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IT’S STILL THE SOFTWARE, STUPID

Wi-Fi gets a boost, maybe...

My Track One editorial in June (“It’s the Software, Stupid”) chided manufacturers for releasing Wi-Fi-based speakers, several of which we tested for that issue, that failed to perform with perfect reliability in our reviewers’ homes. As mentioned, our team had all Wi-Fi networks suitable for video streaming, with average to above-average routers. I concluded that the products’ firmware or the multizoom apps intended to control them were somehow at fault.

But I also began to wonder what role our Wi-Fi network really plays with these new products, and whether the demands are not, in fact, outpacing the capabilities of today’s “average” network. After all, it’s hard to believe manufacturers would release speakers that regularly behave glitchy or drop out in real-world use. Did these things perform this way in their labs? How much can performance really vary from network to network?

So it was with interest that I took a meeting in New York a short while later for a briefing and demo with the principal officers of Blackfire Research. If the name sounds vaguely familiar, it’s because we’ve occasionally mentioned the inclusion of Blackfire’s FireConnect technology in an Onkyo, Integra or Pioneer product announcement or review; it’s found in some of their AVRds and wireless speakers. Blackfire also powers Harman Kardon’s Omni line of multizoom speakers. But I wasn’t really familiar with Blackfire technology or why someone might want it.

Turns out, Blackfire’s founder and CEO Ravi Rajapakse is the former chief technology officer of a major wireless supplier to the Department of Defense, which is another way of saying that he’s been responsible for creating wireless solutions for which cost was little or no object, and in which rock-solid reliability in all sorts of conditions was a primary design goal. His frustration trying to move media files around his own home, and what he saw as the limitations of traditional consumer Wi-Fi, pushed him into the 10 years of research that became Blackfire Red, the current iteration of his firm’s proprietary Wi-Fi protocol.

To provide a basic technical definition here, a protocol in this context is a set of rules that controls how the information packets in a network are transmitted. The Internet uses the TCP/IP protocol (Transmission Control Protocol/Internet Protocol); home networks often use TCP/IP as well, and some media transmissions use RTP (Real-time Transport Protocol), which was designed for streaming audio and video data across IP networks.

All well and good, but as Rajapakse explains it, these protocols were designed in the late 1970s for a wired world. So they make all sorts of assumptions that just don’t apply to today’s wireless networks. For instance, wireless networks are often subject to the momentary collapse of packet delivery because of transient events that occur in radio transmission. But on a TCP/IP network, it’s assumed that any transmission loss on the receiving end is the result of the router being unable to keep up—logical, for a wired network—so the transmitter automatically throttles down the data transmission rate. Oops. “That’s one of many examples of what’s in those protocols that is inappropriate for the world we live in today,” Rajapakse says. And although manufacturers of wireless products have tried a variety of patches to modernize these archaic systems, “at a certain level of performance, it crashes—it’s building on a foundation that’s not appropriate for what you want to do. These are the sorts of underlying problems we realized and studied, and then decided to try to solve at a foundational level.”

Critically, Blackfire addresses these issues at the software rather than hardware level. Rajapakse says his experience working with the DOD proved that engineering sophisticated antennas or transceivers, for example, can only do so much and would make the technology expensive and unattractive to product manufacturers. So Blackfire’s protocol can be implemented in software at the chip level if a manufacturer has the fiscal scale to achieve that, or simply be dropped into flash memory and handled by the onboard processor. It is said to require relatively little processing power or memory capacity.

The purpose of all this, Blackfire execs say, is to join up—with reliability and high throughput of data—all of the “entertainment islands” around the house in which our content is currently stranded. Audio or video products enabled for the Blackfire Red protocol (speakers and soundbars, smart TVs, smartphones, laptops, etc.) talk across your existing Wi-Fi network to other Blackfire-enabled products with what is said to be greatly improved data efficiency and stability versus an unadorned network. And as our Wi-Fi networks continue to improve and bandwidth grows, all the better: Blackfire products benefit as well.

As we went to press, I had occasion to discuss this reliability issue with an engineer at a speaker company who had recently developed a wireless Wi-Fi speaker, and he described the process of proofing it out in a range of households and environments. Moments when his team thought the system was rock solid became back-to-the-drawing-board learning experiences as it unexpectedly became glitchy on a different network. Perhaps Blackfire, and other companies working in the same space, can help improve our user experience and better protect a manufacturer’s brand integrity by eliminating symptoms that are sure to be blamed on the product rather than the network. We hope to test some Blackfire-enabled products soon.
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– Dennis Burger, Home Theater Review
Letters

E-mail them to HTLetters@sorc.com. Please note: Questions about the features and functions of a particular product are best directed to the manufacturer. Questions about what product you should buy are best directed to a dealer who knows all the details of your system, your preferences, and your personal habits. All submissions are considered the exclusive property of Sound & Vision magazine and TEN: The Enthusiast Network. We reserve the right to edit letters for brevity. Due to the volume of mail that we receive, we regret that we cannot respond to every letter.

