAC to my linestage with Audience Au24 e balanced interconnects, and used an Audience powerChord e to provide power. The Tiki was already broken in, but for around 100 hours I played music over the network, with the Tiki driving the linestage.

Sound

The Tiki sounded harmonically rich and dynamically robust. Frequency response was extended. On Jennifer Warnes' CD *The Well*, the song "The Panther" has a variety of percussion

instruments that produce lots of high-frequency information. A system with overemphasized highs can sound a bit brittle on this piece. The Tiki presented the high frequencies with no peakiness or edge—no digital nastiness here. Argento's "For the Angel, Israfil," played by Eiji Oue and the Minnesota Orchestra on Reference Recordings' *30th Anniversary Sampler*, opens with delicate strikes on orchestral chimes, which were detailed without any edge; however,

SPECS & PRICING

File formats: AIFF, WAV, FLAC, MP3

Bit rates: 16 and 24-bit

Sampling rates: 44.1, 48, 88.2, 96, 176.4, 192kHz
PCM files

Outputs: Analog balanced (XLR) and unbalanced (RCA); no digital output

Inputs: RJ-45 Ethernet

Internal storage capacity: None

External storage: On network attached storage (NAS) drive connected via network

Optical drive included: No

Operating system: ThreadX

Remote control: Yes, via user-provided Apple iPad

Dimensions: 17.75" x 3.5" x 15.75"

Weight: 12 lbs.

Price: \$4495

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EQUIPMENT REVIEW - Plinius Tiki Network Audio Player

through the Tiki I could tell that each of the chime strikes was louder than the one before. I've never heard that effect before, so obviously the Tiki was capable of resolving very slight differences in microdynamics.

Remember when digital recordings of stringed instruments sounded somewhat bleached and threadbare? The Tiki belied that impression, sounding sweet and harmonically dense with stringed instruments. On Rachel Podger and arte dei suonatori's recording of Vivaldi's *La Stravaganza* (192/24 FLAC, Channel Classics), the sound of the strings was delicate and harmonically complete, disproving the notion that digital string sound has to be unpleasant.

The Tiki's bass had plenty of weight and detail. I've heard a few DACs with a bit more low-frequency extension, but the Tiki's low-frequency performance was solid. You don't normally expect to hear deep bass on early music recordings, but on Jordi Savall's music from the CD *La Folia* 1490-1701 [Alia Vox], the bass drum extends down into the mid-40Hz range. The Tiki did a respectable job of reproducing both the frequency extension and the detail of the bass drum. On the cut "Folia Rodrigo Martinez," it was obvious that the Tiki accurately tracked the continuously varying microdynamics, allowing the music to sound more expressive. You could tell the musicians were having a terrific amount of fun playing the piece.

Already on the NAS was a recording of The Tallis Scholars' "Allegri Miserere," which I assumed was ripped from CD Gimell's *Allegri Miserere*. This a *cappella* choral setting of *Psalms 51* has the singers arranged in two groups within a church. The larger main group has several

singers placed at the front of the soundstage, while a small solo group is located well behind the main choral singers. A good measure of a component's ability to reproduce depth is provided by comparing the main group of singers with the more distant solo group. Through the Tiki, the solo group sounded appropriately distant, but was a bit nebulous, slightly fuzzy. I've heard them sound slightly more focused.

Comparison

A computer-based music server uses a standard computer running a server program to perform the server functions. Music files may be stored on the computer's internal drive or externally. For comparison to the Tiki, I used a Hewlett-Packard dv7-3188cl laptop computer running 64-bit Windows 7 Home Premium, and JRiver Media Center music management software. JRiver can play WAV, AIFF, FLAC, ALAC, and a host of other PCM file formats, and can also play DSD files with a compatible DAC. My HP laptop is connected to my Audio Research DAC8 DAC via a superb WireWorld Platinum Starlight USB cable. So whereas the Tiki puts all the hardware (except the NAS) in one box, my server consisted of two boxes (the computer and the DAC) plus an expensive USB cable. Although JRiver has a beautiful user interface, the computer is tethered to the DAC by a relatively short cable, so I used a third-party iPad app called JRemote to remotely control JRiver. Unlike JRiver, JRemote lacks a folder view, but even so JRemote's album view displays almost every music file on the server.

JRiver can be adjusted to provide excellent sound quality. For some, that's a drawback: To

get the best sound quality, you have to adjust JRiver properly, whereas with a prefab server like the Tiki all the adjustments necessary for best sound have already been made, giving you a plug-and-play unit. The cost of my digital playback system, including the server, cable, and the DAC, was around \$6360. That's nearly \$2000 more than the Tiki/eLyric system, although that price doesn't include the cost of the NAS and the router, which you may already have. If you have to buy a NAS and a router, they could cost \$500-\$700, maybe more, depending on the capacity of the drives you choose.

Through the computer server, "The Panther's" high frequencies were hard to distinguish from the Tiki's. The Tiki made the microdynamic differences on "For the Angel, Israfil" more distinct, though; on my system, they sounded essentially equally loud. Remember when I said "I've heard a few DACs with a bit more low-frequency extension?" Well, the Audio Research DAC8 was one of those DACs. On "Folia Rodrigo Martinez" the DAC8 produced noticeably deeper bass with more slam, and just as much detail as the Tiki. Leading-edge transients seemed better defined by a slight margin.

I tried to compare the DAC8's performance on "Allegri Miserere," but I had replaced my 44.1/16 rip with a 96/24 FLAC version downloaded from Gimmell, which absolutely stomped the 44.1/16 rip. In my experience, one of the most audible advantages of a high-resolution music file is a better-defined soundstage, which the 96/24 version displayed in spades. It also had higher definition and clarity, so that I could better hear how each individual singer sounded. Finally, the high-res version's channel balance was better.

But although interesting, 44.1/16 vs. 96/24 is not really a fair comparison.

Bottom Line

Excellent sound, drop-dead looks, a quality built-in DAC—what more can you ask for? Well, in today's market, you can ask for and expect an easy-to-use user interface, and while serviceable, Arataki 1.2 doesn't measure up to other control apps I've tried. Arataki is constantly being upgraded and may someday be competitive with other remote-control apps, but for now it made using the Tiki harder than other servers I've tried. Fortunately, PS Audio's eLyric Controller resolved most of my objections to Arataki. It's weird to recommend part of a server system from one manufacturer, and another part from a different manufacturer, but if I didn't do that I would be unable to give the Tiki a strong recommendation. Besides, if Plinius recommends eLyric, why shouldn't I?

The Tiki itself sounded excellent. It had no trouble playing all commercially available PCM files I loaded onto its NAS, including 192/24 FLAC files. While I would prefer the upgradeability that a digital output provides, I suspect most people will appreciate that the Tiki has an excellent built-in DAC, which won't need to be upgraded for some time. Like all Plinius gear, the Tiki looks smashing—a welcome change from the typical box-with-a-thick-faceplate styling of most components. The Tiki will grace any equipment rack, looking right at home beside the highest-end equipment, providing high-resolution sound that's easy on the ears. I hope Plinius upgrades the Arataki Media Controller to make an all-Plinius system easier to use. **t88**



Astell&Kern AK100 and AK120 Portable Music Players

Finally, a Portable Player Fit for Audiophiles

Alan Taffel

You know how people these days mime that their heads are “exploding” over some revelatory fact or idea? How their hands poof outward from their temples, their lips purse, and their mouths faux-detonate the nearby air? That’s a deliberate signal. But recently I witnessed my 14-year-old daughter’s head “explode” involuntarily—but no less dramatically. Her eyes bulged, her jaw dropped, and her temples visually throbbed. What on earth could have elicited a reaction of such astonishment? The latest from Apple? A surprise Abercrombie gift card? No, it was the simple act of listening to a familiar song through the Astell&Kern AK120 portable music player.

Mind you, this revelatory incident took place without the benefit of a decent pair of headphones. Rather, my daughter had auditioned Jason Mraz’ “I Won’t Give Up” [Atlantic] through both the AK120 and her regular music player, an iPhone 4, with her usual, standard-issue Apple earbuds. Nonetheless, she found the difference between the AK120 and the iPhone obvious—and obviously unexpected. “I can hear instruments I never heard before!” she exclaimed at one point. “His voice sounds much more beautiful!” When I offered my Sennheiser HD600 headphones and she listened to the track through the AK120 yet again, she fairly swooned.

It’s worth noting that the AK120 had a hidden advantage in this impromptu evaluation. The version of the song on the iPhone was in the typical low-resolution, lossily compressed format that populates such devices. In contrast, the AK120’s version was in glorious 96/24. So this was not a true apples-to-Apple (ahem) comparison. But that’s beside the point. The takeaway here is the amazed and enthusiastic reaction to high-quality sound from someone who had never shown any interest in it—despite regular exposure—until it was delivered on her own turf.

I was amused to note that my daughter’s response to the AK120 was identical to that of any audiophile smitten with a new component. After hearing the Astell&Kern, she began admiring it from every angle, clutching it like it was ... well, the latest from Apple. She asked how much it cost and began scheming to find the money. Then, my biggest surprise: She started exploring the music, all of it unfamiliar, that A&K had thoughtfully pre-loaded onto the player—exactly the way we audiophiles go through our own collections and seek out new material just to play it through a new component. Kids, it turns out, may all be dormant audiophiles just waiting to be awakened by something like an AK120.

Fogey Liberation

I first heard the Astell&Kern AK100, which is the AK120’s lower-priced sibling, through some excellent headphones at this year’s New York Audio Show. As I wrote in my show report, the debut impressed me mightily. However, I added the usual caveat that I would have to evaluate the device under more controlled conditions before I could take its full measure.

What I failed to understand at the time was that that had already happened. Not until I was packing for a week at the beach, fretting about losing valuable review time and aware of the oncoming deadline, did I realize that a portable music player and a good set of headphones create their own self-contained conditions. This was a foreign thought. With more than a little incredulity, I grasped that I could review these devices pretty much anywhere—no reference system required.

And in the very next moment, another revelation: I can, for the first time, also simply enjoy music at the audio level I’m used to without being anywhere near my reference system. This was a liberating and bracing concept. We audiophiles tend to associate high-quality sound with particular systems in specific places. A high-end portable player untethers us. We can travel with high-end audio, exercise with high-end audio, listen privately to high-end audio. The generation that “grew up digital” takes such freedoms for granted; but for discriminating old fogeys, the concept of physical liberty without sonic compromise is new.

And so I threw my Sennheisers into my bag, stashed the AK100 and AK120 in the car’s glove box, and set off for the beach knowing that I could not only evaluate but savor high-quality sound in a house that contained nary a lick of audio equipment.

The AK100 vs. the Classics

Since I had already heard the AK100 through good headphones at a trade show, I knew it sounded superb.

EQUIPMENT REVIEW - Astell&Kern AK100 and AK120

The player had impressed me with true high-end qualities like timbral richness, airiness, detail, and pace. Still, as part of the review process, I wanted to put the AK100 in context. That meant comparing it to other players on the market. Both iPods and iPhones were obvious touch points, but based on long experience with my own current-generation iPod Classic, I knew any comparo was going to be a slam-dunk win for the AK. I wanted to present the AK100 with a rival that promised to be more challenging. And since portable music players with high-end aspirations are not (yet!) prevalent, I had to look elsewhere.

The answer came from an unexpected source: Apple itself. You see, once upon a time—before music was just another app on a phone—Apple actually cared about the sound of its iPods. So much so, that it went to the trouble and expense of putting genuine Wolfson DACs—the very same brand that graces these Astell&Kern players—into iPods. This was true up to and including the 5th generation of the iPod Classic (before there were Nanos or Shuffles). The Classic 5.5 was the last iPod to include the Wolfson chip. Samples of good-condition Classic 5.5s are readily available on eBay for roughly \$100. I bought one, and it took me about two seconds of listening to relegate my modern iPod Classic to storage. All indications were that the Classic 5.5 would be a worthy challenger to the AK100.

Before I turn to sonics, a few words about the relative aesthetics and functionality of the AK100 and the iPod/iPhone. In industrial engineering, the Astell&Kern sacrifices nothing to Apple. The AK100 is finished in

a black, finely-brushed aluminum case that screams luxury. True, the AK100 is thicker, heavier and larger than the latest waif-like iPods. Yet I find the AK100 easier to handle than those devices, as well as reassuringly substantial in the manner of a bespoke watch. The sensation of being in the presence of something special continues when pressing the AK100's buttons, turning its volume knob, or navigating the bright, instantly intuitive touchscreen. Once operations begin, that roomy screen becomes a font of information about the source material.

Functionally, the AK100 is best thought of as an iPod on steroids. Whereas an iPod maxes out at a tepid 48/16 resolution, the AK100 goes up to 192/24. And while recent Apple devices use an inexpensive Cirrus Logic DAC chip, the A&K employs Wolfson's costly new WM8740. As for formats, iPods and iPhones support AAC, MP3, Apple Lossless, AIFF, and WAV. The A&K handles all those, plus Media Monkey's APE, Windows' WMA, Xiph.org's OGG and, most importantly, FLAC. The latter means that a user can, for example, download a losslessly compressed hi-res album from HDtracks and transfer it directly to the AK100. Such transfers, by the way, are as simple as dragging and dropping selected music files to the player, which appears as an external drive when connected via USB to a PC or Mac.

With the ability to support hi-res material, a music player's memory capacity becomes critical. A 192/24 file is 6.5 times as large as a CD-standard 44.1/16 version, and many times more than that compared to MP3-like formats. The upshot is that, unless you commit the

sacrilege of dumbing down your music to MP3, 32GB on an AK100 won't go nearly as far as the same capacity on an iPod. The AK100 comes standard with 32GB of memory, and its two microSD card slots permit expansion to 96GB. Even so, users will have to be selective about what they load onto the player.

Users should be selective, too, about the headphones they pair with this player. Unlike the iPod and iPhone, the AK100 has a relatively high 20-ohm output impedance. (The AK120 has more typical 3-ohm output impedance.) This means that the sound of a particular set of headphones, depending on its own impedance characteristics, may be altered or even compromised by interaction with the player. Therefore, be sure to audition the AK100 using whichever headphones you intend to listen through.

Given the impedance situation, the true sound of the AK100 is virtually impossible to ferret out—at least without using an outboard headphone amp, which would be anathema. However, I compared all the assembled players using multiple headphones and my findings proved consistent from 'phone to 'phone, giving me confidence in my ultimate rankings. The headphones I used were: my own Grado Professional Series SR80; my aforementioned Sennheiser HD600; the ultra-portable, on-ear Sennheiser PX-100, which came courtesy of TAS writer Karl Schuster; and a set of the incredible Fostex TH900s, very kindly loaned to me by my local (D.C. Metro) high-end dealer, JS Audio. Ultimately, I did the bulk of my listening through the Fostex, which offered the highest resolution and the stoutest bass.

SPECS & PRICING

iriver Astell&Kern AK100

Display: 2.4" IPS touchscreen

Supported audio formats: WAV, AIFF, FLAC, ALAC, APE, MP3, AAC, WMA, OGG

Maximum sample rate: 192/24

Continuous playback time: Up to 16 hours

Memory capacity: 32GB (plus up to 2 x 32GB microSD)

Supported OS: Windows XP and up; MAC OS X 10.6.5 and up

Dimensions: 2.33" x 3.11" x 0.57"

Weight: 4.3 oz.

Price: \$699

iriver Astell&Kern AK120

Display: 2.4" IPS touchscreen

Supported audio formats: WAV, AIFF, FLAC, ALAC, APE, MP3, AAC, WMA, OGG, DSD

Maximum sample rate: 192/24

Continuous playback time: Up to 14 hours

Memory capacity: 64GB (plus up to 2 x 64GB microSD)

Supported OS: Windows XP and up; MAC OS X 10.6.5 and up

Dimensions: 2.33" x 3.5" x 0.57"

Weight: 5 oz.

Price: \$1299

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Irvine, CA 92606
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EQUIPMENT REVIEW - Astell&Kern AK100 and AK120

These headphones allowed me to hear every little difference between players, which is exactly what I needed.

Once I listened to the Jason Mraz piece, I immediately understood why Astell&Kern had included it on the players they sent me. This is an admirably clean recording, with perfect tonal balance. Bass has a solid thump, the all-acoustic guitars are ultra-clear, and Mraz's voice, while no great instrument, is recorded well enough for his earnestness to come through.

Unfortunately, the recent-generation Apple gear lived down to my expectations. Through the iPhone 4, "I Won't Give Up" is, shall we say, less than gripping. You'd never know how plump the bass is, because the iPhone's bass is wispy. You'd never discern any character to the singer's voice, because the iPhone renders it generic. You'd never know the dynamics swell, because the iPhone compresses them. Highs roll off before they get started. Forget about hearing details. Put it all together and the iPhone's rendition of this song is just plain boring. I did not bother listening to the iPhone any further.

Fortunately, the iPod Classic 5.5 turned out to be another matter entirely. This player restored all the detail, dynamics, bass, character, and life to the track. Simply put, the Classic 5.5 sounds darned good, and it spins out music that is far more engaging than its latest Apple counterparts.

Of course, on the Mraz track the AK100 slaughters the 5.5, since the A&K is playing back a higher-resolution version. The point is that the AK100 can play hi-res files, and the iPod can't. What does that capability amount

to sonically? In this case, the vocals take on a "right there" quality; bass is even fuller and tighter; and you can now appreciate the carefully assembled instruments in the overall arrangement. Finally, dynamics are improved to the point where the song is, at times, actually rousing. Clearly, this level of resolution—and the sonic and musical benefits that resolution entails—is one of the AK100's chief virtues.