That Stuff Can Kill You

I am the original owner of a wonderful, but aging, Pioneer Elite PRO-151FD TV. Time has taken its toll, and I would like to replace it with a modern high-technology smart TV in the caliber of a 65-inch LG or Sony OLED or a Samsung. In my opinion, however, today’s models raise potential health concerns from continuous long-term exposure to microwave (Wi-Fi) radiation. Presently, the medical verdict on this issue is arguable and unresolved. Yet, several foreign countries have now adopted exposure levels or are considering introducing them. Yes, I get it. Wi-Fi is a tsunami sweeping the world and here to stay for the foreseeable future. Fortunately, a number of electronics manufacturers incorporate an Ethernet (wired) alternative in their smart TVs. Yet, a problem persists. Of the TVs I tested, operating in their wired Ethernet mode, none had their Wi-Fi/Bluetooth truly disabled—ditto for my Roku. While Setup menus confirmed Wi-Fi “disconnection,” their Wi-Fi transceivers continued to produce microwave emissions clearly above trace levels. In none were Wi-Fi signals fully disabled, i.e., less than 0.1 microwatt/cm². Any consumer attempt to disable a TV’s Wi-Fi risks invalidating the manufacturer’s warranty. It would be appreciated if, in the future, when your technical writers review smart TVs, they test for true Wi-Fi/Bluetooth disabling capability where an Ethernet alternative is integrated.

Doug Perine
Via e-mail

No. Wait, I’m sorry, Doug—was that too abruptly dismissive? Let me clarify. No friggin’ way. As in, no way will we start measuring microwave emissions out of televisions because one of our 80,000 or so print readers, and I’m serious here in suggesting that you might be the only one—plans to make his television purchase decision based on whether the Wi-Fi transceiver can be fully turned off. The notion that anyone should pass on the superior image quality of an LG or Sony OLED or the top-line picture of a state-of-the-art Samsung or other LED display solely because it emits run-of-the-mill Wi-Fi signals 24/7 is just plain crazy. Yeah, yeah, yeah, I know...the duly noted, unresolved research you cite claims that Wi-Fi causes everything from insomnia to malformed babies, and I won’t pretend that the jury isn’t still out on this; it’ll probably be out forever. Is it possible that future science will someday reveal with full certainty that Wi-Fi is in some way unhealthy to some people in some situations? Or that the U.S. might someday adopt new regulations to limit emissions? Sure...it could happen, though I’d argue that we need better and even more powerful Wi-Fi than what we have today (see my Track One editorial this month). There’s also a chance that one day the FDA might try to ban saccharin artificial sweetener or put a warning label on it because it causes bladder cancer in lab rats—oh, that’s right, they tried that based on some shoddy research back in the ‘70s, after the product had been safely used for many decades, and finally agreed to drop the warning 23 years later when someone figured out it was the rats who have a problem with saccharin, not us. I guess my point is that we make choices all the time in this world about how we want to live based on the rampant information and research thrown at us. We can cook all our food fresh because we worry about additives or we feel genuinely better eating that way, or we can buy readily available processed and prepared foods with all kinds of stuff in it that may be unhealthy in excessive quantities but will not likely, short of an allergy or extraordinarily massive consumption, do us any measurable harm. We can worry that the cholesterol and fat in fresh eggs and fresh butter will kill us, or believe the research that it’s not so bad after all. And we can choose whether or not to spend our time worrying about whether Wi-Fi radio signals coming from the bedroom TV will keep us awake at night. Hint: If you’re the kind of person who lies in bed worrying about every little thing in this rapidly evolving world that could potentially harm us in some small way, it probably will.—RS

Please Cover Yourself

I enjoyed John Sciacca’s Connected Life column, “Hiding in Plain Sight,” about concealing televisions (June 2017). Perhaps your readers will be interested in a low-cost and attractive solution for hiding flat-screen TVs that my husband and I cobbled together.

We purchased a reproduction Van Gogh canvas from art.com for $80. The canvas came with an internal wood frame and is slightly larger than our 55-inch Vizio LCD TV.

The canvas is attached to a screen with the help of hinges, dowels, and cup hooks.
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Smile-inducing bass, the kinetic energy reached deafening reference listening levels. My jaw was stuck ajar. Highly recommended.

“I’ve heard almost all of the top subwoofers currently on the market. The SB16-Ultra sounds like none of them. It’s a whole different category of low-frequency sound. May well be the best subwoofer ever made.”

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**LETTERS**

(painted blue), which has two holes drilled into it, allowing it to rest on the two bicycle hooks we screwed into the wall.

To suspend the painting for TV viewing, we simply lift the bottom and secure the left side to a hook on the ceiling and the right side to the curtain rod. The canvas is held to the hook on the ceiling by a 2-foot-long wooden dowel with cup hooks screwed into either end. A similar support is used on the right side of the canvas to secure it to the curtain rod.

I added blue cloth to the back of the canvas, to prettify it and cover the wooden frame, but I left the bottom corners open to allow the hooks to secure to the frame.

It's very easy to use, and the dowels hide behind the curtains when not in use. The entire cost for the canvas artwork, backing cloth, dowels, hinges, and hooks was about $100.

Karen Amrhein
Baltimore, MD

I love the DIY resourcefulness and simple elegance of this, Karen. Nice job! If anyone else out there has a home-brewed solution for hiding or otherwise camouflaging their TV when it's not in use, feel free to share some snapshots.

—RS

**Beating a Dead 3D Horse**

I speak for the videophiles who still and always will support 3D TV. Many of us do not agree with Ken Pohlmann's article in June (Signals, "3D TV Is Dead"). And some of his key reasons are thoroughly wrong. Let's start with video quality. Those of you who debunked 3D video quality have obviously contented yourselves with the crap glasses that come with these sets. I've got a 2014 Samsung 55-inch 4K UHDTV; it cost me $3,300, and when I bought it, I wasn't even thinking about 3D. But I activated it and then searched the net for quality glasses (there's your error in judgment—the glasses) and found a company named Dimensional Optics. I struck gold. I watched *Frozen* the previous night before they arrived, and then re-watched it with the new glasses and was absolutely shocked! These wonderful Samsung TVs upconvert the picture to 3D, and the effect is nothing short of amazing. But it's in the glasses! All three of Mr. Jackson's *Hobbit* movies are 3D visual masterpieces. I and several people I know watch 3D movies on a regular basis. I don't know who makes these decisions (killing 3D TV) without even consulting the consumer.

Elvis Cain
Via e-mail

The real reason why "3D Is Dead" is because 3D became a distraction to movie producers that didn't want the 3D "wow" effects to scoop their show. Producers rarely appreciated the science involved in using 3D to enhance their movie; they wanted their movie itself to do that. In the end, the movie couldn't serve both masters, and 3D had to go.

John Flack
Burke, VA

If It Quacks Like a Duck...

Just wanted to correct you for including the BenQ HT8050 in the small group of native 4K home theater projectors. If you check the features and specifications for this model on BenQ's website, you'll find the native resolution of this projector to actually be 2716 x 1528 (4.15 million pixels). It utilizes what they call "XPR fast-switching technology" to double the resolution on the screen. Something like pixel shifting or interlaced television.

I can't really fault you for including this model because BenQ does their best to make it look like it's a 4K projector, but the truth is it's not a native 4K projector by any means!

Zevi Slotkin
Forest Hills, NY

Zevi, thanks for pointing this out. The new BenQ, along with new "4K" projectors from Optoma (including the $2,500, UHD60 we expect to review shortly) use the new Texas Instruments 4K DLP chip, which places it in something of a gray area in this regard. As you suggest, native chip resolution is 2716 x 1528, and the projector delivers two very rapidly switched sets of off-shifted pixels to render all 8 million or so individual pixels in the 4K original signal. That's a significant upgrade from the "enhanced" 4K projectors from JVC and Epson that use native 1080p chips and deliver about half that amount via pixel shifting. It is said to produce an image that is fully indistinguishable, resolution-wise, from a native 4K grid, even when displaying a 4K test pattern with alternating one-pixel-width black and white lines—a pattern that quickly shows the resolution weakness in 1080p-based pixel-shifters. We'll be anxious to test this ourselves when we get a model in house that uses the new DLP chip.—RS
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- Al Griffin, Sound & Vision

“The Triton Reference presents a serious challenge to speakers in the multi $10K range”

- Robert Deutsch, Stereophile

GoldenEar’s Triton One is one of the best selling high-end loudspeakers ever, consistently thrilling listeners and reviewers alike and winning an enviable and unmatched collection of the industry’s most prestigious awards, including “Loudspeaker-of-the-Year” and “Product-of-the-Year” from key publications all around the world.