I wondered, though, how the AK100 would measure up to the Classic 5.5 on a more level playing field—that is, with both tackling identical tracks at the same resolution. For that test, I selected Prada's lovely recording of Dvorak Serenades. The Classic 5.5, it turns out, delivers such music more than respectably well. Indeed, I found little to complain about sonically or musically. In regard to the latter, the 5.5 allows the instrumental interplay at the heart of these octets to come through.

The AK100 does sound better than the Classic 5.5 on these pieces, but in ways that initially seem subtle. What the Classic 5.5 lacks—and the A&K delivers—is the last degree of timbral nuance and dynamic inflection. The Classic is also afflicted with a mild digital haze that, while not overtly objectionable, does make listening a less serene experience. Furthermore, the AK100's dead-quiet background allows instruments and transients to stand out effortlessly, as if in bas-relief. Add up these subtleties and the sum is a not-so-subtle advantage. While the Classic plays well beyond modern iPod-gear, it cannot match the AK100's purity, ease, and authority.

In sum, the AK100 establishes itself as a superior player in not just one but two key ways. First, given material of moderate

resolution, the AK100 is unquestionably the higher-fidelity device. But the Astell&Kern takes another step by allowing the listener to enjoy higher resolution material. In my listening, this ability to support hi-res reaped benefits with everything from Keith Jarrett's solo piano to Led Zeppelin's thunderous rock to pop productions like Jason Mraz. Once you have held hi-res in your hands, you will never settle for less.

Sibling Rivalry

Now that we've established that the AK100 is a cut above the best iPod Apple ever made, let's find out if the nearly twice as dear AK120 tops it. The latter certainly has advantages in specs, componentry, and functionality. Internally, the primary difference between the two players is the AK120's inclusion of dual Wolfson DACs. In general, the use of multiple DACs provides greater linearity and lower noise. A&K claims significantly lower jitter for the AK120.

The flagship model also has more memory capacity; it comes with twice the AK100's 32GB as standard, and its microSD slots support higher-capacity cards. All told, the AK120 can hold 192GB of music—a key advantage over the AK100. All this additional componentry makes the AK120 slightly taller than its sibling. The AK120 also sports a snazzy leather case, a racy red stripe around its volume knob, and pegs that protect that knob.

There is really only one functional difference between the two units: The AK120 will play DSD files, while the AK100 won't. However, Astell&Kern has a history of incorporating

AK120 features in the AK100. For instance, at one point the AK120 was the only model that could be used as a USB DAC. However, in mid-review, Astell&Kern released a software upgrade for the AK100 that conferred upon it the same capability.

The decision, then, to spring for the AK120 boils down to two important features—more memory and DSD support—plus potentially better sound. To find out if the 120 delivers on that last promise, I first turned back to the now-familiar Jason Mraz track. As I compared the two players, I was furrowing my brow trying to detect differences. I ended up hearing two on this track (more on others), but they were obviously small in degree.

The first difference between the AK120 and the AK100 is that the former removes a very mild grain, especially from vocals. This is not to say the AK120 is quieter; both players boast wonderfully silent backgrounds. But the AK120 has greater purity. Although I dare say the AK100's mild deficit in this area would likely go unnoticed without an even cleaner point of direct comparison, the AK120's grain-free sound does make for even easier listening. The second difference this track makes apparent is in the bass. The AK120's is a hair fuller and better defined. Yet, again, without a great set of headphones, hi-res source material, and an A/B comparison, I doubt anyone would find the AK100's bass lacking.

To confirm these findings, I fired up a series of disparate recordings. The first was "Whole Lotta Love" from the terrific 192/24 version of Led Zeppelin II [Atlantic]. Let me state from the outset that both of these players rock out

EQUIPMENT REVIEW - Astell&Kern AK100 and AK120

with abandon, and that this track is a bracing experience through either. Other than that, the previous comments—less vocal grain and better bass on the AK120—fully apply, with two additions. There is an extended instrumental passage in the middle of this track that consists mostly of noises. As the passage begins, the dominant sound is John Bonham's cymbals. It is in the quiet moments between his cymbal taps that the AK120 conveys a sense of space that the AK100 lacks. Later in the passage, sounds swing from ear to ear—oops, I mean channel to channel. On the AK120, when the sound moves to one side, it moves far to that side, indicating superior channel separation and lower crosstalk.

Easing my way into orchestral music, I turned to Paul McCartney's *Kisses on the Bottom* [Hear Music], a superb hi-res recording of standards that I reviewed in a recent TAS "Downloads" piece. Once again, both players have the right stuff, rendering strings sweetly, almost caressingly. McCartney's voice has great intimacy; on "My Valentine," you can almost see the dew in his eyes. Still, the AK120's greater air and purity benefit the proceedings, particularly the strings. Further, the superior definition of the upright bass makes it easier to follow its line—and to a surprising degree.

Moving to classical music, I wondered if the AK120 could top the AK100's sensitive portrayal of the Dvorak Octets. It did, and in now-familiar ways: a greater sense of air and better bass. The AK120's timing is also a tick more precise than the AK100's, as can be heard at the opening of the first Octet, where

the strings should be metronomic.

The Final Grade

Assigning grades to each of these players seems an efficient way to convey their relative merits. The latest generation of iPods and iPhones, thanks to manifest sonic shortcomings, sonic shortcomings, earns a D—barely a passing grade.

The iPod Classic 5.5 is on a completely different level and has chops that allow real immersion in the sound and a real connection with the music. Still, it is a dated device, as evidenced by its less-than-pristine background silences. In the context of mainstream music players, the 5.5 earns an A. In high-end terms, it still musters a solid B. If you can't afford an A&K, you will hug yourself for spending a hundred bucks on one of these babies.

The Astell&Kern AK100 is very, very difficult to fault. Indeed, its subtle compromises come into focus only in direct comparison—using the highest-quality sources and headphones—to the AK120. Here is a player that brings true high-end performance to portable music. As such, I would feel churlish giving the AK100 anything less than a well-deserved A.

What, then, of the AK120? It is better than the AK100, though not drastically so. Yet the more you listen to it, the more addicted you become to its subtle benefits. If you can afford the tariff, the AK120 will reward your investment. This player deserves a higher grade than the AK100, though the differences do not justify a full grade jump. Conveniently, there is one last grade available on our scale. The AK120 gets an A+. *tas*



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3beez Wax Music Management System

Simple Things Should Be Simple

Andrew Quint

When a music lover of the audiophile persuasion decides to take the plunge into computer audio and organize a large collection of recordings, he chooses one of two basic approaches. The first is the “roll-your-own” method: Dedicate a computer (or part of one) to storing music files and get ripping/tagging/playback software such as JRiver, Media Monkey, MusiCHI, Foobar, MusicBee, or a host of others. This is clearly the economical course, even if the music lover decides to get a brand-new music-only computer. But there are hidden expenses and potential complications. Assuming that he’ll be employing lossless formats and that there are a sizable number of high-resolution downloads in his collection, he’ll probably need to purchase supplemental storage. And he won’t want to use the stock sound card in his new computer for D-to-A conversion. An audiophile-grade sound card or, more likely, a USB DAC or some other conduit to his processor’s converters will give superior sonic results.

The other tack is to buy a music server, a traditional audio component that packages hardware and software in one box. Theoretically, this method will be less trouble for the poor soul who just wants to listen to music rather than hone his IT skills. Olive, Meridian, Sonore—you know the names.

The 3beez Wax Music Management System represents the second approach, and it’s worthy of close consideration by anyone at all anxious about the leap into the breach. 3beez (as in the three B’s—Bach, Beethoven, and Brahms) is the current project of electronics industry veteran Jeffrey Barish. Barish is an MIT-trained electrical engineer who also had success as an architectural acoustician. His first job was at Fairchild Semiconductor designing integrated-circuit preamps and power amps; he also worked at Sound Technology, famous for a widely used distortion analyzer. Before 3beez, he founded and led another start-up, EuPhonics, that specialized in applications of computer technology to audio and electronic music. Barish comes by his audio design skills honestly: His father started NAD.

Jeffrey Barish is a record collector with broad interests who had been considering a music organization system even before the introduction of Apple’s epochal platform. “To the best of my knowledge, iTunes didn’t exist when I began thinking about this,” Barish told me. “Because of my computer background, I started planning a ‘home project’ that would realize the vision I had for a system that I, myself, wanted. It took some time before I was able to start working on it and by that time, iTunes did exist, though I made a conscious decision to ignore it. I wanted to come up with something that was ideal for my needs and I didn’t want to be prejudiced by what others had done. As the system developed, I began to show it to friends, all of whom reacted along the lines of ‘I want one for my own system!’ So I started thinking about the possibly of commercial application.”

A distinction should be made between Wax, which is Barish’s proprietary music-organizing software and the Wax Box, which is the commercial product in which that software is available. Together, they comprise the Wax Music Management System. You cannot purchase the

Wax software “engine” separately. “It’s conceivable that someday I’ll have a software-only product, but I don’t have it today largely because of issues of support. 3beez is not a large enough company to support a software-only product. Another reason is that my thinking in developing this product was that I wanted to offer something that was as close to turnkey as possible. That is, a user should be able to take the product out of the box, connect it easily to an audio system, and use it. There is no software to install or additional components to connect. There aren’t any more purchase decisions to make.”

The Wax Box is a compact component, built into a standard computer enclosure measuring 13.4" x 12.6" x 2.7". The case is so loaded to the gills there isn’t room for a pair of standard RCA outputs, and you’ll need a 3.5mm mini-plug-to-RCA cable if you want analog output from the Wax Box. The device’s CPU does generate heat and to avoid the need for a cooling fan and the noise issues that would entail, Barish employs passive cooling. His product has the expected fins on its enclosure but also a series of six copper pipes that transfer heat from the CPU’s environment to the outside world. The DACs installed in the Wax Box are Realtek ALC892s. While they do support sample rates up to 192kHz, Barish freely admits that they don’t provide “audiophile-level performance”—and wonders if that goal is actually realistic in a server. “Putting a DAC inside a box that is essentially a computer makes it difficult to provide good sound quality because there is a lot of electrical noise. You really want to have the DACs in a separate box. It’s an argument that I don’t want to have, so I’ve provided options. If you’re happy with the sound, great. Just use the analog output. If not, connect a USB DAC.” Which is what I did, more or less. I connected the Wax Box from one of its six USB outputs via a Halide Bridge to my Anthem Statement D2v processor to employ the better DACs in that excellent component.

Underneath the optical drive—the Wax Box slot loads from the front—are two 1TB hard disk drives (HDDs) and a single solid-state drive (SSD). Barish needed to use 2.5" drives

EQUIPMENT REVIEW - 3beez Wax Music Management System

instead of the more common 3.5" size because of the enclosure's smallish dimensions, but there were other concerns as well. "I was sensitive to issues of noise because this is a product that's going to live in a user's listening room," he told me. "I didn't want to have the sound of a mechanical device interfere with the enjoyment of music. The first thing I did to address that issue was to choose 2.5" drives. They have less mass and they tend to be a little quieter than 3.5" drives. They're carefully mounted in a box with a solid base using mechanical isolation to prevent the transmission of mechanical noise." The operating system is on the solid-state drive. "I included the SSD for two reasons," Barish said. "One is that it allows Wax Box to start up and stop more quickly so that it acts more like a standard audio product. The other reason is that it permits completely silent operation when playing. Wax, when you make a request for a recording, checks first to see if that recording is available in a cache on the SSD. If it's not there, it turns on the HDD with the sound archive long enough to transfer all of the files it needs off of it and store them in the cache on the SSD. It then turns off the HDD—it idles it. To any substantial degree, the only time you use the hard disk drive is when you're ripping and tagging. Otherwise, it's all SSD."

Barish uses 1TB hard drives because, as of this time, that's the largest capacity available in the 2.5" size. This will be changing (if it hasn't already), and Barish promises to use the highest-capacity 2.5" HDDs he can. The two HDDs hold identical data: Wax Box automatically backs up your music files once a day. "I decided to build the backup capability into the Wax

Box because many people are negligent when it comes to backups. I think almost everybody knows that you're supposed to do backups but my experience is that many people never get around to it. My fear was we might have a situation where somebody invests a tremendous amount of time ripping an entire collection and carefully entering all the metadata desired and then, because of a disk crash—over which I have no control—he loses everything. I highly recommend that you create additional backups, especially if you're so conscientious that you move your backups off-site. If your house burns down, you still have the data." Likewise, Barish is also watching out for you when it comes to software updates. If you leave your Wax Box on at night, they will occur automatically between midnight and 3 AM.

There are two ways for a user to operate the Wax system. Option 1—"Direct Control"—is simpler. After establishing an Ethernet connection for the Wax Box, you plug a monitor into either the DVI-D, D-Sub, or HDMI ports on the back of the unit and a keyboard and mouse into two of the USB ports. You could use this method permanently but most users will configure Option 2 to allow remote control from the listening position using a tablet, smart phone, or desktop system. The excellent 55-page user's manual (included in the Wax software—print it out and put it in a binder) explains clearly how to set up a "remote desktop viewer" with pretty much any device (an iPad and Android or Windows-based tablets, for examples.) Viewer applications—there are quite a few—range in cost from free (the Real VNC Viewer for Windows) to \$30 or so.

The heart and soul of the Wax Music Management System is the Wax software. How smoothly it works with all kinds of music is what makes Wax Box worth the \$5000 asking price (which is actually right in the middle of the pack for this kind of product.) Wax is based on the Linux operating system, both for economic reasons—no licensing fees—and because it's open-source software, which allowed the designer to "dive into the source code" when necessary. Barish carefully examined the way he interacted with physical media to devise a platform that's exceptionally intuitive to use. This is apparent the very first time you turn the thing on and encounter the uncluttered Graphical User Interface (GUI).

The central organizing principle for Wax is musical genre. In the left upper corner of the GUI, the user is presented with a list of options: Anthology, Chamber, Comedy, Film, Jazz, Opera, Pop, and so on. You can add your own genres. Some have sub-genres. For "Symphonic," you can parse the recordings as Baroque, Classical, Romantic, etc; for Pop, choices include Blues, Country, Electronic, New Age, Rock, and so on. Once you've clicked on a genre (or sub-genre), a list of recordings already in your library appears. For each genre, the identifying information—the "primary metadata"—is a little different. So, for "Symphonic," the recordings are described by three columns—composer, work, and conductor. For "Show," it's the musical, composer, librettist, and date (of the production). In a large collection, you might have a dozen versions of Beethoven's *Eroica* Symphony. Wax's presentation lets you quickly know what your options are and choose the version you want to hear.

Also prominently located on the GUI is a button labeled Mode. Clicking on Mode reveals four choices that direct you to everything Wax can do. Select lets you choose what you're going to listen to from the music files in your library. Play presents all of the metadata for the recording you've selected, including cover art. The Edit mode is used to add recordings or to modify the metadata of a recording already in the library and Config lets one engage various housekeeping functions—which codec to use when you rip, the status of updates, and many, many more options for advanced tweaking of the software's functionality.

It's in the Edit mode that the critical tagging process occurs. I'll emphasize Wax's performance with classical recordings because it's this

SPECS & PRICING

Drive capacity: Two 1TB drives (one for backup)

Interface: Direct Control with attached mouse, keyboard, and monitor or TV; Remote Control with VNC or RDP remote desktop viewer—available for tablets and smartphones (iOS, Android, Windows Phone) and for desktops (OSX, Windows, Linux)

Analog output: 3.5mm miniplug

Digital output: Four USB-2 ports; three USB-3 ports; TosLink; DVI-D; D-Sub; HDMI; RJ45

Dimensions: 13.4" x 12.6" x 2.7"

Price: \$5000

3beez

contact@3beez.com

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EQUIPMENT REVIEW - 3beez Wax Music Management System

material that presents the biggest challenge to music-organizing software, the area where the ID3 standard employed by iTunes fails most miserably. Several aspects are worth mentioning. First, entering the “work metadata”—the most basic identifying information about each recording—is facilitated because the prompts to complete blank fields differ from genre to genre. So, for “Symphonic,” you’re asked for the composer, work, and conductor as opposed to “Jazz,” where the requests are for “ensemble” and “title.” Additional work metadata fields can easily be added on the fly (Barish refers to this as “infinite metadata”) as you are processing a disc or download. Second, Barish has thought long and hard about where Wax should go on-line for information, choosing MusicBrainz as his primary source of metadata. The MusicBrainz database is curated, meaning that an editor has viewed the metadata submitted by a user and declared it reliable. Additionally, MusicBrainz has established standards for the manner in which the metadata is presented, which makes it possible for Wax to extract information about a recording—say, the conductor—and put it in the right place. FreeDB is Wax’s backup source for metadata—there’s information on a larger number of recordings, though that information is more likely to be inaccurate.

Third, Wax has a clever way of organizing the “track metadata”—the designations of the individual movements of a string quartet or the titles of the arias on an opera recording, for example. Say a recording of Puccini’s *La Bohème* has 40 tracks. You can highlight the 12 tracks of the First Act, hit the “Group” button that appears, and watch the 12 tracks collapse into a single line that can then be labeled “Act

I.” The same is then done for the eight tracks of Act II, the ten of Act III, and the ten of Act IV. Each act opens automatically to show the track metadata when you actually listen to the recording but, in the meantime, you don’t get a screen of track listings when you’re deciding what to play.

Barish recognizes that a collection is often best-served by taking a “work orientation” to cataloging classical music, as opposed to an “album orientation.” If a CD holds both Beethoven’s Fifth and Eighth Symphonies, you’ll want separate entries under “Beethoven” for each work. Working in the Edit mode, it’s a snap to specify “New Entry” for the two works as you’re cataloging them.