Clearly, we knew that the One would be a very hard act to follow. There was a spirited discussion within our product development group about an all-out assault on the ultimate, cost-no-object, state-of-the-art, to produce a six-figure loudspeaker to do battle with the most esoteric and expensive loudspeakers on the planet. However, after much soul-searching, rational minds won out, and the decision was made to create a new GoldenEar flagship, positioned above the Triton One (of course still current and available), that would joust with the best, but still stick to our trademarked slogan, “We Make High-End Affordable.” We are pleased and proud to introduce the new Triton Reference. The Reference has begun gathering its own collection of honors, winning the prestigious and coveted CES Innovations Design and Engineering Award, Digital Trends Best Home Audio Tech at CES, HD GURU Best High Fidelity Loudspeaker at CES and What HiFi Stars of CES! And Triton Reference won the grand slam from Absolute Sound and winning an enviable and unmatched collection of the industry’s most prestigious awards, including “Loudspeaker-of-the-Year” and “Product-of-the-Year” from key publications all around the world.

The Triton Reference is an evolution of everything that we have achieved with the Triton One, but taken to a stunning new level of sonic performance and sophisticated visual design. All the components in the T Ref: including larger, more powerful, active sub-bass drivers with huge “Focused Field” magnet structures, upper-bass/midrange drivers with “Focused Field” magnet structures, and High-Velocity Folded Ribbon tweeter with 50% more rare earth neodymium magnet material, are brand new, and have been specifically developed for use in the Reference. The powerful 1800 watt subwoofer amplifier, with level control to fine tune the bass to your room, and 36-bit DSP control unit are a significant evolution of those in the Triton One and our SuperSubs.

There are a myriad of other significant upgrades and refinements, including: new internal wiring with a specially developed twist, further development of our signature balanced crossover including film capacitors bridged across the high-pass section on the upper-bass/midrange drivers, a unique proprietary mix of long-fiber lamb’s wool and Dacron for more effective internal damping, intensive work with a high-resolution accelerometer to determine the most effective implementation of complex internal bracing, a 3/32˝-thick steel plate built into the medite base to further stiffen it for increased stability, new stainless steel floor spikes and cups, all of which results in higher resolution of subtle details ... and the list goes on and on.

“Undeniably stellar ... Yes, it does deliver the sort of performance previously delivered only by cost-no-object speakers.”

- Dennis Burger, Home Theater Review

Visually, the Reference offers a strikingly beautiful upgrade to the classic Triton styling, with a gorgeous hand-rubbed piano gloss-black lacquer finished one-piece monocoque cabinet. Sleek, statuesque and refined, the Reference is simply an elegantly gorgeous statement piece that will excite listeners with its dynamic visual presence, as well as its extraordinary sonic performance.

Sonically, the Reference has been engineered to perform with a dramatic and authoritative voice, comparable to speakers that sell for ten and more times its surprisingly affordable price. T Refs completely disappear, with superb three-dimensional imaging that will open up your room, stretching from wall to wall and beyond, and depth that makes the wall behind them seem to vanish. The astonishing bass is rock-solid, with low-frequency performance that is tight, quick, highly impactful and musical with extension flat to 20Hz and below. Another GoldenEar signature is a silky smooth high end that extends to 35 kHz with a lifelike sheen but no trace of fatiguing harshness, sibilance or stridency so common with lesser tweeters. Tremendous time and energy has been put into the voicing of the speaker and the seamless blending of the drivers, for unmatched musicality with all types of music, and home theater perfection. Rarely do speakers excel at both, but with their world-class neutrality, the Reference absolutely does. A special bonus is the Reference’s extremely high 93.25 dB sensitivity, which gives them tremendous dynamic range and allows use with almost any high-quality amplifier. You must experience T Ref for yourself!
In the age of internet-delivered entertainment, it’s easy to lose sight of the power of broadcast TV—that woefully underutilized bastion of free HD-quality programming. A few decades ago, rabbit ears and roof-mounted antennas were a staple in American homes. Today, about 11 percent of American households get TV over the air, and another 9 or so percent rely exclusively on the internet for TV. Both categories are growing (the latter far more dramatically) as the we’re-tired-of-stupidly-high-cable-bills cord-cutting movement gains momentum. All of this brings us to ATSC 3.0, hailed by its proponents as a revolution in technology that will transform TV broadcasting by bringing together internet and over-the-air signals with a common IP backbone. We reached out to Mark Richer, president of the Advanced Television Systems Committee, to learn more.—Bob Ankoska

S&V: Let’s start with a brief overview of the Advanced Television Systems Committee—what it is and the role it plays in developing the technology that will transform TV broadcasting by bringing together internet and over-the-air signals with a common IP backbone. We reached out to Mark Richer, president of the Advanced Television Systems Committee, to learn more.—Bob Ankoska

MR: Rewinding back to the 1950s, the National Television Systems Committee (NTSC) developed black-and-white-compatible color television in 1953. Nearly 30 years later—in 1982—the Advanced Television Systems Committee (ATSC) began with the idea of updating broadcast TV standards for a new age—a digital age. The committee developed the transmission standard for digital TV in the U.S., which was approved by the Federal Communications Commission (FCC) in 1996, and continues to work as technology evolves. We’re now putting the finishing touches on what we call ATSC 3.0, or NextGen TV.