The workflow when ripping and tagging is very efficient. A CD is placed in the Wax Box’s front slot and the user hits the on-screen “Find CD” button. You decide which tracks to rip (all of them, usually) and click Rip and the four-to-five-minute ripping process begins. With ripping underway, you then turn to producing the desired tags and specifying the cover art from the choices Wax finds on-line. Before long, you’re completing the tags before the CD rip has finished. Very satisfying. In the Edit mode, Wax has you choose between “CD” and “File,” in terms of what you’ll be adding to the library. If it’s the latter, Wax helps you to navigate to wherever it is on your computer that you keep your downloads. Processing multi-disc sets is especially slick. Whether it’s a 4-CD recording of *Parsifal* or a 12-disc *Grateful Dead* box, as one disc finishes ripping, you simply click “Add Tracks” and Wax knows that the next CD coming belongs with the previous one(s). Happily, Wax

provides “gapless” playback, controlled on a track-by-track basis, so playback of *The Rite of Spring* or *Sgt. Pepper* doesn’t result in pauses between tracks.

Sonically, Barish has made design choices with two constituencies in mind—the record collector who doesn’t value sound quality to an obsessive degree and, well, those of us who do. Barish declares that he, himself, is no Golden Ear and rips his own CDs to Ogg, a lossy codec (M4A and MP3 are other alternatives with Wax.) As a result, Barish has had no problem fitting his own substantial collection onto Wax’s 1TB HDD. But Wax also lets one encode with WAV or FLAC (personally, I do not hear any difference between these two and see no reason to waste precious disk space on the former.) Likewise, listening to the Wax Box’s analog output—AudioQuest makes a decent cable for the purpose—falls short of the stellar sonic result achieved by connecting the 3beez product with the Halide Bridge to my Anthem. A well-made piano recording (Leon Fleischer’s *Two Hands*) sounded more dimensional, with more commanding bass, when the Anthem’s DACs did the conversion. But the Wax Box’s Realtek DACs are surely better-sounding than the stock soundcard in an off-the-shelf computer.

The Wax Box isn’t perfect, of course. It doesn’t do multichannel and some audiophiles will be disappointed by the relatively limited encoding options, specifically the lack of DSD-sourced codecs. Its storage capacity will strike some as limited, especially if large, losslessly encoded HD files are part of the mix. (An additional HDD can be easily connected to increase storage capacity.) But Barish is a man we need more



of in the burgeoning area of computer audio: a creative engineer who makes a real effort to understand the needs and IT capabilities of his potential customer base.

The above descriptions of the Wax Box’s operation barely scratch the surface of what it can do, and, in a way, that’s the whole point. There are layers and layers of functionality that are kept, unthreateningly, just out of view until you are ready to use them. You can create playlists (“Queues”), search for a composer or artist of interest, export files to a portable player, and accomplish the bulk import of music already resident on your computer with gratifying efficacy. A new user can start processing a large music collection effectively on day one: The Wax software is highly sophisticated yet unquestionably the easiest to learn in my experience. Jeffrey Barish makes this point. “There’s a well-known phrase in designing computer software: ‘Simple things should be simple; difficult things should be possible.’ There are many music lovers who are not audiophiles. They just love music—they just want to hear Beethoven.”

Point taken, Jeffrey. Mission accomplished. t85



EQUIPMENT REVIEWS

Integrated Amps with USB DACs

Micromega AS-400 Integrated Amplifier/Wireless DAC

A High Wire-Less Act

Neil Gader

What do you get when you combine an integrated amplifier, premium DACs, and a cutting-edge wireless network? Micromega calls it the AS-400. Based on the Micromega IA-400, a 200Wpc (400Wpc into 4 ohms) Class D integrated amplifier, the AS-400 raises the ante by adding the company's core wireless network connectivity, AirStream, to the package. Like the original stand-alone WM-10, the Airstream standard (Micromega calls it WHi-Fi) is based on Apple's iTunes software and AirTunes wireless transmission protocol. However the latest incarnation is an entirely different animal. It's been thoroughly revised in-house by adding three-stage R-core power-supply regulation, a custom-made 25MHz master clock to reduce jitter, superior Cirrus Logic CS 4351 24-bit/192kHz DACs, and a lower-noise analog section. All the user needs to supply is an Apple or Windows-based computer running iTunes music software. A Windows machine without iTunes will not connect to the AS400.

Visually the AS-400 is a home run. It sports a clean and direct front panel—its hefty volume knob has a nice action and is augmented only by the necessary input buttons plus dual mini-jacks for an iPod and a set of headphones. The solidity of the chassis and casework is impressive, and a marked improvement over the Micromega preamp/amp separates I reviewed in Issue 199. Like the IA-400, the AS-400 features a large blue fluorescent display, with easily readable, 7mm-tall characters that indicate input and volume.

Some may well ask: Do I need this level of network connectivity when I already have a wireless network in my home? Can't I just

piggyback my music streaming onto that network? The short answer is yes, but you'll miss the payoff. Because the AS-400 creates its own dedicated network, music doesn't compete with the home network for bandwidth. And that's a big plus given the potential bottleneck created by multiple family users who might otherwise be gaming, surfing, or number-crunching. The result is fewer potential dropouts. In fact, so much faith has Micromega placed in its AirStream technology that it opted to exclude digital inputs. There's no S/PDIF, TosLink, or USB. Now that's what I call a high wireless act.

Limitations? Sort of. The Apple AirTunes encoding algorithms currently used to transmit to the Marvel IC inside the AS-400 and Apple AirPort Express don't support high-resolution music sampling rates above 16-bit/44kHz—at least for the time being. But not to worry, thanks to its internal Cirrus Logic 24/192 DACs, the AS400's wireless AirStream will be compatible with high-resolution streaming content whenever iTunes makes that option available.

Trouble-free setup is everything for a computer-phobe like yours truly. Happily, Micromega has endeavored to make wireless connectivity as routine as plugging in any traditional source component. And it has largely succeeded, assuming you have some



EQUIPMENT REVIEW - Micromega AS-400 Integrated Amplifier/Wireless DAC

Inside the AS-400

Micromega is a company on the move. In recent years it's been rejuvenated by new owner and CEO Didier Hamdi, and guided in the States by its importer/distributor Audio Plus Services.

In Issue 199 I reviewed Micromega's PA-20 preamp and PW-400 power amp quite favorably. The AS-400 is a continuation of that upward trend. The AS-400's preamp stage features a low-noise gain section matched with low-noise power supplies. An R-core transformer is dedicated to all low-level signals, thus avoiding cross-coupling between the two sections and preventing any hash from the mains line from disturbing the circuit. Ultra-low-noise regulators feed the preamplifier section to allow accurate low-level resolution. Input switching is done by relays, and the 100k ohm input impedance means that the preamplifier section will not adversely load the various sources connected to it. The output of the preamplifier section is buffered by JFET amplifiers and then balanced to avoid ground coupling between the preamplifier section and the power amplifier modules. A moving-magnet phono section is included. Volume control is by a digitally controlled resistor ladder.

The power amplifier section uses a robust 1kVA toroidal "quiet design" power transformer, ultra-fast soft-recovery rectifiers, and four 10,000pF smoothing capacitors in a dual-mono configuration. The Class D modules are rated at 200W into 8 ohms and 400W into 4 ohms. A DC detection circuit prevents any damage to the loudspeakers in case of a failure occurring to the power modules.

Using the processor bypass and subwoofer I/O permits volume-control switching for a sub in two-channel and multichannel configurations. Via software control, inputs can be renamed from a library list stored in the AS-400's memory, while unused inputs can be switched off. A headphone amplifier is available with a front output, and its separate volume control setup is stored in the AS-400. A true monitor loop is accessible for users willing to insert an external unit in the signal path. The unit is equipped with a full-featured remote control that's comprehensive enough, though with such a dizzying number of identical buttons it's more than due for an upgrade. **NG**

basic familiarity with a computer and iTunes. The initial handshake between your computer's WiFi and the AS-400 takes just a moment. As the AS-400 powers up for the first time it activates the AirStream network and the small icon on the front-panel display changes from red to blue. Then, if you're running a Mac, simply click on the WiFi icon in the upper right portion of the Mac's desktop and select the AS-400 network "Music," which appears as an available network connection. The first time you do this, the computer will prompt you for the password "airstream"; after that, you're off to the races. Then open iTunes and select the AS-400 in the pull-down menu located in the lower right corner of the iTunes window. If you prefer controlling iTunes via an iPhone/iPad/iTouch, you have two options. The first is to stream audio directly from your handheld device to the AS-400 via Apple's AirPlay. The second, and better-sounding option, is to download the "Remote" app (free at Apple's Web site) that sends just the commands to your laptop or desktop machine running iTunes. In this scenario, the audio data are not transmitted wirelessly, just the track selection, volume, and other commands.

I evaluated the sound of the AS-400 on two levels: as a traditional integrated amplifier from a CD source and in wireless mode. With compact disc, right out of the block the AS-400 had a powerful sense of midrange presence and stability, lively dynamics, and a pleasingly propulsive energy. For me, these attributes created a resolution of vocal nuances that instantly made this amp a top contender in its segment. Whether I was listening to the darkly sensuous styling of Shelby Lynne singing "How Can I Be Sure" from , or the homespun sweetness of James Taylor's "If I Keep My Heart Out of Sight" from , or Marc

Cohn's throaty cover of "The Only Living Boy In New York" from , the AS-400 never failed to uncover the subtlest micro-information about vocal inflection and interpretation. Tonally, the AS-400 was neutral through most octaves with only a slight darkening on top and small losses of air at the frequency extremes. Piano harmonics were rich and full-bodied with a sweetness in the treble that I didn't typically hear with earlier switching amplifiers. There was a reassuring sense of resonance and harmonic weight throughout. The top end was clean with just a hint of coolness and a slightly brittle complexion on leading-edge details. Transient behavior was elsewhere uniformly excellent—clean, concise, and well integrated into the performance.

The Rutter [Reference Recordings] with the Turtle Creek Chorale is pivotal for my listening evaluations, and the AS-400 didn't disappoint. The vast assembly of pipe organ, choristers, and strings was anchored firmly to the soundstage and there was little to no smearing among adjacent instrumental or vocal images—which is no small accomplishment. Lateral soundstage presentation was excellent, as well. Only at the frequency extremes did the AS-400 lose a little ground. The Chorale's upper reaches were just a shade dry and constricted. And the full dimensions of the cavernous acoustic and stage of Meyerson Center were just not as faithfully replicated as I've heard with other gear. During Vaughan Williams' the landscape of symphonic images lacked the sense of near-topographical relief that defines the layering of string sections, and the ability to reproduce the corners and boundaries of the venue, as well

SPECS & PRICING

Power output: 200Wpc into 8 ohms, 400Wpc into 4 ohms

Inputs: Three analog, one phono, one processor

Outputs: Preamp, headphone, subwoofer

Dimensions: 17" x 3.75" x 14.5"

Weight: 33 lbs.

Price: \$4995

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EQUIPMENT REVIEW - Astell&Kern AK100 and AK120

as the sensation of ceiling height and of the backwall upstage behind the musicians.

Bass control was excellent, something I've come to expect from Class D power—the rolling thunder of tympani during Copland's being a prime example, the steady kick of the bass drum during Steve Winwood's "Higher Love" being another. The Wilson Sophia 3, on the other hand, is a speaker that demands an awful lot from an amplifier. In most instances the Micromega was a model of unflappable consistency and the Sophia sounded fabulous. But if concert-level rock 'n' roll is your thing, then you'll find the AS-400 bottom octaves a little soft.

Turning to the AS-400's wireless AirStream performance, the sonics maintained the essential character established with the disc player in the system; yet now the music was streaming from my kitchen to the listening room some 25 feet away while I controlled it via an iPad using Apple's Remote app! The AS-400's wireless sonic abilities weren't just a rough approximation of the CD source, or vaguely in the ballpark, or a "close-but-no-cigar" attempt. Rather, they were close. Image placement was spot on, as was the rendering of three-dimensional space. The tonal distinctions between wireless and the CD reference were small enough that it might just as easily be ascribed to a simple choice of disc player interconnect or the individual personalities that the DACs might be contributing.

That's not to say the character of the AirStream was identical. As I listened to solo piano and the acoustic space that enveloped it, the sound via wireless was actually a little more weighty, as if the midrange had a slightly

thicker waistline. The top end was a bit sweeter and more harmonically complex—something I never would have predicted. Moreover, the sound was more coherent, as though each piano note was more clearly defined. Likewise, during singer Jen Chapin's cover of "Renewable" her sibilance range was more finely textured and cleanly aligned with her voice's body.

Only in the lowest register did the CD source narrowly edge out the AirStream. For example, when pianist Evgeny Kissin comes down hard on the keyboard, the instrument was a bit more explosive in the dynamic sense, the soundboard resonance suggesting a little more body and bloom. To tell the truth no one was more surprised than I was when I kept reaching for my iPad rather than the disc player's remote control. I kept thinking to myself while gleefully scrolling through my iTunes playlists that I could really get used to this. (Tip: If you're running a Mac make sure the format setting in iTunes MIDI setup matches the sampling frequency you're streaming—most likely 44.1kHz/16-bit. I speak from experience when I say that an incorrect setting degrades the wireless sound quality.)

The Micromega AS-400 is not just about musicality and performance. It's equally about the user experience. For many of us the mere mention of music, computers, and wireless networks sets off fire alarms. Micromega, however, has done its homework with the AS-400 and removed any lingering reservations. Now anyone can contemplate a computer-based music collection and step fearlessly into a future of wireless possibilities—or not. The AS-400 happily let's you have it your way. And believe me, that's a tough act to follow. **tas**

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NuForce DDA-100 Integrated Amplifier

A PWM Integrated Amplifier for the Masses

Steven Stone

Insomniacs must populate NuForce's R&D department. That's the only explanation I can come up with for NuForce's rapidly expanding stable of new products. I reviewed its excellent DAC-100 in Issue 228, and now NuForce has introduced an even more revolutionary digital product—a direct-digital integrated amplifier that utilizes pulse-width-modulation technology.

Priced at a paltry \$549 the DDA-100 delivers value with a capital V. You get four digital inputs (no analog—remember, this is an all-digital amplifier), one TosLink digital output, and one pair of speaker terminals. NuForce even throws in a nice little credit-card remote control. Add a computer to the front end and a pair of speakers on the back and you've

got a completely modern audio system. And, I will brashly add, the DDA-100 sounds better than any conventional integrated amplifier I've heard priced under \$2500.

Technical Tour

According to NuForce, "The DDA-100 doesn't require the typical DAC stage found in most of today's digital audio products. Rather, its PWM power amplifier stage is modulated directly by the incoming signal, and the digital-to-analog conversion takes place at the speaker outputs. In effect, the PWM power amplifier stage operates as a power DAC." The DDA-100 supports any 16- or 24-bit digital signal, from 44.1 to 176.4 (but not 192 kHz) via its one S/PDIF input. The two TosLink and single USB 2.0 inputs support up to 96kHz and 24 bits.

For a description of how PWM power amplifiers work, please read Robert Harley's sidebar. Suffice it to say that PWM is not the same as switching amplifiers, such as Class D or T designs, and offers the technical advantages of a simple signal path and fewer active components, as well as a few ergonomic drawbacks.

Setup and Ergonomics

The DDA-100 principal market is audiophiles who want a simple, moderately priced, one-box solution to go from any conventional digital source directly to a pair of loudspeakers. Headphone and subwoofer users will need to add additional components to the signal chain. Using either a USB to S/PDIF converter box with multiple digital outputs (one for the DDA-100 and a second one for your headphone DAC) or a USB DAC with an auxiliary S/PDIF output, will expand a DDA-100-based system's capabilities to handle more ambitious systems.

Hooking up the DDA-100 is easy as long as you keep it simple. If you do any amount of headphone listening you'll need to add another DAC to your system, since the DDA-100 has no headphone output. For headphones I used the NuForce DAC-100—I gave it the TosLink output from the DDA-100. Using the DAC-100 also supplied me with a line-

level subwoofer feed if I needed one. Another option I looked at was NuForce's new headphone amplifier, the HAP-100, but it only has analog inputs. You will need a headphone amp that has a DAC and a TosLink input to interface with the DDA-100.

At 50W RMS (8 ohms) the DDA-100 is far better suited for speakers, even desktop speakers, that are at least 88dB sensitive. With some of my less sensitive monitors, such as the Aerial Acoustics 5B's (86dB), I could hear the amplifier section beginning to strain during dynamic peaks. And because the DDA-100 is such a low-noise device (true 95dB S/N from digital input to analog power output) variations from its optimal operating range were readily apparent.

For computer sources NuForce supplies a basic USB interface that supports up to 96/24. For higher resolutions you must use either the RCA S/PDIF input or TosLink. Unfortunately for us high-resolution addicts, 176.4/24 is the maximum resolution supported by the DDA-100. If you try playing full-resolution 192/24 files through the DDA-100 all you will hear is modulated noise through your speakers.

Sound

The DDA-100 was my first encounter with a PWM amplifier, and I was impressed by its lack of coloration and the absence of electronic noise. In my desktop system, regardless of what speakers the DDA-100 was tethered to, it always produced a more convincing soundstage than I've experienced before. Locational cues were simply easier to decipher, as was all sonic information.

During the initial stages of my review I used the DDA-100's USB input, and while it didn't sound bad, the USB input is certainly not the DDA-100's "best" input. Through the USB the sound had a slight but pervasive opaqueness when compared to better, lower-jitter sources coming from the S/PDIF input. I used several outboard USB/SPDIF converters with the DDA-100, and in every case the inclusion of a dedicated outboard USB converter in the signal chain rewarded me with a better and more transparent sound.

Since this is a review of the DDA-100, not USB converters,

EQUIPMENT REVIEW - Oppo BDP-105 Universal/Blu-ray Player and DAC

I will not go into great detail enumerating differences between various USB boxes through the DDA-100, but I will tell you that the DDA-100 offers sufficient resolution to easily hear that a Bel Canto RefLink or Empirical Audio Off-Ramp 5 delivered better low-level detail and resolution than a \$60 Matrix converter.