S&V: Work on ATSC 3.0 has been underway for some time. In big-picture terms, what is ATSC 3.0, and how does it differ from the current standard?

MR: A lot has changed since the FCC officially adopted the ATSC standard for U.S. broadcasters in December 1996. No one had a smartphone back then, and the internet was still in its infancy. In order to stay competitive, broadcasters began several years ago to develop the framework for a service that would work with the internet (which became ATSC 2.0). But additional changes in online TV viewing habits, the emergence of 4K, and the move to Internet Protocol (IP) made it necessary to leapfrog ahead to ATSC 3.0. The new standard is designed to seamlessly combine over-the-air television transmissions with over-the-top content from the internet. It will deliver a better experience for viewers and also allow broadcasters to utilize addressable advertising and better measure who is watching which programs.

S&V: In addition to improved 4K picture quality, what does ATSC 3.0 bring to the table that our readers can get excited about?

MR: There are several key attributes of ATSC 3.0 that will benefit both viewers and broadcasters. Better pictures are coming with the capability of transmitting 4K as well as content with high dynamic range, high frame rate, and wider color gamut. Immersive audio with Dolby AC-4 in the U.S. (and MPEG-H audio in other parts of the world) is part of the standard.

S&V: So does that mean ATSC 3.0 will accommodate Dolby Atmos and DTS:X?

MR: Individual technology proponents would have to answer specific questions about compatibility. (Editor’s Note: Dolby confirmed that as long as the television has an ATSC 3.0 tuner that supports Dolby AC-4, no additional hardware will be required to decode Dolby Atmos. DTS-X, on the other hand, is not accounted for in the standard.) ATSC 3.0 will also allow for exciting new features that will provide convenience, personalization, and greater control over content. Examples include the ability to start programs at the beginning even after they have already started, zoom in and choose camera angles when watching sports, create custom home screens based on preferences, and receive alerts when favorite shows, sporting events, or weather reports are airing. The standard will also support fast-forwarding and rewinding with any show or sporting event, a personalized onscreen guide with recommendations, and onscreen search of video-on-demand, streaming services, and programs delivered over the air.

S&V: How will ATSC 3.0 address the “TV everywhere” reality of today’s video entertainment?

MR: The new standard is flexible, robust, and mobile. One of its key attributes is the ability for a broadcaster to greatly enhance reception and robustness. That means mobility can be part of an ATSC 3.0 transmission from the beginning, giving rise to a new type of mobile tablet and smartphone receiver (if those devices include ATSC 3.0 reception electronics). So for the living room, there’s the benefit of 4K and high dynamic range. For the viewer on the go, there’s taking your favorite live content with you wherever you go.

S&V: What non-entertainment features does 3.0 offer?

MR: Advanced emergency alerting, or AWARN for Advanced Warning and Response Network, will deliver rich media alerts in times of emergency and might even result in consumer devices that wake automatically in an emergency. Maps, live video, instructions, and more will come with this new type of emergency system. At the recent NAB Show, the NAB’s Pilot lab showed how an AMBER Alert for a missing child might be transmitted to a car, helping to expedite the recovery of an abducted child. ATSC 3.0 will also allow broadcasters to deliver data to other devices, since its backbone is entirely IP-based.

S&V: If everything goes according to plan, how many ATSC 3.0 stations do you expect to see on the air in 2018 and 2019? And will the 2018 Winter Olympics in South Korea be the first major ATSC 3.0 broadcast event?

MR: Korea is certainly leading the way with ATSC 3.0, having introduced the transmission system in May in preparation for the Winter Olympics. The first ATSC 3.0-equipped TV receivers are also being introduced in Korea. In America, we’re hopeful that the FCC will soon approve the voluntary introduction of ATSC 3.0 service over U.S. airwaves. We expect the rollout of the new transmission system to begin in earnest in 2018. But unlike the previous analog-to-digital transition, the voluntary move to ATSC 3.0 will require broadcasters to collaborate to ensure that ATSC 3.0 viewers aren’t left behind. In that way, this technology transition will be more complicated than the move from analog to digital service. But the benefits of ATSC 3.0, merging the best functions of over-the-air with over-the-top, will certainly be appealing to both viewers and broadcasters alike.

The full version of this interview appears on soundandvision.com.
This Just In...
By Mark Fleischmann

Control4’s Custom Airstream
is rolling across the country to promote “Smart Design, Smart Living.” It features wholehouse A/V, smart lighting, intelligent safety and security, and voice control...

HHGregg Closed
after 62 years in business. The Indiana-based CE retail chain fell victim to an ill-advised IPO, national expansion, the rise of online retailing, and falling prices...

LG, Samsung, and Sony
are Netflix-recommended TV makers. Among other talents, their products can power up and start Netflixing within seconds, rapidly switch between Netflix and live TV, and display the Netflix interface in HD...

Vizio’s Acquisition
by LeEco has come apart due to “regulatory headwinds” in China. The combined company would have taken third place in 2017 TV shipments...

Comcast’s Xfinity Instant TV
streaming is designed to tempt young broadband customers who don’t opt for pay-TV. Now being tested in Boston and Chicago, the skinny bundle would go for $15 to $40/month including cloud DVR service...

Verizon May Launch
a streaming video service that would tempt cord-cutters with skinny bundles. Bloomberg reports that the company has been quietly signing streaming deals with content providers...

Pay-TV Subs Plummeted
in 2016, with the biggest operators losing 795,000 customers, reports the Leichtman Research Group. The losers were cable and telco TV companies—the two satellite operators actually added 190,000...

Cable Ops Are Beating Telcos
in new broadband subscriptions, adding 3.3 million in 2016, says Leichtman. It’s their best year since 2007 and more than compensates for the loss in video subscribers...

AT&T Fiber
is reaching another 17 metro areas including Chicago, Houston, Indianapolis, Los Angeles, Memphis, New Orleans, St. Louis, and others, raising the total to 51. One-Gbps service starts at $80/month, then $119 after a year, and bundles with AT&T-owned DirecTV and U-verse TV are available...

Charter Got Smacked
with a class-action lawsuit claiming it sold the personally identifiable information of subscribers without permission from 2005 to 2014. ISPs claim they protect your privacy, though Congress just axed the FCC’s broadband privacy regs...

Consumers Are Gorging
on news programs, with viewership up 18 percent in 2016, mostly due to a rise in cable news. But are we better informed?...

Netflix Downloads
now work on Windows 10, lagging other platforms. Get update at Windows Store...

Showtime Added Downloading
to Showtime Anywhere mobile apps. Choose 540p, 720p, or (for tablets) 1080p...

AMC Is Mulling
an ad-free streaming service aimed at millennials who have not cut the pay-TV cord. Pricing may be $5 to $7/month...

Charter and AMC
are teaming up to produce exclusive co-branded content for Spectrum pay-TV subscribers starting in 2018. Charter gets the initial window, while AMC gets subsequent (including international) rights...

The YouTube TV
streaming service boasts a cloud DVR with unlimited storage, but it won’t skip ads on all channels. Content deals with the networks restrict ad skipping on TV episodes that are also on pay-TV VOD...

Amazon and NFL
have brought Thursday Night Football to Amazon Prime. It’s a no-extra-cost addition to the $99/year service...

Logitech’s Harmony
 Elite, Companion, and Hub now support Google Assistant on Google Home. That enables you to use voice control to watch streamed video, pick a TV channel, adjust volume, skip forward or back, and use “activities” to control lighting color, a Nest thermostat, or play music...

DTS:X
bitstream passthrough is now supported by Microsoft’s Xbox One gaming console, which includes a Blu-ray drive. DTS:X supports full 360-degree surround and adapts to any given speaker layout...

Dirac Live
is now a standard feature (or free upgrade) for owners of StormAudio surround processors. The high-end room correction system tackles both frequency and impulse response...

Sling TV Beefed Up
its sports programming with the addition of the NBC Regional Sports Networks, part of Sling Blue at $25/month. Oh—and Sling added Showtime...

Luxman America
is the new U.S. arm of IAG-owned Luxman Corporation. Among the 92-year-old audio brand’s products are stereo integrated amps with wiggling needles that make our hearts beat faster...
Jewels for the Ear

**PRICE $999**

**IT’S A STUNNINGLY BEAUTIFUL design:** The Beyerdynamic Xelento Remotes are most definitely a looker. Better yet, their ergonomically balanced design made for a perfect fit in the concha of my ears; these are some of the most comfortable in-ears I’ve ever worn. As for the sound, it was spectacular!

The Xelento Remotes feature Tesla drivers with large ring magnets. The drivers are essentially miniaturized versions of the Tesla drivers featured in Beyerdynamic’s high-end over-and on-ear headphones. And like those, the Xelento Remotes are handmade in Germany. When I asked the company’s spokesman why their technicians handbuild each Tesla driver and wind its incredibly tiny voice coils, he said Beyerdynamic hasn’t been able to automate the process and maintain the quality they demand.