But how does the DDA-100 sound different than more conventional amplifier designs? During listening sessions I was continually aware of the DDA-100's lack of haze and homogenization in the "black space" between

instruments. The edges and dimensions of each instrument were defined in a more concrete manner through the DDA-100 than any amplifier I've heard near its price. On my recently recorded "field recordings" of Chris Thile, Chris Eldritch, and Gabe Witcher from a Rockygrass Academy workshop on improvisation, not only did the DDA-100 place each musician in a cohesive and dimensionally convincing soundstage, it also allowed me to hear into the background so well that I could clearly identify Pete Rowan's vocals coming from another tent 75+ feet away.

As for any traces of a "characteristic" sonic signature in the DDA-100, I have yet to hear one. Unless driven into clipping, I could not identify any additive colorations that I could attribute to the DDA-100. As for subtractive colorations, compared to a traditional tube design, the DDA-100 will not be as warm or harmonically rich in the lower midrange, but I wouldn't call this a subtractive coloration as much as a lack of an additive one. The bottom line was that for me, with current sources, the DDA-100 was sufficiently transparent and uncolored to be used as a reference device as long as it was mated with sufficiently sensitive and unproblematic transducers.

power, that even after adding a NuForce DAC-100 to augment the ergonomic flexibility of the system, the final cost is still a sonic bargain. I haven't heard any integrated amplifier with DAC capabilities priced near this combo that offers any serious sonic competition.

If you have sensitive speakers, at least 88dB, and can work around the DDA-100's ergonomic limitations, you may find that the DDA-100 is simply the best integrated amplifier solution that you've ever heard. And for those readers who still firmly believe that all-digital amplifiers are for someone else's system, listening to the DDA-100 will be, as it was for me, a revelation. **tas**

Why the DDA-100 Isn't a Conventional Class D Amplifier

A true digital amplifier such as the NuForce DDA-100 is not a conventional Class D switching amplifier. In a conventional switching amplifier, analog input signals are converted to a series of pulses that turn the output transistors fully on or fully off. The signal's amplitude is contained in the pulse widths, and an output filter smooths the pulses into a continuous waveform.

But in the DDA-100 PCM digital signals fed to the amplifier's input (such as from a music server, or other source) stay in the digital domain and are converted by digital-signal processing (DSP) to the pulse-width modulated signal that drive the output transistors. This is an important distinction, because the true digital amplifier (the DDA-100) eliminates from the signal path the DAC and its associated



Final Thoughts

You can view the NuForce DDA-100 in two ways—it's either a supremely high-value entry-level integrated amplifier or it's a component that lacks just a few vital features needed to make it into a devastating price-no-obstacle-to-performance component.

The issues with the DDA-100 are primarily ergonomic. It can play 176.4/24, but lacks the ability to play 192/24 files. Through USB it can support only up to 96/24, but will handle up to 176.4 through S/PDIF. It also has no analog outputs for headphones or subwoofers, and is only 50W RMS (into 8 ohms). And while you can remedy the paucity of analog outputs by linking the DDA-100's sole digital output (which is TosLink) to a second DAC with headphone and analog line-level outputs, this adds substantially to the complexity and cost of a system.

But the sound of the NuForce DDA-100 is so impeccable, up to the point when it runs out of

SPECS & PRICING

- Digital input:** Two TosLink, RCA coaxial 75-Ohm, USB 2.0 adaptive mode
- Sampling rates:** USB: 44.1, 48, and 96kHz; S/PDIF: 44.1, 48, 88.2, 96, 176.4kHz
- Resolution:** 16-24-bits
- Power:** 75W (4 ohms), 50W (8 ohms)
- Frequency response:** 20 to 20kHz +/- 0.1dB
- SNR > 95dB A-weighted**
- Dimensions:** 9" x 2" x 8.5"
- Weight:** 2.64 lbs.
- Price:** \$549

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Peachtree Audio Grand Pre X-1 Hybrid Tube Preamp & DAC

Chameleon

Wayne Garcia

While typing my finishing thoughts to this article, my hometown team won its second World Series in three years. As it was in 2010, this year's edition of the San Francisco Giants seems a most unlikely champion of the big leagues. Their two-time Cy Young award-winning pitcher had a terrible year; their best closer was out early due to season-ending surgery; their best offensive weapon, a crowd-favorite and All-Star Game MVP, was suspended after the half-way mark for illegal drug use; and their starting first-baseman, a star of their previous championship team, was relegated to a pinch-hitter role due to anxiety attacks. But after a few key trades the Giants turned a roster of smart, scrappy players into a feisty, never-say-die team that nearly collapsed in two hard-fought playoff games, before sweeping Detroit in four. Versatility was a huge key to the team's success; witness that Cy Young Award winner being left out of the World Series rotation, only to shine from the bullpen.

My baseball musings are a way of saying that many of today's most exciting and interesting audio components offer their own brand of chameleonic versatility, appealing to traditional audiophiles while at the same time embracing the needs of those who prefer their music not from vinyl or compact discs but rather streamed via computer.

Elsewhere in this issue I reviewed Wyred 4 Sound's mINT, a tiny integrated-amp/DAC. Now we'll look at Peachtree Audio's Grand Pre X-1, a \$3299 hybrid-tube preamp and DAC.

Peachtree is best known for its line of affordable, wood-clad designs, but the Grand Series, which as of now also includes the \$4499 Grand Integrated, charts new, higher-end territory for this Bellevue, Washington-based firm. The hefty, round-cornered chassis sports a half-inch-thick aluminum faceplate, titanium buttons, and engraved rather than screened input names. Likewise, the design and internal component choices reflect the company's drive for excellence.

Given Peachtree's commitment to computer-driven audio, the Grand Pre X-1—which is slightly upgraded from the original Grand Pre (more on that later)—employs Reference ESS Sabre32 9018 DACs to significantly reduce jitter from highly jitter-prone computer and other sources. A newly designed asynchronous USB input is said to provide the best possible connection between computer and DAC by allowing “the Grand Pre's internal high-precision clock to control the flow of data coming from the computer. This method lowers incoming jitter so the Sabre DAC has less timing errors to re-clock.” Capable of 24/192 resolution, the Grand also accepts sampling rates of 44.1, 48, 88.2, 96, 176.4,

and 192kHz. Galvanic isolation, used to break ground loops when multiple circuits need to speak to each other, is said to eliminate the noise caused by the switching power supplies commonly used in computer and other devices. And to sweeten the harsh digital nasties from poor or compressed recordings, Peachtree commissioned the legendary Bascom King to design a tube buffer stage. Using a pair of 12AU7s running in mono, a front-panel tube-bypass switch allows listening in either a completely solid-state or hybrid-tube mode from both the preamp as well as from the built-in headphone amplifier. As with any good design, the preamp stage uses the shortest possible signal paths, while a VCA (voltage-controlled-amplifier) gain control changes current in the preamp without having the signal pass through a potentiometer. Hence, the motorized pot's role is to simply feed a reference voltage to the VCA unit. Peachtree feels strongly that the result is superior channel matching, excellent soundstaging, low coloration, and high dynamic range.

Because early editions of the Grand Pre reportedly had a few minor issues, Peachtree's David Solomon wrote me about the changes that went into the X-1 version, which also created a few-hundred-dollar price bump. Some listeners were said to get a slight popping noise while adjusting gain, so Peachtree added a few caps to the gain control to eliminate any noise. Secondly, Peachtree changed the USB receiving chip from a Tenor TE8802L chip to a more stable XMOS device.

This is my first review of a Peachtree Audio design and, though I'm aware that I'm starting at the top, the Grand Pre X-1 is a mighty impressive effort.

EQUIPMENT REVIEW - Peachtree Audio Grand Pre X-1 Hybrid Tube Preamp & DAC

Whether spinning vinyl, CD, or streaming from my MacBook Pro, which was a snap to set up for use with the Grand Pre X-1, the sound was open and airy, with a nice feeling of drive and pace, good re-creation of dynamic extremes, and fine microdynamic shading. The tube buffer is certainly that. Over time I would go back and forth with different sources, and

Peachtree's stated design goals for the unit proved to be true—meaning that with LPs and all but the poorest-sounding CDs, I preferred the unit with the buffer off. For example, with something like HK Gruber's marvelous, funny, very well recorded, and always surprising *Frankenstein!!* [Chandos], the Grand Pre did a fine job of carving out a large stage with excellent depth and spot-on imaging. Gruber's *singspiel*, performed while standing in front of a horizontally arranged orchestra, was articulate, strings were lively, percussion was delivered full of verve and snap. But the tube buffer softened things too much, and dulled air and edges. On the other hand, while casually streaming from lower-quality sources such as Pandora, or a poor-sounding older compact disc, the tube buffer did a fine job warming things up, adding a bit of golden tone, rich texture, and generally saving one's ears from that harsh, edgy, aural-icepick effect.

My advice is to experiment. If you're going to listen to a lot of digital sources of varying quality—and if you're reading this I'd say that's a safe assumption—then the tube buffer should prove a welcome feature.

But not surprisingly, the Peachtree Grand Pre X-1 shines with superior sources such as the Gruber mentioned above. Fine LP sources, too, are impressive, and of genuine high-end quality when played through this design. I highly enjoyed my record collection over this peachy unit, and compared to analog-only models never felt that the Grand Pre was a compromise approach. For one example, Analogue Productions' superb 45rpm edition of Dave Brubeck's *Time Out* displayed a

marvelous sense of the intricate timing changes that still make this music so inventive and satisfying so many decades after it was released. The interplay of Brubeck's piano with his terrific small ensemble was always revealing, drawing me into tune after tune. The Peachtree's tonal quality neatly splits things nearly down the middle, with perhaps a nod toward the lighter side of the spectrum, which I generally prefer to the darker side.

Streaming high-resolution files proved to be a rewarding experience over this Peachtree model. As I said in my review of Naim's outstanding SuperUniti (Issue 225), the world of computer-derived audio is still relatively fresh territory for me and one I'm not quite comfortable with, as the technical micro-details and very different musical/sonic experience, in many ways superior and in others not, are issues I'm still grappling with.

Nevertheless, with something like the truly fine 192/24 rendering of Cat Stevens' *Tea for the Tillerman*, the Grand Pre X-1 was a model of resolution, tonal complexity, and "there-ness." Vocals were superb, the stage was big, wide, and open, dynamic range from whisper to thunderclap and back, and the experience was highly impressive as well as musically compelling. So I'll now confess that I found Analogue Productions' QRP vinyl pressing even more engaging.

Like I said, Peachtree Audio's Grand Pre X-1 sets a new standard for this company. It's a thoughtfully designed, well built, and truly versatile performer that should more than satisfy a wide range of music lovers—from those who have enthusiastically embraced computer audio to geezers like me who are still straddling the proverbial fence. **tas**

SPECS & PRICING

Type: Hybrid Tube Preamp & DAC	peachtreeaudio.com ASSOCIATED EQUIPMENT
Inputs: Aux/HT analog, Aux 2 analog, balanced (XLR) analog, USB digital, one BNC digital, two coax digital, two optical digital	Acoustic Signature Challenger turntable, Funk FX-R Pickup Arm, and Transfiguration Phoenix moving-coil cartridge; Sutherland 20/20 and Simaudio Moon 310LP phonostages; Cary Audio Classic CD 303T SACD player; Apple MacBook Pro computer; Exposure 3010S2 mono amplifiers; Magnepan 1.7 loudspeakers, Tara Labs Zero interconnects, Omega speaker cables, The One power cords, and BP-10 Power Screen; Finite Elemente Spider equipment racks
Outputs: Coax: pre, line, high pass pre, balanced (XLR)	
Tube complement: 12AU7 (2)	
Dimensions: 17.5" x 4.8" x 16.5"	
Weight: 24 lbs.	
Price: \$3299	
PEACHTREE AUDIO 2045 120th Avenue North East Bellevue, Washington 98005 (704) 391-9337	



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Peachtree Audio Nova125 Integrated Amplifier/DAC/Headphone Amplifier

Power and Refinement to Spare

Chris Martens

Some years ago, Peachtree Audio recognized that a seismic shift in the high-end audio universe was at hand—a shift wherein PCs would step outside of their traditional roles as office tools to become full-fledged digital-audio source components. Thus, long before others began to pursue the idea, Peachtree was hard at work developing integrated amplifiers fitted with easy-to-use, built-in, high-performance DACs. In retrospect, the concept not only seems brilliant, but downright prescient. Peachtree also understood that with the rise of interest in computer audio there would come a golden opportunity for high-end manufacturers to reach out to young music lovers who might never otherwise have considered owning high-performance audio systems of any kind. As a result, Peachtree has always sought to build components clever enough, hip enough, and accessible enough to appeal to young, computer-centric music lovers, but that also offered credible high-end features that appeal to veteran audiophiles. This requires, of course, finding a balance between simplicity and sophistication and between price and performance—a point of balance many Peachtree components have struck in a successful way.

If there is any drawback, I think it may involve the fact that some Peachtree components may suffer from a perception problem: Are they mid-fi (albeit very good mid-fi), or are they the gateway to the serious high end, or perhaps both? What causes these questions to be raised is that earlier-generation Peachtree amp/DACs traditionally have had front-end sections (typically comprising a preamp, DAC, tube buffer stage, and headphone amplifier) that offered considerably stronger and more sonically sophisticated performance than their associated power amplifier sections did. In fairness, the power amplifier sections of those earlier generation Peachtree amps could perform pretty well when matched with relatively easy-to-drive loudspeakers, but they offered limited current drive and power output capabilities and thus were not suitable for driving some of today's best, but also most demanding, value-priced speakers (e.g., Magnepan's excellent but power-hungry model 1.7s). Faced with this dilemma, Peachtree Audio founders Jim Spainhour and David Solomon did what high-enders have always done: They upgraded, and in a big way.

Accordingly, Peachtree has revised its entry-level integrated amps by improving their already very good front-end sections and then by equipping their new models with powerful, high-current Class D power amplifier sections. Consider, as an example, Peachtree's new Nova125 amp/DAC (\$1499), the subject of this review. The old Nova put out 80Wpc into decidedly benign 6-ohm loads. By comparison, the new Nova125 belts out a generous 125Wpc at 8 ohms and an even more impressive 220Wpc into 4-ohm loads. Moreover, Peachtree claims the Nova125's "high-current output stages

can comfortably drive any speaker load from 2 ohms" (something that could never have been said of the earlier Nova).

Then, where the original Nova provided a 24/96-capable DAC with an adaptive USB input and four SPDIF inputs, the Nova125's onboard ESS Sabre 9023 upsampling DAC offers 24/192 resolution (except for the optical input, which is limited to 24/96), with an asynchronous USB input and three SPDIF inputs (two coaxial and one optical). Peachtree points out that the ESS 9023 DAC uses "a patented process called Hyperstream," which "buffers the incoming digital bitstream and reclocks it from thousands of picoseconds of jitter to less than 3 picoseconds." Expanding on this theme, the firm says the new 24/192-capable asynchronous USB input, "keeps digital jitter at bay by not relying on the audio clock in the computer, which can get thrown off by the thousands of processes running in your operating system's background." Finally, the Nova125's DAC section is backed by a decidedly performance-minded new Windows device driver, which is provided on an included CD ROM. In addition to its many digital inputs the Nova125 also provides one analog input to support any legacy analog components the owner may wish to connect.

Astute Peachtree observers will notice that the old Nova did have a somewhat more generous mix of inputs than the Nova125 does (the old Nova offering five digital and three analog vs. four digital and one analog for the new model). But, given that the new DAC supports higher-resolution formats and asynchronous USB backed by more sophisticated device driver software, there is every reason to think that the sonic performance of the Nova125 should be significantly higher than that of the old Nova.

EQUIPMENT REVIEW - Peachtree Audio Nova125 Integrated Amplifier/DAC/Headphone Amplifier

To give users a measure of control over amplifier voicing, the Nova125 can be run purely in solid-state mode, or, when desired, with a triode 6N1P tube buffer section engaged (the tube buffer can be switched on directly from the Nova125's remote control). The tube buffer also provides a Class A tube-powered output for the Nova125's headphone amplifier. According to the manufacturer, the Nova125 power amplifier section uses "the newest generation of Class D technology" with benefits said to include "extended bandwidth, improved dynamic range, and exceptionally low distortion," plus the aforementioned ability to handle low impedance loads. The bottom line is that, apart from a modest reduction in the net number of inputs supported, the new Nova125 appears to be better than its predecessor in every way, but costs only about \$300 more. All of this, of course, sounds good on paper and in theory, but how does the Nova125 sound in real life?

Well, let me come right out and say it: Peachtree's Nova125 sounds terrific. Taking nothing away from the original Nova (and iNova) designs, I would say this new amp sounds like it belongs in an entirely different and better class of equipment than the original Novas did. The original Nova had a warm, friendly, inviting sound, but a sound that in truth did not provide the last word in resolution, definition, or focus. What is more, the original Nova's dynamic capabilities were highly load dependent. By comparison, the Nova125 sounds as if someone has turned its resolution, definition, and focus "knobs" up to 12, yet without in any way causing the amp to sound sterile, mechanical, or edgy. More importantly, the Nova125 sounds powerful (and *is* powerful) in a way no previous generation Peachtree Nova Series amp has ever been. In short, this thing flat-out rocks, yet in a quite sophisticated way.