The Xelento Remotes come with an unusually generous assortment of ear tips. There are seven sizes of proprietary super-soft silicon eartips and three sizes of Comply tips. I like the eartips’ earpieces have large, easy-to-read “L” and “R” markings. Beyerdynamic includes two super-flexible 51-inch-long silver-plated cables, one with an iOS- and Android-compatible three-button remote, the other cable sans remote. You also get a beautifully finished hard carry case. I can’t fathom why, but they were more tangle-prone than average. But, if you ever get the urge to skip the wires entirely and go for Bluetooth, you can go ahead and pick up Beyerdynamic’s optional Bluetooth cable designed for use with the Xelento Remote.

Beyerdynamic makes a similar pair of headphones for Astell & Kern, the AK T8iE MkII, but they are tuned for a different sound. The Xelento Remotes’ fuller, yet livelier character clicked with me, whereas the T8iE MkII’s didn’t. The Xelento Remotes’ sound, led by my iPhone 6S, was big, dynamic as hell, and fully transparent. Still, with headphones as good as these, I thought it would make sense to pair them with a world-class portable music player. So I tried that...but when I did, I found that I actually preferred the sound on my iPhone 6S! That was an unexpected plus, and I can only surmise that Beyerdynamic voiced these ‘phones for use with smartphones.

Next, I sampled the 2017 remix of the Beatles’ *Sgt. Pepper’s Lonely Hearts Club Band*. For this demo, I compared the Xelento Remote, which has a single 11mm dynamic driver, with a pair of custom-fitted $1,099 Jerry Harvey Audio JH13 Freqphases in-ear headphones that use six balanced-armature drivers in each earpiece. The Xelento Remotes’ sound was awfully good, but the JH13 Freqphases were clearer and more dynamic, and their bass was more pitch accurate, though less deep. As a custom-fit design molded for my own ears, the JH13 Freqphases did a better job hushing external noise. That said, the Xelento Remotes’ ear tips have a shallower insertion, and for that reason, they’re a more comfortable set of headphones to wear.

Speaking of wearing, the Beyerdynamic Xelento Remote is a luxury pair of headphones for adults, with looks and sound quality fully commensurate with their price.

**AT A GLANCE**

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<tr>
<td>Handmade in Germany</td>
<td>Tangle-prone cable</td>
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<td>Stunning good looks</td>
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<td>Best-in-class sound</td>
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**THE VERDICT**

The Beyerdynamic Xelento Remotes look, feel, and sound like a true luxury design.

**SPECs**

- **Type:** In-ear
- **Driver:** 11 mm Tesla dynamic driver
- **Impedance:** 16 ohms
- **Sensitivity:** 110dB/1mW
- **Value:**

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<th>RATING</th>
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**Remotes are most definitely a looker.** The Beyerdynamic Xelento Remote takes a stand-up bass's sound was a little ripe, but it didn't take anything away from the music. Patricia Barber's *Cafe Blue* sounded deliciously palpable; I could feel the texture of the hand percussion. Still, with headphones as good as these, I thought it would make sense to pair them with a world-class portable music player. So I tried that...but when I did, I found that I actually preferred the sound on my iPhone 6S! That was an unexpected plus, and I can only surmise that Beyerdynamic voiced these 'phones for use with smartphones.

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Outfitting Robo Car

What will people do in a self-driving car? The Auto Insurance Center, an industry-supported site, asked that question in a recent survey. Reading a book and catching up with friends and family via phone were the two most popular responses. But there was a three-way tie for #3. Equal in ranking to getting work done outside the office were watching a TV show and viewing a movie.

Considering that the majority of commuters fortunate enough to not be at the wheel peer incessantly at a screen, it’s reasonable to expect that the coming liberation from driving will result in even more bubs and screens. I haven’t been this excited about the prospect of in-car entertainment since the days of putting the pedal to the metal to reach the drive-in for a kung-fu double show and viewing a movie.

The windshield could double as a wide movie screen. It would turn opaque white to reflect light from a projector that pops down from the car ceiling. Or the glass itself could embed OLEDs for direct display. Lawrance of Arabia and other movies with a native 2.20:1 aspect ratio would fit nicely on such a screen without much need to letterbox, stretch, or crop the picture, just like the director intended.

With a running time of 227 minutes, Peter O’Toole would make a particularly peckish图纸 from the car ceiling. Or the glass itself could embed OLEDs for direct display. Lawrance of Arabia and other movies with a native 2.20:1 aspect ratio would fit nicely on such a screen without much need to letterbox, stretch, or crop the picture, just like the director intended.

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The windows themselves could become screens, presenting the roadside view as augmented reality or virtual reality. The former would annotate landmarks as you drive by; the latter would show the same view as seen 30 or more years earlier, a kind of moving history.