Some will surely ask, "Yeah, but can it actually drive truly demanding speakers?" To settle the question once and for all, I connected the Nova125 to my undeniably power-hungry Magnepan 1.7s, put on a dynamically challenging track, and

let things fly. And man, did they ever fly. The track I am speaking of is the exuberant and boisterous all-percussion cut "Stank" from Jamey Haddad's *Explorations in Space and Time* [Chesky]. "Stank" features some low percussion drum thwacks that are likely to loosen your molars, plus a plethora of (somewhat) more delicate higher percussion voices that supply piquant commentary and textures, with the proceedings as a whole captured in a wonderfully reverberant, natural acoustic space. In short, it's the sort of track where there is a lot going on at once, serving up everything from bombastic, brute-force dynamics to multiple layers of delicate textural and transient detail. There is, quite simply, no place for amplifiers (or transducers) to hide.

Happily, the Nova125 has no need or desire to hide from any types of music or loudspeakers, because on "Stank" it rolled up its figurative sleeves and pushed my Magnepans with serious authority and a welcome dash of brio. The big drums on the track crackled and thundered as they should, while the higher-pitched drums exhibited excellent transient "snap" and beautiful variegated skin sounds that conveyed an impression of real players deftly varying the intensity of their touch and attack from note to note. Through all of this, the Peachtree did not whimper, whine, or wilt; instead, it just cranked out the song's ultra-funky groove for all it was worth. In my view, this is something the old Nova could never have done—at least not with Maggie 1.7s. With the Nova125, then, Peachtree has cooked up a sensibly priced amplifier that possesses, in roughly equal measure, both serious dynamic muscle and a generous measure of finesse.

To explore the finesse dimension more fully, though, I decided to put on one of my favorite orchestral recordings: namely, the Michael Tilson Thomas/San Francisco Symphony performance of the Henry Brant-orchestrated version of Charles Ives' *A Concord Symphony* (SRS Media). In particular, I focused on the third movement of the symphony, entitled "The Alcotts" (each of the symphony's movements is named for an important figure or figures in the American

SPECS & PRICING

Power output: 125Wpc into 8 ohms, 220Wpc into 4 ohms

Inputs: One asynchronous USB, two coaxial SPDIF, one optical SPDIF, one stereo analog, one 12V control signal.

Outputs: Speaker taps, 1/4-inch headphone jack, one variable level stereo preamp output

DAC: ESS Sabre 9023

Jitter: <3ps measured at master clock.

Resolution levels supported: MP3, 16/44.1, 16/48, 24/88, 24/96, 24/176, 24/192

USB: Asynchronous up to 24/192

Optical: Up to 24/96

Coax: Up to 24/192

Tube complement: One 6N1P (used for headphone amp, switch-selectable tube buffer stage)

Frequency response: 20Hz-20kHz +0.5dB

S/N: 96dB

Dimensions: 14.8" x 4.37" x 11.5"

Weight: 21.65 lbs.

Price: \$1499

PEACHTREE AUDIO

2045 120th Avenue NE
Bellevue, WA 98005
(704) 391-9337
peachtreeaudio.com

ASSOCIATED EQUIPMENT

Digital Sources: AURALiC VEGADigital

Processor, Rega Isis CD player/DAC, Musical Fidelity kW SACD player, Oppo BDP-105 universal/Blu-ray player. Windows PC feeding the DAC sections of the above devices with uncompressed digital audio files.

Linestage Preamplifiers: Burson Audio Soloist, NuForce Reference P8, AURALiC TAURUSMKII

Power Amplifiers: NuForce Reference 9 Special Edition monoblocks

Integrated Amplifier: Rega Osiris

Speakers: GoldenEar Triton Seven, Magnepan 1.7.

Headphone Amplifiers: Auralic Taurus MKII, Burson Audio Soloist, HiFiMAN EF-6, and more.

Headphones: Audeze LCD-3 and LCD-2 with Rev2 drivers; HiFiMAN HE-400 with Rev2 drivers, HE-5LE, HE-500, and HE-6; and more.

Cables: Furutech Flux-series interconnect, speaker, and power cables; Kimber B Bus Ag USB cables.

A/C Power: Furutech Daytona 303 power filter/distribution system, power cable as above, PS Audio Soloist in-wall power conditioner.

Equipment Racks and Room Treatments: Auralex Studiofoam panels, RPG B.A.D. panels, Solid Tech Rack-of-Silence Reference racks with various vibration control accessories

EQUIPMENT REVIEW - Peachtree Audio Nova125 Integrated Amplifier/DAC/Headphone Amplifier

Transcendentalist movement). What I've found appealing about this live recording (captured in Davies Symphony Hall in San Francisco) is the way it provides rich but believable amounts of orchestral detail, while also placing the orchestra within the context of a naturally resonant, three-dimensional performance space (or at least that is what should happen with good electronics driving a music system).

Happily, the Nova125 did not disappoint. It did a lovely job with the voices of the various orchestral sections at hand, offering a particularly fine rendition of the winds and brass. Indeed, the brass theme introduced about three minutes into the movement sounded heart-meltingly beautiful, conveying that elusive mix of transient bite and blooming burnished "glow" so characteristic of brass at its best. Throughout the movement, the Nova125 also revealed enough low-level detail to remind me that the recording was captured live, yet without pressing details forward so insistently as to make a nuisance of itself. While the Nova125 can and does sound very focused—much more so than the original Nova did—there is also about this amp/DAC combo an over-arching quality of "just-rightness" that reminds me of the old adage regarding the importance of enjoying all good things in balance and moderation.

How did the Nova125 fare as a DAC? To find out, I used an Oppo BDP-105 as digital transport to test the SPDIF inputs and a Windows PC loaded with 100% uncompressed digital audio files to try out the asynchronous USB input. As a comparison standard, I used my reference Rega Isis CD player/DAC. What I discovered

was that the Nova125's DAC and SPDIF inputs sounded, again, more detailed and focused than the DAC section of the original Nova did. However, I felt that the DAC section's best performance was realized through the asynchronous USB input, which was even more refined, tightly focused, and generally more spacious and three-dimensional than the SPDIF inputs. While the Nova125 could not match the even higher levels of resolution and all-round refinement of my Rega Isis, I felt it acquitted itself admirably given the huge price differential between the two components.

What of the Nova125's 6N1P tube buffer? Frankly, I came into this review thinking that I might enjoy using the buffer, since I have been a proponent of hybrid tube/solid-state amplifiers in the past. However, in doing some admittedly crude "blind testing" with and without the tube buffer, I consistently found that I preferred the clearer and, to my ears, more explicit and less colored sound of the Nova125's solid-state circuitry. Your mileage, of course, may vary, but for the bulk of my listening tests I felt more comfortable with the tube buffer disengaged (though I continued to try it from time to time, just to keep an open mind).

Finally, I wanted to check out the Nova125's headphone amplifier section and for this purpose I listened through my reference Audeze LCD-3 planar-magnetic headphones, comparing back and forth between the Nova125 and the superb Burson Audio Soloist headphone amp (the Burson is essentially a handmade Australian headphone amp/preamp that sells for just under \$1000). What I found was that the Nova125 sounded very good, with plenty

of output for powering the Audezes (which are not the easiest-to-drive headphones around), a reasonably low noise floor, and a rich (but not overly rich) and articulate sound. Nevertheless, the Burson sounded even better, with more detail, superior three-dimensionality, and an even lower noise floor. In fairness, though, let's acknowledge that the Burson costs two thirds what the Nova125 does, yet provides only a fraction of the Nova125's functionality. Once you throw that consideration into the mix, I think the Nova125's headphone amp section has got to be considered icing on the cake.

To sum things up, I would say that Peachtree has taken the Nova125 forward, not just by a

small incremental step, but by a giant leap. Relative to the original Nova, which was a very high-value product in its own right, the Nova125 offers a front-end DAC section that is better, an asynchronous USB input that is much better than the original Nova's USB section, and a power amplifier section that is just light years ahead of the original Nova's amp. Perhaps best of all, the Nova125 has lifted many of the equivocations and qualifications that applied with the original Nova; at last, Peachtree has given us an affordable amp/DAC that can drive fine but power-hungry speakers in an effective way. **tas**





Hegel H300 Integrated Amplifier

From Oslo With Love

Neil Gader

It seems as if Hegel Music Systems, the Norwegian electronics manufacturer, can do no wrong these days. Kirk Midtskog has written glowing reviews of the Hegel H100 and H200 integrated amplifiers (in Issues 206 and 211). And when Editor-in-Chief Robert Harley evaluated the H30 Reference stereo amplifier, he characterized the 350Wpc behemoth as a contender for any well-heeled audiophile's short list (in Issue 223). So, when the opportunity for me to review the H300, Hegel's latest and most powerful integrated amplifier, presented itself, I figured, "Okay. Let's see what all the excitement is about."

Even before I started delving into what makes the H300 tick I cued up "Georgia Lee" from Tom Waits' *Mule Variations* [Anti-Epithaph]. It's a favorite track of mine—a raw performance, underscored by Waits' gravelly, chesty voice. With the mbl Corona C31 CD player handling front-end duties, I could already hear straight through the H300 to the tattered felt hammers of his old upright sounding uncertain pitches, the noisy sustain pedal thumping along with the piano, the song's tempo shortening and lengthening with the shifts in the tune's emotional landscape. It's a track adorned with low-level found-sound ambient clatter and birdcalls. I felt that I was hearing and feeling this performance at its deepest levels.

I then turned to the Jimmy Cobb Quartet's bossa-nova-accented cover "If Ever I Would Leave You" from *Jazz in the Key of Blue* [Chesky]. The easy ensemble playing was captured in a stunning display of discrete imaging, micro-dynamic gradients, and hi-hat detailing—and of course trumpeter Roy Hargrove's tasteful playing and carefully measured dynamics. Even after just a couple tracks I was beginning to understand what all the Hegel brouhaha was about.

The H300 is a high-power, line-level integrated amplifier that outputs a generous 250Wpc into 8 ohms (430Wpc into 4 ohms). Visually, the flat black exterior is seriously Spartan with merely a pushbutton on/off, and rotary knobs for input and volume selection plus a large blue-lit display, easily legible from afar. Paired with the H300 is a beautifully machined aluminum, full-function remote control that makes front-panel visitations essentially irrelevant. The back panel houses ample analog and digital connectivity and one big plus. The H300 joins a new and relatively select segment of electronics, the DAC/integrated amplifier—new in the sense that amplifiers and DACs, though not novel in themselves, have mostly been marketed as independent components. However, in recent issues I've reviewed DAC/integrateds from Simaudio and Perreux, and more are either currently available or coming to market. Given the ever-expanding popularity of digital media the trend is logical and not unlike the built-in phono/RIAA inputs that were commonplace when vinyl was dominant.

The H300 represents a ground-up redesign, which Hegel characterizes as a Hegel 2 amplifier platform; improvements are geared to increase channel separation and decrease noise levels. The H300 evolved during the design phase of the P30 Reference preamp and the H30 Reference monoblocks. The most significant change, according to Hegel chief designer Bent Holter, is in the preamp section—a dual-mono design with new advancements in circuitry, optimized

board layout, improved components, hand-matched FET transistors, and, perhaps most significant of all, a newly devised precision volume attenuator that's based largely on the P30. The amplifier stage features a robust dual-mono 1000VA power supply with 90,000uF capacitors and an output stage formed by twenty 15A 150W high-speed bipolar transistors. Hegel's newest generation core technology, SoundEngine, was also spawned during the H30 project. It's based on a proprietary topology and highly selective transistor-matching that is said to eliminate dynamic crossover distortion in Class AB amplification. (See RH's H30 review in Issue 223 for Holter's thorough explanation of the SoundEngine technology.)

The 32-bit DAC stage is built around the AKM AK4399 chipset. For Hegel it's AKM's best pro audio chip and capable of 24-bit/192kHz resolution. For USB throughput, resolution tops out at 24-bit/96kHz, but extends to 192kHz through either the optical or coaxial SPDIF inputs. Hegel notes that the new DAC improves over the HD11 with more robust and cleaner power supplies and newly designed, higher-precision clocking. Like the HD11 it features proprietary reclocking circuitry and a Hegel designed clock.

Unique to the H300 is the DAC Loop function, which allows the owner to add an external (and presumably more advanced) DAC down the road while retaining Hegel's sophisticated reclocking circuit. Although naturally Hegel would urge owners bent on upgrading to buy its own HD25 DAC, the company stresses that all H300 owners can continue to take advantage of its reclocking circuitry by connecting any quality DAC to the H300's digital output. Holter explained that the DAC loop has a high-quality SPDIF reclocker circuit that removes jitter from all digital inputs so that the H300 can be used as a stand-alone reclocker with any audio system. He adds that "the beauty of the H300 reclocking is that when feeding the reclocked SPDIF signal to the coax input of an external DAC you will reduce the complete

EQUIPMENT REVIEW - Hegel H300 Integrated Amplifier

system digital jitter to as low levels as possible.” [I heard a demo of the H300 used as a reclocking device and can report that it improves the sound as claimed.—RH]

The sonic character of the H300 is strictly neutral. Neutral, that is, in the sense that even the most minor tonal colorations or electronic detritus common to many amplifiers simply don't materialize. There's certainly no grit or grain. If you're looking for a plush midrange warmth, some extra push in the bass, a golden bloom in the upper mids, or even a burst of sparkle in the treble, the H300 won't be your ride. Hegel's approach is holistic but non-nonsense—opening a transparent, harmonious window of sound. And neutral doesn't imply dull by any means. For the H300 neutrality is merely the platform to exhibit a pristine lack of distortion, superb edge definition, and micro-dynamic liveliness.

What the Hegel possesses in spades is the ability to reproduce the source material from an exquisitely low noise floor without compression, constriction, and transient distortions, in essence releasing music openly, rather than bullying it into submission. So to my ears, during Elgar's *Enigma Variations* from the new Reference Recording disc [RR129], a snare drum thwack and a bass drum or tympani thwump never sounds cut off or artificially controlled at the resonant end of the note. It lingers as long as it can before it's swallowed by the silence of the hall. And equally defined is the timbre of wind instruments, notably flutes, which is reproduced in a remarkably lifelike manner and always with the appropriate halo of surrounding air.

The H300 provided a wide luscious soundstage during Dire Straits' "Private Investigations" from *Love Over Gold* [Warner], a track brimming with sound cues large and small. I was especially taken by the dynamic breadth of the performance, from the CinemaScope-styled drum fills emerging from somewhere approximating the center of the Earth to the delicacy of the nylon-stringed guitar, marimba accents, and scratchy soles beneath the intermittently appearing footsteps. The sudden turn of a doorknob and a kitten's mewing, noises I've heard dozens of times, still send shivers down my spine.

Turning to the DAC, I felt it produced a startling, focused sound without the sensation of phasiness or smearing of stage and image information that has often accompanied DACs in this segment. Images were detailed and discrete yet possessed of a natural ambient connection with adjoining images on the soundstage. Like some of the elite DACs the H300 digital section suggests more than a hint of analog-like warmth, dimension, and continuity, a richer flow of information. On Jennifer Warnes' "Song For Bernadette" [Impex] there's plenty of image elbow room, the overall impression being one of expansiveness rather than clutter, right down to the very last element of reverb echo.

How does this compare to the USB/DAC section aboard the mbl Corona C31, a \$9200 player? It's awfully close, but fair is fair. The mbl is more convincingly realistic on Holly Cole's cover of "I Can See Clearly." And it has more warmth and a stronger sense of dimensionality and physicality. Still, the H300 is excellent by any yardstick I've encountered thus far.

I listened initially to the H300 primarily with digital sources, reserving LP playback for the latter stages of this review. And as expected my turntable rig plus the H300's superior analog circuitry and low noise floor served as a stunning reminder that, as inspired as the performance of Hegel's digital section is, the LP remains ensconced as stubbornly as ever in the playback throne. As I listened to the glorious Athena LP pressing of the Rachmaninoff *Symphonic Dances* the dimensionality, tonal ripeness, and bloom that were hinted at but not fully developed in digital playback were restored. This was most especially the case with massed strings, as a distinct sweetness and a sense of individuation spread across the section from front to back.

As a testament to the high-level performance of the Hegel H300, only a benchmark integrated amp like the considerably more costly Vitus Audio RI-100 (\$13,000) can help define the H300's modest limits. The H300, by comparison, doesn't have quite the same expansive soundstage as the Vitus, nor does it image quite as discretely. Vocals have a little less air and the resonance of piano soundboards is less palpable. The bass line vamp that introduces "I Can See Clearly" becomes less distinct as the song progresses. Toss the Vitus into the mix and the acoustic atmosphere of the Rachmaninoff thickens, the soundstage widens and deepens. Still the H300 cuts the margin of these differences awfully fine—coming so close to the Vitus at times that it's scary.

In fact, no matter how you cut it, the Hegel has got it all going on, as an unbiased transporter for music reproduction or in its sophisticated

connectivity or in its forward thinking philosophy or sheer value. The greatest tribute I can pay the H300 is at once understated yet in its way an overwhelming affirmation: In all the hours I spent with this amp, I never wanted to shut it off. Ever. It represents the high end at its most rewarding. **tas**



SPECS & PRICING

Power output: 250Wpc into 8 ohms	hegel.com
Analog inputs: Five RCA, one balanced, three unbalanced plus HT bypass	ASSOCIATED EQUIPMENT Sota Cosmos Series IV turntable; SME V tonearm; Sumiko Palo Santos, Air Tight PC-3; Parasound JC 3 phono; Synergistic Element Tungsten/CTS, Wireworld Platinum interconnect & speaker cables; AudioQuest Coffee USB & Firewire, Synergistic Tesla & Audience au24 phono & powerChord, Wireworld Platinum power cords
Digital inputs: Two coaxial SPDIF, two optical, USB	
Outputs: One preamp, one coaxial	
Dimensions: 17" x 4.7" x 15"	
Weight: 55 lbs.	
Price: \$5500	
HEGEL MUSIC SYSTEMS, USA (641) 209-3210	

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Download Roundup

POP/ROCK

Alan Taffel

Talking Heads: *Naked*. (96/24) HDtracks.com

1988's *Naked* doesn't sound like the farewell album it is. Here, the Heads are fully committed and the songs are an appealing fusion of the group's earlier forays into rhythmic complexity and its later emphasis on a lighter spirit and melodic hooks. Of course, off-kilter lyrics are a given. If you don't already own this album, it's worth buying if only for the ebullient, ironic "(Nothing but) Flowers."

Though not as awful sounding as earlier Heads CDs, this one certainly has its problems, including a flat perspective and mildly muffled vocals. David Byrne has a quirkily emotive voice and, personally, I like to hear it. The first thing you notice about the download is that its level is much higher than that of the CD—usually a bad omen. True to form, the hi-res version shows signs of being taken from a compressed master. As a result, this is not the glare-free presentation we might hope for. Nonetheless, the download brings forward everything that the CD mix buries—from little details to Byrne's voice. Add in a bit more dimensionality and the download wins on points.

Elvis Costello: *The Return of the Spectacular Spinning Songbook*. (96/24) HDtracks.com

Remember when live rock albums all sounded like they were recorded in high school gyms? Remember when Elvis Costello played in high school gyms? This new

album is a throwback to those days, not only because the sound is abysmal, but because Costello hasn't evolved these songs from the arrangements introduced decades ago. For an artist with Costello's range and experimental sensibilities, this is unforgivable.

Sonically, the album could hardly be worse. The naked reverb swallows the vocals, bass is a thudding drone, the guitars are cringingly metallic, and songs bleed unrecognizably from one to the next. There is no doubt this guy writes great tunes, with catchy melodies and biting lyrics ("I said I'm so happy I could die/She said 'drop dead' then left with another guy"), if only we could hear them clearly as we could from the studio versions. Given all this, it's natural to wonder why this album gets the hi-res download treatment in the first place. The download sounds no less terrible than the CD, except that it allows you to hear the bombast a hair more cleanly. Is that a good thing?

Paul McCartney: *Kisses on the Bottom*. (96/24) HDtracks.com

These days, it seems like every rock icon is making an album of standards. Most of them don't work, but this one emphatically does. McCartney's vocal charm and pop sensibilities are perfect for this material, and his intimate familiarity with the songs lends them an authentic feel that will eternally elude, say, Rod Stewart. McCartney's voice remains astonishingly flexible and pure, and the rest of the supporting musicians, including Diana Krall on piano and Eric Clapton making acoustic cameos, are superb. In addition to the familiar and less-so standards, the album contains two new McCartney originals. One of them, "My Valentine," fully holds its own in this exalted company.

As befits the album's tone, the CD's sound is warm

and liquid. McCartney's voice has never sounded so mellifluous, undoubtedly aided by the use of the same mike employed by Nat King Cole (an experience McCartney calls "amazingly intimidating"). That doesn't leave much room for improvement, but the download does offer a small lessening of grain, especially on McCartney's voice. Both versions are highly recommended. This is a demo-quality recording.

Bob Marley: *Legend*. (96/24, 192/24) HDtracks.com

The original CD of this essential album—a thoroughly satisfying summation of Marley's career and artistry—is anemic in the manner of so many discs of the era. But at least it gets the percolating rhythms right and has an unpolished mien that perfectly suits the music. The 96/24 download sounds comparatively subdued, both dynamically and timbrally. The lower noise floor allows some hidden details to emerge, but that doesn't compensate for the loss of energy. Fortunately, things get cooking with the 192/24 download. Compared to the 96/24 edition, this download has tighter bass, even less grain, and more extended highs. Best of all, rhythms are even more propulsive than the CD's. If you're going the download route, suck it up and bypass the 96/24 in favor of the 192/24 version. It's worth it.

Donald Fagen: *The Nightfly*. (44.1/24) HDtracks.com

We all oohed and aahed over this album's sound when it first came out, but in truth the original CD is bright, bass shy, and...well, digital sounding. The subsequent DVD-A partially mitigates these problems. More bass would still be appreciated, and there's no eradicating the

digititis burned into the master tape, but this version does best the CD. For example, horns, which are an integral part of these arrangements, have a realistic bite, and dynamics open up. The download was clearly sourced from the same master as the DVD-A, and sounds just as good. The music itself holds up surprisingly well, especially the feel-good "I.G.Y."

Bonnie Raitt: *Slipstream*. (88/24) HDtracks.com

Slipstream is a typical Bonnie Raitt album, with all that that implies. As per usual, the new collection finds the blues singer by turns sassy and sensitive. And, as always, Raitt's choice of songs is beyond reproach. Here, she revisits chestnuts like Gerry Rafferty's "Right Down the Line," and unearths deserving deep tracks such as Bob Dylan's "Standing in the Doorway" and Joe Henry's "God Only Knows." Raitt's voice remains peerless, and she is never less than fully committed to her material. Her slide guitar playing finds welcome new prominence here, as she trades tasty licks with a band that's even more crackerjack than usual.

The trouble with *Slipstream* is that it hews to safe, often characterless song treatments. Only the Rafferty tune holds any surprise—it's done reggae style. All else borders on—to borrow Simon Cowell's one-word dismissive—karaoke. Super good karaoke, but still. Where is the bluesy twist that elevated past joys like "Thing Called Love"?

Another virtue we've come to expect from Raitt is sonics that eclipse standard pop fare. *Slipstream* is no exception. The recording is clean, uncluttered, and well balanced. The choice between CD and download is academic; they sound identical.

Download Roundup

CLASSICAL

Andrew Quint

Vivaldi: *La Cetra*, Op. 9. Rachel Podger, violin; Holland Baroque Society.

Stravinsky: *The Rite of Spring*. Firebird Suite. Scherzo. Tango. Budapest Festival Orchestra, Iván Fischer.

The Mahler Album. Amsterdam Sinfonietta, Candida Thompson.

All: 192/24. channelclassics.com/high-resolution-audio-downloads.

A decade ago, when SACD was new, *TAS* gave sonic ratings to all “New Format” releases on a scale of 1 to 10. Rachel Podger’s Channel Classics recordings of the twelve violin concertos of Antonio Vivaldi’s Op. 4 (*La Stravaganza*), with the Arte dei Suonatori Baroque Orchestra, was among the very first to earn a “10.” Now Podger’s back with another Vivaldi set, this time the dozen works of the Red Priest’s Op. 9, *La Cetra*. Podger’s playing is as effervescent as ever but even more confident. Her “historically-informed” execution is perfectly natural, almost off-hand, “original instrument” playing all grown-up. This time out, the Holland Baroque Society collaborates and its playing, too, is invigorating. Fast movements are propelled along by two hard-strumming lutenists that occasionally knock loudly on the body of their instruments. The first time *that* happens, you jump.

Iván Fischer is a contemporary master of Dvorák and Bartók’s orchestral music but doesn’t have the same affinity for Stravinsky. The opening pages of *Firebird* lack the necessary sense of mystery and expectancy and Fischer’s *Rite of Spring* is among the lowest key versions I know—it feels like many of the rough edges of this

epochal work have been rounded off. Likewise, Channel Classics producer, engineer, and managing director C. Jared Sacks isn’t really a “sonic spectacular” kind of guy and if you’re looking for timpani and bass drum *thumps* that rearrange the china, you’d probably better look elsewhere.

The Mahler Album, from the Amsterdam Sinfonietta led by Candida Thompson, is an exceptionally interesting and coherent program. The familiar Adagietto from the Fifth Symphony leads off. Presented as a stand-alone piece, there’s room for more variation in tempo and dynamics, and Thompson fully exploits the emotional range of this much-beloved orchestral gem. We then hear a string orchestra arrangement of Beethoven’s String Quartet No. 11 in F minor, Mahler’s remarkably successful attempt to reconfigure the chamber music experience for a big audience in a large hall. Finally, there’s the chamber orchestra arrangement by Hans Stadimair of the Adagio from Mahler’s unfinished Symphony No. 10. The 27-minute movement is made even more psychologically intense by the homogenization of orchestral color. Those who love the piece will want to know how effective the famous gut-wrenching dissonant nine-note chord at the Adagio’s climax is, a sonority that so accurately reflected the composer’s desparate frame of mind at this time in his life. It’s devastating, I assure you.

Compared to the SACD’s stereo versions, the 192/24 downloads have more immediacy, openness, and detail, plus they allow one to listen more deeply into the soundfield. The playing of the Budapest Festival Orchestra’s principal bassoonist in *Firebird*’s “Berceuse” seems more exquisitely nuanced and the triangle that bravely struggles to be heard over the final brass peroration of that work’s finale sounds less like a doorbell. **tas**

POP/ROCK

Alan Taffel

Wilco: *The Whole Love*. (96/24) HDtracks.com

A new Wilco album is cause for high expectations, and a good one is cause for outright celebration. *The Whole Love*, Wilco’s latest, is a good one. Whereas the band’s previous effort, *Wilco* (the album), was overly self-conscious (Exhibit A: that title), *The Whole Love* is all about good songs with catchy hooks played by musicians at the peak of their form.

Unfortunately, in contrast to other recent Wilco albums, which have been models of natural recording, *The Whole Love* has sonic issues. The main trouble is that too many tracks sound grungy. In less severe cases, like the infectious title track, the CD and the HDtracks 96/24 download are sonically essentially indistinguishable—and fairly decent. But on the worst-sounding tracks, such as the equally-radio-ready “Dawned on Me,” the download is a bit cleaner, making it easier to enjoy. That’s reason enough to give the download the nod, but be forewarned that neither version is up to Wilco’s recent sonic standards.

Beach Boys: *Pet Sounds*. (96/24 and 192/24) HDtracks.com

In 1990, this legendary work finally received the golden-gloved CD-remastering treatment. That disc is quite satisfying, with a clean, mostly relaxed sound that makes Brian Wilson’s handiwork easy to appreciate. In keeping with the style of the day, the balance is quite lean. On occasion, this version’s vocals get irritatingly edgy, but the problem isn’t pervasive.

As for the 96/24 download, this is a case where hires really lives up to its moniker. Compared to the CD, the download more faithfully captures difficult instruments like the sleigh bells in “God Only Knows.” Strings invariably sound more realistic, too, and vocals lose some of that grating edge. The 192/24 version offers even more resolving power, so realism is amped up still further. Additionally, this version offers a greater sense of space and more solid rhythms than the 96/24 edition. Most significantly, vocals at this resolution achieve a heretofore elusive purity. Indeed, the 192/24 download is a surprisingly big jump up from the 96/24. It’s well worth the extra coin, especially for such a classic, archive-worthy album.

Allman Brothers Band: *Live at Fillmore East*. (96/24) HDtracks.com

This, as all must know, is the recording of the blues-rock band. I hadn’t heard it in quite some time, and though the songs have become perhaps overly familiar, I was still knocked out by Gregg Allman’s fabulously raw vocals and the swirling guitar work of masters Duane Allman and Dickey Betts.

I had on hand two 44.1/16 versions of the album. The 2003 Deluxe CD sounds great: airy, clear, rock solid. Dickey Betts’ guitar, in particular, is appropriately and deliciously raw. The only real drawback is that Greg Allman’s voice is recorded so brightly it’s occasionally piercing. Surprisingly, the 2004 MFSL hybrid CD/SACD is less successful, at least on the CD layer. (I didn’t have a way to play the SACD layer.) This version curtails the Deluxe CD’s sense of space, as well as the rawness of Betts’ guitar. Vocals are, if anything, even more stingingly bright.

Fortunately, HDtracks has taken the 96/24 download

Download Roundup

from the same master as the Deluxe CD version, so it starts with good bones. Liberating the sound with a higher sample rate and bit depth results in a far greater purity of raucousness, if such a thing is possible. Vocals become more natural (though still overly bright on certain tracks), as do the drums, which are after all the only acoustic instrument in sight. The download's rhythms are also sharper than the CD's.

The Who: *Tommy*. (96/24) HDtracks.com

One of the most impressive things about the rock opera *Tommy* is that it works perfectly well without “help” from visuals. The lyrics are so clear, the music so evocative, that scenes spring vividly to life within the listener's mind. Even the unlikely conceit of Roger Daltrey singing all the parts is so successful that one never feels a need for different vocalists. Indeed, versions with visuals (e.g. the film) or additional singers (e.g. Elton John as the Pinball Wizard) have consistently fallen short.

The decades since *Tommy*'s release have done nothing to diminish its appeal. Whatever else *Tommy* may be—the birth of a new art form, a commentary on industrialized society—it's at root a collection of simply great songs. That's why I never could leave it at “Overture/It's a Boy,” which already told me everything I needed to know about each format's sonics. I always got sucked into *Tommy*'s strange and melodic world. To modern ears the production and instrumentation seem quite basic, but that doesn't distract from—indeed, it underlines—the excellence of the music and performances.

Because *Tommy* was written for—and works best in—the purely aural world, sound is especially important. The MFSL release, the only one I had

on hand, is very good indeed; but the download is a brighter shade of wonderful. Highs are more extended, so cymbals stop sounding pasty, and more subtle dynamic variations significantly enhance the emotional impact. Sonic check-listing aside, the download just has more verve than the CD, and I recommend it highly on all counts.

POP/ROCK

Alan Taffel

Grateful Dead: *Workingman's Dead*. (96/24) HDtracks.com

Workingman's Dead epitomizes the Dead's ability to seamlessly fuse folk, country, and blues using mostly acoustic arrangements, unpretentious playing, and loose harmonies. It even includes a couple of tunes that have easily stood the test of time. If this is your thing, this is your album. But which format? I didn't have the original CD, but I did audition the subsequent Rhino release and found problems. On certain tracks, notably “Casey Jones,” the vocals are so sharp they're piercing, which seriously messes with the album's intended mellow vibe. Also, the vocals are so forward in the mix they relegate everything else to the background. Some tracks are less abrasive, but in no case do instruments emerge from the haze.

It takes only two seconds to hear the sonic improvements in the download, which gives the impression that the players all took three steps toward the microphone—and they cleaned the tape heads. Not

only can the guitars be heard, they also have real body and air around them. Vocals remain prominent, but now there's a band to balance them out. Meanwhile, all traces of vocal shrillness are gone. Clearly the download is *the* version to own. For me, at least, it's revelatory.

Crosby, Stills and Nash. (96/24) HDtracks.com

Although CSN and the Dead bear superficial resemblances—both are folk-forward, harmony-heavy, and mostly unplugged—they represent different eras. The Dead were laid-back hippie heroes, while CSN heralded a more commercial, perfectionist musical bent that's still with us (albeit in very different forms). CSN's eponymous first album makes it work through infectious energy and top-notch songwriting. Never again would the group feel so original.

Once again I lacked the original CD; but, given the era, it's likely pretty dreadful. However, I do own *three* other silver disc versions. The Joe Gastwirt remaster from 1994 isn't bad; the guitars and vocals sound good, if a bit recessed. However, there are a couple of issues. The bass is punchy but sloppy, and the top is rolled off. The Rhino “Expanded” version helps resolve both problem areas. It also brings the midrange forward—perhaps a little *too* forward—and that makes vocals and guitars more audible. The Steve Hoffman-remastered Gold CD on Audio Fidelity cleans things up considerably. The bass tubbiness is finally banished, and the midrange is dialed back (versus the Rhino version) just enough to achieve perfect balance. The leaner midrange does lead to occasional guitar and vocal brittleness, but not distressingly so.

The download most closely resembles the Joe Gastwirt version, from which I assume it was taken. That means

overripe bass (to put it mildly) and smothered vocals. On the plus side, the download exhibits demonstrably better upper-frequency extension than the CD, as can be heard in the percussion on “49 Bye-Byes.” Overall, though, the download suffers from the same problems that mar every version of this album except the Gold CD. That's the version I'd seek out.

Rod Stewart: *Every Picture Tells a Story*. (96/24 and 192/24) HDtracks.com

Listening to this classic album is refreshing in so many ways. Here's a band, fronted by Stewart's guitarist chum Ronnie Wood before he was a Rolling Stone, that could be considered “rag tag” or even sloppy. They didn't bother about perfectly lining up every part to the measure marker—or even to each other. Stewart's vocals could hardly be considered pristine, either. Yet the resultant music is so much more human than today's quantized and auto-tuned exercises. Equally refreshing are lyrics that haven't been through a political correctness filter. Imagine a modern paean for a “slit-eyed lady” offering a “ride on the Eastern moon.” Finally, it's bracing to hear Stewart in prime voice and feisty spirit, as opposed to his current incarnation as a standards crooner. The material has held up well, too. Most listeners will immediately think of the Stewart-penned hits, such as the title track, “Maggie May,” and “Mandolin Wind,” but the covers are equally rewarding. These include the definitive version of “I Know I'm Losing You” and a surprisingly tender “Someone Like You.”

So how do the downloads sound? Overall, pretty darned good, at either resolution. This is one album that will never fool you into thinking the musicians are

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in the room. But nor is it harsh, muffled, bright, or afflicted with any of the other common pop maladies. Sound quality rises in inverse proportion to the number of musicians playing. For instance, several songs begin with a guitar, piano, or mandolin solo, with Stewart then joining in. These moments have a beautiful purity—a purity that crashes in flames as soon as the rest of the band enters.

The 96/24 download is hard to fault; it does nothing to compromise the virtues described above. The 192/24 version has a tad more top-end extension, which allows it to “breathe” a little more. The difference is subtle, so unless you have a top-drawer USB DAC and cable I doubt you’ll be able to hear it. On the other hand, the various CD editions clearly can’t compete with either download. The 1988 re-master sounds tubby and claustrophobic, and suffers from some sort of time-based distortion that raises the hair on the back of my neck. The MFSL version fixes both problems, but this version is muffled throughout. Bottom line: download the highest-resolution file you think your system can handle and prepare for a thoroughly enjoyable experience.

CLASSICAL

Andrew Quint

Beethoven: Symphony No. 3. *Creatures of Prometheus and Egmont* Overtures. Orquesta Sinfónica Simón Bolívar, Gustavo Dudamel. (96/24) HDtracks.com

Mahler: Symphony No. 5. Philadelphia Orchestra, Yannick Nézet-Séguin. (96/24) HDtracks.com

Gustavo Dudamel is to conducting what Lang Lang is to piano playing. Both men are phenomenally talented (and photogenic) young musicians with an ultra-dynamic stage presence who’ve been in the public eye since they were teenagers. Both have hyperactive PR departments behind them to support each new release. And both seem immune to any sort of criticism, as if it would be unseemly to ever suggest that these two anointed saviors of Classical Music could ever be capable of an artistic misstep.

Sometimes good hair and podium pirouettes aren’t enough. Dudamel’s new version of the “*Eroica*” Symphony with the Orquesta Sinfónica Simón Bolívar—the ensemble of which he was named music director at 18; now 32, he’s also in charge of the Los Angeles Philharmonic—is pretty ordinary. The opening Allegro con brio gets a bit sing-songy and Dudamel’s Funeral March is the longest I’ve ever encountered, the conductor dragging the movement out to 17:39. After the Symphony comes two shorter Beethoven items, *The Creatures of Prometheus* and *Egmont* Overtures; the latter may be the most successful selection on the program

in achieving a Beethovenian solidity. The musicians of the Venezuelan ensemble play competently, sometimes more than that, as with the stirring horn passage in the *Eroica*’s third movement Trio section. The sonic presentation is rather flat and not especially refined, no better than a good CD.

It’s a very different scenario in Philadelphia. When Yannick Nézet-Séguin was named the eighth Music Director of the Philadelphia Orchestra in 2010, most casual music-lovers in The City of Brotherly Love hadn’t heard of him. (Even now, that last name is too complicated and most locals simply refer to the 36-year-old conductor as “Yannick”.) The French-Canadian steadily built a career over the past 15 years and has been impressing Philadelphia audiences since he arrived with memorable performances of blockbusters like the Verdi Requiem and Mahler’s Sixth Symphony. If this reading of Mahler’s Fifth isn’t as white-hot as venerated versions of old from Bernstein and Solti, it nonetheless manifests the composer’s characteristic emotional volubility. We also get *prima facie* evidence that the PO has been built into one of the finest orchestral groups on earth by its recent conductors; a special treat is Jennifer Montone’s graceful execution of the Scherzo’s obbligato French horn part. The sound from Verizon Hall has superior front-to-back layering and a good sense of the performing space.

Chesky: *New York Rags*. (192/24) HDtracks.com

By the time you’re reading this, the CD iteration of David Chesky’s astounding *New York Rags* will have been released. *Don’t get it*: This music and recording deserve the highest of high fidelity and that’s just what

the 192/24 download delivers. The piano sound is immediate but not claustrophobic. The listener gets an enormous amount of detail: it’s apparent that the Yamaha DCFX Mark IV Disklavier concert grand recorded at the Hirsch Center in Brooklyn has been meticulously regulated, voiced, and tuned. This is certainly among the finest piano recordings ever made. And do try it with headphones for an extraordinary binaural “dummy head” experience. You’re getting the performer’s aural perspective. Except, of course, that there *is* no performer: the instrument is a “reproducing piano,” programmed to flawlessly render Chesky’s pianistically impossible miniatures.

Chesky is a New Yorker through-and-through. (“I really don’t go to the Colorado Rockies or the Pacific Northwest and look at sunsets. I’m not inspired by that,” he told TAS’s Bill Milkowski, who wrote the album’s program notes.) These pieces, in addition to serving as an homage to the great ragtime composers of generations ago (Scott Joplin, James Scott, Joseph Lamb, et al.) also reflect Chesky’s irrepressible love for his hometown. Most of the rags are played at brisk, sometimes manic tempos that reflect the pace of life in The Big Apple, both public (“Times Square”, “Penn Station”) and domestic (“Kids You’re Late for School Rag”). The “J Walker Rag” has a slightly loopy feel—a native citizen ignoring a flashing *Don’t Walk* sign, oblivious to the traffic rushing by—while the “Fourth Street Rag” sports the vibe of a Lower Manhattan hipster. There are nods to other musicians besides the Ragtime gods. “The Bernstein” has the slightest whiff of *West Side Story* (Chesky has always been a genius at just hinting at the essence of another composer when he pays tribute) and “The Duke” suggests both Edward Kennedy Ellington’s refined

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piano style and a big band sonority. Those familiar with Conlon Nancarrow's player-piano studies may also detect affinities to those spidery, jangling mid-century excursions in superhuman rhythmic complexities. But, mostly, we get David Chesky's distinctive, disciplined yet spontaneous voice: The harmonic language is a sophisticated polytonality, meters are often irregular, and melodies asymmetric and spiky, as Chesky conjures up panoramas of his beloved Gotham.

POP/ROCK

Alan Taffel

**Carole King: *Tapestry*. (96/24, 192/24)
HDtracks.com**

No amount of remastering or re-rezing is going to rescue *Tapestry* from its early 70s leanness or its mix, which renders indistinct every instrument other than King's piano and vocals. Exhibit A: The drums are all but inaudible on most tracks. On the other hand, no amount of sonic butchery can diminish the quality of material or the sincerity of the performance on this quintessential singer-songwriter album. These songs are as timeless and well-crafted as any in the rock canon, although the arrangements are by now hopelessly quaint.

Would that the downloads rectified the album's sonic ills, but unfortunately that's not the case. Indeed, the

96k version manages to sound worse than the CD. Tonally, the download is even paler, and what few high frequencies the disc exhibits are pretty much squelched on the file. Dynamics, too, are more restrained. The 192k version is better in than the 96 in every respect, yet compared to the CD it still represents a trade-off; the download has greater purity, but it's still rolled off in the highs.

Given the generally poor quality of this recording, and the fact that the CD can be had for a mere six bucks on Amazon, it's hard to justify spending three to five times that amount on one of the downloads when neither is superior to the CD overall.

Michael Jackson: *Bad*. (48/24) HDtracks.com

When we reminisce about Michael Jackson in his prime, most of us think of *Thriller* or perhaps *Off the Wall*. Yet *Bad* was another solid collaboration between the "King of Pop" and producer Quincy Jones. The album includes a surprising number of hits, including the title track, "The Way You Make Me Feel," "Man in the Mirror," "I Just Can't Stop Loving You," and "Smooth Criminal." They all hold up well, and all give the lie to the legion of feeble MJ pretenders that populate modern pop radio.

The "25th Anniversary Edition" CD is a bit more bass-heavy than the download. I suspect that in this respect the CD is "right," given the nature of the music, but who really knows in this purely electronic context? In any event, the CD is mildly punchier than the download, but the latter more than compensates by being liberated from the CD's digital edge.

This last point should not be taken lightly. Jackson's voice on the download is far more dimensional and

refined. The entire presentation is smoother, which is a good thing because this jagged, synthesized music can do without any sonic "help" in those departments. Overall, the download is simply much more listenable than the CD.

Billy Joel: *The Stranger*. (88/24) HDtracks.com

Typical of Billy Joel's music, *The Stranger* contains songs of undeniable loveliness and catchiness—as well as an all-too-generous helping of maudlin moments. But by now you know how you feel about this music, so I'll talk no more about it and turn instead to sonic matters.

The Stranger has seen numerous CD-format releases. I had on hand the original issue as well as the super-duper Legacy version, which includes an entire extra disc containing a live concert. Between these two the original is decidedly better sounding. The Legacy edition is *louder*, but you know what *that* usually means. Sure enough, this version is compressed, and that compression renders Phil Ramone's production lifeless and the sound irritating.

So what about the download? It's one of those slam dunks. The hi-res version of this album is *much* more revealing than the CD; yet, at the same time, it is also far more relaxing to listen to. And that's not all. Upbeat songs like the title track get newfound drive, while softer entries such as "Just the Way You Are" take on greater beauty. In sum, the download is a major step up from the CD, and highly recommended.

Janis Joplin: *Pearl*. (192/24) HDtracks.com

The original CD of this superb blues-rock standard—sadly, Joplin's last studio release—suffers from a surfeit

of grunge and puts an artificial edge on Joplin's voice—the last thing it needs. A later CD, *The Pearl Sessions*, contains additional material but no sonic improvement to the original tracks, which sound identical. (The liner notes are unclear about whether this is supposed to be the case, but either way, it is.)

HDtracks offers *Pearl* in two resolutions. The 96k version at first resembles the CD. Then you notice that it is blessedly missing about half of that nasty vocal edge and virtually all the grunge. On further listening, you become aware that the download has noticeably tighter rhythms and greater top-end extension.

At 192k there are even fewer digital artifacts; yet, for some reason, the music doesn't "move" as well at this sample rate. The music sounds bogged down and sluggish. This appears to be a case where, in going to an even higher resolution, the baby got thrown out with the bath water. (It happens more often than you might think.) At any rate of all the digital versions of *Pearl* extant, the best I've heard and the clear choice is the 96k download.

Download Roundup

POP/ROCK

Alan Taffel

Grand Funk Railroad: *We're An American Band*. (96/24, 192/24) HDtracks.com

As a teenager I worshipped GFR even as the critics scorned them. Now I'm a critic and I see what my forerunners were talking about. So why did I reviews these downloads, especially as I have no CD or other digital format to compare them with? Sheer curiosity: I wondered why the album merited the high-res treatment. Did it have stellar sonics? Had I missed something in the music? Well, no on both counts. This is juvenile music played by a not-particularly-tight band (but they're *American*). As for the sound, the 96k download is what you'd expect of the era: flat, bass heavy, smothered, monodynamic. The 192k version is more transparent and open, allowing the music to make an almost-compelling case for itself. Almost.

Bob Dylan: *Highway 61 Revisited*. (88/24) HDtracks.com

Highway 61 Revisited includes several of Dylan's most famous songs, including "Like a Rolling Stone" and, of course, the title track. Unsurprisingly, given its status in rock's pantheon, the album exists in a mind-numbing mélange of releases—in both mono and stereo. I shan't attempt to catalog them all here. Let's just say the various CD-format versions all capture the fresh brashness of a youthful, confident Dylan, while occupying a fairly narrow sonic spectrum characterized by a subdued high end and more or less midrange

honk. Until, that is, you get to the DCC Gold Disc, which is markedly brighter and bouncier than what came before. The same is true of the hybrid SACD's CD layer, and of this 88k download. These two are pretty much dead ringers for each other, and I find them both too tipped-up for comfort. My bottom line here is that the old CDs are just fine, but the DCC is also a good way to go.

Paul Simon: *Graceland*. (96/24) HDtracks.com

Unlike the LP, the original CD of Paul Simon's watershed meld of African rhythms and American folk sensibilities is not all that great sounding. Simon's voice is full and natural, as are the other-worldly harmonies of Ladysmith Black Mambazo, but other instruments are tonally neutered and lacking in dynamics. The HDtracks download is a whole 'nuther animal, in part, I'm sure, because it was taken from the re-mastered 25th Anniversary Edition of the album. Pretty much everything about the download stomps the CD. The resultant album has a rich tonal palette, perfect top-to-bottom balance, dynamics galore, and propulsive rhythms. In short: awesome.

The Band: *The Last Waltz*. (48/24) HDtracks.com

Here's the soundtrack to one of rock's greatest concert films (along with *Stop Making Sense* and *Woodstock*). Its charms are many, including the enduring songs, superior musicianship—especially Robbie Robertson's

herky-jerky guitar and Levon Helm's gravel-throated vocals—and the amazing guest roster (Eric Clapton, Joni Mitchell, Bob Dylan, Van Morrison, and on and on). Yet the most astonishing thing about *The Last Waltz* is the chameleon-like way The Band just drops into the perfect style for each guest artist. Without seeing Martin Scorsese's masterful film, for instance, you could be forgiven for thinking Muddy Waters brought his own backup players.

Still, for all its musical strengths, the original CD is not especially pleasant to listen to. Dynamics are flat, as is spatial perspective. The sound can get rather gritty, too. In 2002, Rhino Records came to the rescue, bestowing upon the album the full deluxe re-issue/re-master treatment. The contrast to the original CD is dramatic. Forget about a veil being lifted; Rhino removed all seven! Dynamics, space, extension (both high and low), pace, and a visceral sense of presence are all here in spades. So the question for the download becomes: how does it stack up against the Rhino CD? One would expect them to be close. After all, the resolutions aren't that different—the download is 48k to the CD's 44.1k—though of course the download enjoys a 24 to 16 bit-depth advantage. As it turns out, these small differences are insufficient to compensate for the superiority of the Rhino re-master, to which HDtracks presumably didn't have access. Yes, the download is more refined and transparent than the original CD; but it can't match the openness and verve of the Rhino disc.

That a particular physical disc sounds better than the corresponding download is academic if the disc in question is an audiophile limited-release and now hard to obtain. That's not the case here. So while this download is good, the superior Rhino CD is readily available. If you don't have it, you should.

Leon Russell. (96/24, 192/24) HDtracks.com

From the meltingly beautiful "A Song for You" to the raucous closer "Roll Away the Stone," this is an essential album from the master of Delta blues/rock. I don't own the original CD, but I did have on hand the Steve Hoffman re-mastered DCC Gold CD, which sounds terrific on low-level tracks. But the disc becomes quite strained when Russell hits full boogie mode. Fortunately, the 96k download is an improvement in every respect. Russell's piano takes on welcome warmth and body, and his voice has greater immediacy. Too, there's more air around instruments and dynamics are far more convincing. Most importantly, you can thoroughly enjoy the boisterous tracks without fear of cringe-inducing distortion. Although I recommend the 96k download unreservedly, the 192k version is even better. The two are very close, but the nod goes to the higher-res edition thanks to a hair more clarity, images that fill the stage more completely, and rhythms that are even more rollicking. Who would have thought *that* was possible? **ALAN TAFFEL**

Download Roundup

CLASSICAL

Andrew Quint

Stravinsky: *Le Sacre du printemps*. *Firebird Suite*. *Scherzo à la Russe*. *Tango*. Budapest Festival Orchestra, Fischer.

Vivere. Ragazze Quartet.

BOTH: Channel Classics. (DFF stereo and multichannel) channelclassics.com

Channel Classics is one of a very few labels to currently sell DSD downloads. Its entire SACD catalog, over 130 titles, is available as stereo DFF files and, as of this writing, there are about a dozen multichannel offerings. These files are huge—an SACD-length program weighs in at 5-7 gigabytes—and takes a few hours to download.

If you're not one of the very few who can actually decode a DSD file with your processor, you'll be asking your music management software to convert the DFF files to PCM. Things will work out much better if you pick a multiple of 44.1 kHz, rather than 48, 96, or 192. Also—and I have TAS computer-audio maven Karl Schuster to thank for the advice—resist the temptation to convert to 176.4kHz and go instead with 88.2. The lower sampling rate will prevent contamination of your sound with the ultra-high-frequency “noise-shaping” artifact of the DSD encoding process. As Karl put it, unless you want to “drive away bats or torture dogs,” don't invite that stuff in.

Whether the repertoire is Dvorák, Beethoven, or Mahler, Iván Fischer is not a conductor given to grandstanding. His reading of *The Rite of Spring* has

neither Leonard Bernstein's savagery nor the precision of Pierre Boulez. It's nonetheless an appealing performance that's beautifully shaped and colored, and undeniably danceable. Fischer's interpretive tendencies are better suited to *Firebird*, where the splendid tonal resources of the Budapest Festival Orchestra are put to good use. Stravinsky's circus-like *Scherzo à la Russe* and his tart but wistful *Tango* fill out the program.

The four young women who make up the Ragazze Quartet trained for two years at the Dutch String Quartet Academy and have since seen international success. Their death-obsessed debut program for Channel is, oddly, entitled *Vivere*, Latin for “to live.” Never mind. We get robust but aptly scaled performances of two chamber music staples, Haydn's “Quinten” and Schubert's “Death and the Maiden” quartets. Technically, the playing is top-notch and ensemble blend is gorgeous—but it's the lyrical, yearning quality that makes this program essential. Completing the program is a work by the contemporary German composer Jörg Widmann, his *Hunting* Quartet. The four players start off amiably enough but...well, let's just say that the Ragazze finishes as a trio.

Comparing the stereo DFF download to stereo SACD playback, while both are excellent, the download gets the nod. With the files, there's more tonal richness, superior spatial representation, and a more effortless sense of dynamic headroom—those 11 cataclysmic timpani/bass drum strokes that begin “Glorification of the Chosen One” in Part II of *The Rite*, for example. As for multichannel playback of DFF files: two-channel 88.2kHz data can exit your computer via a USB DAC for decoding in your processor but that doesn't fly for HD surround sound. For that, most will employ HDMI and standard implementations won't do

the 44.1 multiples. Converted to 96 or 192kHz PCM, Channel's DSD-sourced multichannel downloads sound much less involving than the corresponding silver disc program. But an Oppo 103/105 will happily read a multichannel DFF file off a hard drive and send it via HDMI for processing as 88.2kHz; I spent an evening with a Beatis music server that could do it as well. The sonic results were Nirvana for the multichannel devotee.

Recital: James Welch.

Beethoven: Violin Sonata No. 10. Enescu: Violin Sonata No. 3. David Abel, violin; Julie Steinberg, piano.

BOTH: Wilson Audiophile. (176/24). HDtracks.com

Wilson Audiophile Recordings—dormant all these years—has chosen well for its first HD downloads. *Recital: James Welch* is a stunning recording of a modest-sized Flentrop organ. The program is mostly Bach, with a few less familiar composers thrown in, notably Jan Koetsier, whose exquisite Partita for English Horn and Organ opens the program. Organ recordings are usually judged by their dynamic power; this one impresses by virtue of its tonal and timbral nuances. Details of Welch's registrations can be fully appreciated: it's quite obvious when a stop that isn't an octave multiple of the fundamental pitch has been added.

I've long felt that David Abel and Julie Steinberg's two violin-and-piano records for Wilson are the best-sounding chamber music recordings I've ever heard. The hall has been effectively eliminated from

the equation and the two musicians are there in your listening room, palpably scaled and positioned. Abel has a small but attractive tone, and he plays with spot-on intonation and a narrow, even vibrato. The subtlety and control of his playing is matched by his accompanist.

I have a pristine copy of the Abel/Steinberg LP and it pains me—I'm no vinyl fetishist—to report that the record sounds better. The two players are presented in even sharper relief and the overtone structure of Abel's instrument is delivered with exceptional realism. Some of these Wilson LPs go for hundreds of dollars on-line. I can see why. Time for Wilson to reissue them.

Andrew Quint **tas**

CD/SACD PLAYERS, DACS, SERVERS, & OTHER DIGITAL SOURCES



Marantz SA8004

\$999

This two-channel only SACD/Red Book player boasts parts, circuitry, and construction way disproportionate to its low price—virtues that are mirrored in its equally superb-

for-the-money reproduction of music. Tonally neutral, authoritative and natural, with just a hint of warmth—

thus simply sumptuous on big material like operas and nineteenth-century symphonies—the SA8004 is a music lover's dream. Fans of hard rock, heavy metal, and the like may—may—find it a little too smooth, but it's certainly no sluggard with such fare. It's hard to imagine anyone who appreciates what real music actually sounds like not being seduced. PS bought the review sample.

us.marantz.com (211)



Oppo BDP-105

\$1199

Few disc player/DACs can compete with Oppo's BDP-105 at its price point (or even near its price point), because the Oppo offers a seemingly unbeatable combination of versatility, flexibility, and serious high-end sound quality. Clean, clear, and decidedly detail-oriented, it hews somewhat toward sonic leanness, but is far more revealing than it has any right to be for the money. With the BDP-105 what you hear is what's on the record, with no comforting (but perhaps sonically misleading) infusions of softness, warmth, or bass enrichment. In sum, the do-all Oppo is a multi-format disc player and multi-input DAC with which your system can grow (and it is also the vehicle of choice for many firms offering ultra-high-performance upgrade mods). Finally, did we mention the Oppo sounds terrific when heard through top-tier headphones?

oppodigital.com (232)



Marantz Reference Series SA 11S

\$3999

Marantz products almost always stand out from their competitors for a very musical sound that is notably free from harshness, glare, or anything remotely abrasive. Such is the case with the SA-11S. The tonal balance is neutral, which means that nothing calls attention to itself up and down the spectrum. It has state-of-the-art control and resolution yet also an elusive naturalness and musicality that banish all memories of the digital sound of yore. On SACD sources especially, the SA-11S is one of the best PS has heard anywhere and unquestionably the best he has had in his house. If he were in the market for an integrated player to handle both Red Book and SACD sources, this is the one he would buy owing to its lineage, its perfect mediation of musicality and neutrality on CD sources, and its absolutely magnificent SACD performance.

marantz.com (233)



Marantz UD9004

\$5999

The UD9004 is one of the first Blu-ray-capable universal players with high-end ambitions, and it makes a strong case for both itself and this new category. After a rather complex set-up process, the Marantz juggles formats with alacrity. Its playback of video and high-resolution music—particularly SACD—is unimpeachable. Meanwhile, CD playback is reference-caliber in dynamics, neutrality, bass and depth, though the UD9004 imparts some grain to vocals and softens leading edges. In addition to excellent overall performance, the Marantz delivers all the luxurious aesthetics and refined operation one would expect at this price.

us.marantz.com (204)

CD/SACD PLAYERS, DACS, SERVERS, & OTHER DIGITAL SOURCES



Cary CD 303T

\$6495

Cary's CD 303T is a remarkably complete digital audio playback device. Its bag of tricks includes Red Book CD playback with selectable upsampling frequencies of

44.1, 96, 192, 384, 512, and 768kHz; decoding of HDCD-encoded CDs, and, of course, SACD

playback. Both two-channel and multichannel modes are available, and the 303T's internal clock processes DSD at 22.5792MHz, which is double the norm. What's more, the unit has selectable solid-state and tube output stages. Even in transistor mode the sound is quite warm (though never sluggish) in a way that highlights musical expressiveness, as opposed to more angular, detail-oriented designs that arguably deliver more impressive hi-fi effects. It also delivers convincing soundstaging both large- and small-scale, and layered three-dimensionality with plenty of ambience.

[caryaudio.com \(213\)](#)



mbL Corona C31

\$9200

The Corona line from MBL may well be just about the most purely beautiful electronics on the market with sonics to match. However, in today's computer-driven marketplace, if you needed further proof that the CD player is alive and well, look no further than the C31. A slot-loading CD player at heart, it includes a high-

performance DAC with inputs for USB, SPDIF, and TosLink. At times NG found himself giving the CD player a slight nod for superior image focus and the reproduction of low-level detail. But moving to 24-bit/96kHz material, he preferred USB hands-down. The classic MBL signature—the bloom and analog warmth that informs all its gear—is built into the C 31's DNA. A fabulous two-fer.

[mbl-northamerica.com \(228\)](#)



Esoteric K-03

\$11,650

A brilliant concept beautifully executed, the Esoteric K-03 is much more than a CD/SACD player. It is also a full-fledged DAC, with ample inputs, multiple upsampling and filtering options, and even provisions for an external word clock. Its USB interface is state of the art, supporting the highest resolutions and asynchronous clock control. As a DAC, the K-03 has few peers. Both the S/PDIF and USB interfaces are among the best AT has heard. In either case, rhythms are unflagging, details emerge clearly and naturally, and listener fatigue is non-existent. Dynamics are superb as well, and the sound is always open and airy. The K-03 also excels as a disc player, especially when playing SACDs. CD sound is not quite up to the K-03's benchmark in other modes, but it is ravishing nonetheless. Though it is not cheap, the K-03 delivers a level of versatility, build- and sound-quality, and operational smoothness that fully justifies its price.

[esoteric.teac.com \(213\)](#)



dCS Puccini and U-Clock

\$18,999; dCS Puccini U-Clock; \$5499

If you're part of the 99.99% of audiophiles who can't afford dCS' \$110k Vivaldi digital playback system, the company's Puccini CD player is the next best thing at less than one-fifth the price. As with the Vivaldi, the Puccini is packed with dCS' proprietary technologies, including the brilliant Ring DAC and a custom software-based digital filter. The sound from CD is extraordinarily dense in detail and tone color, with a solid bottom end and spacious soundstaging. The icing on the cake is the Puccini's fabulous rendering of SACD. The U-Clock is an outboard clock that not only improves the Puccini's sound quality but also serves as a USB interface so that you can access the Puccini's DAC with a computer-sourced signal. Recently updated to support DSD on USB and Puccini digital inputs.

[tempohighfidelity.com \(183\)](#)

CD/SACD PLAYERS

CD/SACD PLAYERS, DACS, SERVERS, & OTHER DIGITAL SOURCES



Esoteric K-01

\$20,450

The entry fee for Esoteric's flagship K-01 isn't chump change, but how often does such a sum purchase three reference-level components? The K-01 is the best CD player and SACD

player and USB DAC AT has ever heard. Even as an SPDIF DAC the K-01 fully competes with reference models, and

as a transport it puts many stand-alone units to shame. In either player or DAC mode, the K-01's resolution, dynamics, soundstaging, and timing are all top drawer. Meanwhile, the internal linestage, often an afterthought in otherwise good DACs, is a standout. Sum it up, and the K-01's sonics are never less than riveting. Esoteric has packaged all this performance and functionality in a flawlessly operating, elegantly hewn chassis, making the K-01 one of the high end's best values. If AT had to choose a single yet singular digital source component, the Esoteric K-01 would be it.

esoteric.teac.com (230)



Burmester 089

\$30,495

Burmester's versatile 089 can be used as a pure CD player, but it also features a built-in linestage—identical to the \$30,000 088 standalone linestage—a volume control, plus a digital and an analog input. Thus, this player can serve as both the source and the nerve center of an audio system. As with all Burmester products, the 089 positively oozes quality. Sonically, the 089 has an ultra-quiet background that gives free rein to an intense musicality. The player is highly but gently resolving, exquisitely renders dynamic and emotional shadings, and provides an uncanny sense of “inevitable” pace. As a linestage, too, the 089 is excellent. Using the 089 as a DAC sacrifices some of the integrated unit's magic; nonetheless, it is perfectly suited to supporting an external DVD player or cable box. In any configuration, the 089 delivers a truly captivating musical experience.

burmester.de (212)



dCS Vivaldi Digital Playback System

\$108,496

The four-box Vivaldi is unquestionably the state of the art in digital sound quality, functionality, and technical sophistication. This flagship from dCS incorporates technology unlike that of any other digital product, with all the key subsystems designed and built by dCS using proprietary hardware and software. It sounds unlike other digital products as well, with a density of information, saturation of tone color, bottom-end authority, and highly spacious yet precisely rendered soundstage that outdo the competition. Although the complete system comprises four separate chassis, not all of them are required. The pairing of the Vivaldi Transport and Vivaldi DAC (\$74,998) will get you most of the way there. The Clock and Upsampler are nice additions, but not required to realize the Vivaldi's extraordinary sound quality. Note that the Vivaldi is a highly sophisticated instrument that requires more user involvement than most digital-source components.

tempohighfidelity.com (223)



Esoteric D-07X DAC

\$4650

Despite being Esoteric's entry-level DAC, the D-07X is a serious piece of kit. Its high-grade componentry and lush chassis make it appear underpriced. That impression continues upon listening.

DACS

Sonically very similar to AT's reference DAC, on both SPDIF and USB sources the D-07X

is a lively, dynamic powerhouse, with tight rhythms and rich timbres. The Esoteric lacks a reference's sonic purity—it adds a very thin digital veneer—and sense of effortlessness, but these shortcomings are audible only via direct comparison. On the other hand, the D-07X distinguishes itself even from many reference models with its massive sense of space and surprisingly respectable linestage. Care must be taken when setting the D-07X's myriad upsampling, filtering, and clocking options; they are plentiful enough to tailor the sound to your liking—or to get you into trouble. That's really the only proviso when it comes to recommending this excellent DAC.

esoteric.teac.com (230)

BUYER'S GUIDE

CD/SACD PLAYERS, DACS, SERVERS, & OTHER DIGITAL SOURCES



Berkeley Audio Design Alpha DAC Series 2
\$4995

The Golden Ear and Product of the Year Award-winning Alpha DAC is not only one of the best-sounding digital-to-analog converters, it's also an amazing bargain. In addition to world-class decoding of CD sources, the Alpha DAC can handle any sampling rate to 192kHz and word lengths to 24 bits. Its robust analog output stage and variable output level allow it to drive a power amplifier directly. This feature is significant, because the Alpha DAC is capable of such resolution, timbral purity, and dynamics you'll want to hear it without the limitations of a preamp in the signal path. When used at its best—fed by true high-res sources from a music server, and driving an amplifier directly—the Alpha DAC delivers stunning resolution of the finest musical detail, throws a spectacularly large and well-defined soundstage, and plays back music with gorgeous tone color and purity. A reference-quality product at a moderate price. berkeleyaudiodesign.com (189)

DACS



dCS Debussy
\$11,499

The least expensive DAC from England's digital specialist, the Debussy nonetheless makes use of virtually the same circuitry and technology as its far more expensive stablemates. Further, its generous feature list includes plentiful source-format options, single-ended and balanced outputs, and a front-panel sample-rate display. Most importantly, though, the Debussy's sound is pure dCS, with a density of musical information that sets it apart from the competition. Nor is there any sense of frenetic digital machinations; AT found that sound winds out of the Debussy like thread from a spool. Moreover, this DAC's USB interface is one of the industry's best-sounding, and was recently upgraded to accommodate 24/192 and DSD over a single cable. AT did not care for the Debussy's sound when directly driving a power amp, but otherwise the lack of a front-panel alphanumeric display is about the only drawback of this superb DAC. Despite being about \$10,000 less than the next "cheapest" model, the Debussy boasts a sonic and musical imprimatur that unquestionably identifies it as a true dCS. Recently updated to support DSD on USB and all other digital inputs.

tempohighfidelity.com (209)

MUSIC SERVERS & PERIPHERAL PRODUCTS

Amarra

\$189, \$99, \$85, \$49 (price varies depending on the feature set)

When Amarra first appeared on the scene it was pricier than most of its software competition. But with current pricing that barrier to ownership has been greatly reduced. While there are sonic differences between Amarra and its competitors, the nature, scope, and perceptibility of those differences will vary drastically depending on the other components, both hardware and software, in your system. Still, after all these years, if you want to hear how good a Mac-based system can really sound, Amarra is one of the few playback programs you must have. In the end, it's that simple. sonicstudio.com (225)



Audirvana

\$50

If you have so far resisted buying any third-party music playback software for your Mac, Audirvana offers some compelling reasons to reevaluate that decision. Especially if you use multiple DACs or listen to higher-res files and DSD, Audirvana Plus is a more ergonomically elegant and sonically superior alternative to iTunes. And for readers who need to see and hear for themselves, you can download the trial version of Audirvana Plus for free. For fifteen days you can use the full version with no restrictions. I'd be very surprised if, by the sixteenth day, you haven't anted up that \$50 to become a licensed user. audirvana.com (225)



Channel D Pure Music

\$129



Pure Music is a great piece of software at a price that even

a flea market-scrounging hobbyist audiophile can afford. Combine Pure Music with any recent Mac computer and you have a front end that will play back any digital file from FLACs to lowly MP3s on up to 192/24 high-resolution files with ease. Mate this front end with a top-flight DAC and you have a digital playback system that will catapult you to the forefront of the new computer-playback revolution.

channld.com (211)

CD/SACD PLAYERS, DACS, SERVERS, & OTHER DIGITAL SOURCES



Wadia 170 iTransport/151 Power DAC Mini

\$299/\$799

Wadia's 170 iTransport was the first Apple-sanctioned iPod docking device that let you tap into the iPod's digital output, bypassing the iPod's compromised internal D/A converters and analog output stage. Digital output appears on a standard jack for connection to an outboard D/A converter, providing the convenience of the iPod with the sound quality of your outboard DAC. As a companion to the dock Wadia has recently created the 151 PowerDAC mini digital integrated amplifier. This little all-in-one box should be ideal for a den, bedroom, or desktop system. Coupled with a pair of top-echelon monitor speakers and the Wadia 170, the Wadia 151 will deliver sonics that will enthrall anyone who gives it a listen.

wadia.com (204)



Berkeley Audio Alpha USB Interface

\$1895

The folks who brought us the amazing Alpha DAC have finally solved the problem of how to get high-resolution audio out of a computer with the highest possible quality. The Alpha USB is a sophisticated solution to an apparently simple problem: how to connect a DAC to a computer's USB output. The Alpha USB connects to your computer's USB port, outputting a coaxial signal (on BNC jack) or AES/EBU (on an XLR jack) so that you can drive a DAC. The Alpha USB's sonic magic is the result of heroic measures to isolate the "dirty" USB signal from the "clean" S/PDIF or AES/EBU output, and the precise, low-jitter clocking of the digital-audio output. The sonic result is state-of-the-art playback of standard-resolution and high-resolution files, exceeding the performance of even the best soundcards.

berkeleyaudiodesign.com (214)



Bryston BDP-1 Digital Player

\$2195

The astonishing new BDP-1 Digital Player is a technological tour de force that bridges the divide between the Old World CD player and the New World of high-resolution files and music-library management. The Bryston BDP-1 performs the same function as a CD transport, but it plays data files from removable USB storage media, capable of recording thousands of hours of music, rather than from optically-encoded discs. It plays files of all industry-standard sample rates at their native resolution—from CD-quality 16/44.1 up to mastering-grade 24/192—in a multiplicity of file formats too numerous to list. As with CD transports, the BDP-1 offers digital-only output in both S/PDIF and AES/EBU formats for connection to an external DAC. The Bryston BDP-1 doesn't merely "sound better"; the experience of hearing music through it is qualitatively different. It plays music with an unprecedented purity closer to the real thing.

bryston.com (216)

Meridian Streaming System

\$7500 (Price varies with configuration)

When RH had the Meridian music server (formerly called Sooloos) for review, he gave a visiting speaker manufacturer a two-minute crash course in how to use it. Five minutes later the manufacturer exclaimed: "I'm getting one!" Such is the power of having instant access to your entire music library with the tap of a finger on the album art. But the Meridian also anticipates from your browsing what you might want to hear and suggests alternatives. That's just the tip of the iceberg in how Meridian's server revolutionizes the way you interact with your music library. This is the state-of-the-art in music servers. After you've lived with a Meridian, it's hard to go back to searching for CDs.

meridian-audio.com (204)



CD/SACD PLAYERS, DACS, SERVERS, & OTHER DIGITAL SOURCES



Astell & Kern AK100 and AK120 Portable Music Players

\$699, \$1299

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



Holm Acoustics DSP

\$10,000

This DSP unit for room and speaker correction gives excellent results in automatic mode, but offers the opportunity to work with DSP in depth—all the way up to designing digital crossovers for multiway speakers. Doing what should be done, the unit measures independently the direct response of the speaker and the in-room response of the speaker below 500Hz and then makes a correction using both data sets. The results are sonically stunning. Measurement for DSP correction always tends to point up how much correction is needed. But the Holm delivers not only the bad news of how much needs to be done, but also the very good news of what your system can sound like when it is done right. [holmacoustics.com](#) (208)