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By Steve Guttenberg

Looking Good

**PRICE** $299

**TIDAL FORCE** is a brand spanking new headphone company, and at the time I started working on this review, the Wave 5 was their one and only set of headphones. They’re off to a good start; build quality is excellent, and the mostly metal design felt great in my hands.

I review so many headphones and spend time with so many more, I can’t keep track of them all. Upon opening the box, I had a déjà vu feeling about the Wave 5; it seemed very familiar. And then it hit me: It reminded me of the Monoprice M560 headphones I heard at a hi-fi show. I immediately went to Monoprice’s website to confirm the hunch, and sure ‘nuff, they looked like near twins. Then I checked the M560’s specifications and noted that the M560 and $199, $100 less than the Wave 5.

Just because they share similar specs and overall design doesn’t mean they sound the same. In fact, Tidal Force says that while the two headphones share similar industrial design, both the outer and inner earcups on the Wave 5 are improved over the Monoprice and that customization of the planar drivers results in better bass response and soundstaging. While I didn’t have the M560 on hand, I did have a pair of the $299 HiFiMan HE400S planar magnetic headphones, which are comparably priced with the Wave 5. So I spent some time comparing these two.

The Wave 5 comes with a nicely finished semi-hard zippered carry case. The headphones sport detachable 70-inch-long, nicely finished Y cables that plug into each earcup with a standard 3.5mm plug. The other end of the cable has a 3.5mm plug and a 6.3mm adaptor plug.

I used a Little Labs Monotor headphone amp for most of my listening tests at home. Starting with Pink Floyd’s trippy “Set the Controls for the Heart of the Sun,” the Tidals unleashed a huge, reverberant soundstage that encircled my head. With the HE400S, the swirling image was sharper in focus, wider, and more spacious. The Wave 5’s treble was brighter and more forward, while the HE400S’s top end was sweeter and more laid-back. The bass was a little lighter in weight and less well defined on the HE400S, and bass transients were clearly better on the Wave 5. On the other hand, the HE400S headphones are a better-balanced design, and they were more comfortable (sonically) to listen to; I found the Wave 5’s aggressive edge fatiguing over time.

When I started listening with my iPhone 6S, the differences between the two headphones intensified, with the Wave 5 becoming brighter and bassier and the HE400S smoother in its tonal balance. The Wave 5 ‘phones were easier to drive, so they could play louder; there were times the HE400S didn’t play quite loud enough, even with the volume set to max. Overall, I’d call it a draw.

Sound and Vision

22 SEPTEMBER 2017

soundandvision.com

**RATING**

**Tidal Force Wave 5 Headphones**

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<thead>
<tr>
<th>Performance</th>
<th>Comfort Quality</th>
<th>Value</th>
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<td>★★★★★</td>
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**THE VERDICT**

These Tidal Force headphones face stiff competition from other comparably priced planar magnetic designs.

**AT A GLANCE**

**Plus**

- Open-back, planar magnetic design
- Solid build quality
- Handsome look

**Minus**

- Can sound bright

Wave 5 both feature 56mm planar magnetic drivers, neodymium magnetics, 42-ohm impedance, and similarly well-made earcups and pads. There was one big difference, though: The M560 can be used as a closed- or open-back headphone, while the Wave 5 is open only. Oh, and the M560 retains for the other hand, the HE400S headphones are a better-balanced design, and they were more comfortable (sonically) to listen to; I found the Wave 5’s aggressive edge fatiguing over time.

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If you listen to Eric Clapton and B.B. King’s Riding With The King album with a great set of headphones, you can’t help but feel that the two legendary guitar slingers relished every second of the sessions. I did with the Wave 5 as well. The tune “Key to the Highway,” which Clapton first covered on his Derek & the Dominos record in 1970, is taken at a slower tempo, but the acoustic picking is tastier. The Wave 5 left no doubt about that!

The Wave 5 is just the beginning for Tidal Force headphones; in-ear, high-end, DJ, and pro models are coming down the pike. A Tidal portable high-end music player is also in the planning stages.

**SPECS**

**Type:** Open-back, over-the-ear • **Driver:** 56mm planar magnetic • **Impedance:** 42 ohms • **Weight (Ounces):** 16.9
Bowers & Wilkins products consistently set the benchmark for high-performance Hi-Fi, home theater and personal sound. Its 800 Series Diamond loudspeakers are the reference monitors of the world’s most demanding recording studios, and it produces best-in-class speakers for most budgets. Bowers & Wilkins is also the audio system of choice for premium automotive manufacturers such as BMW, Maserati, Volvo and McLaren.

Audition the Bowers & Wilkins collection at an authorized dealer today.
HDMI Anxiety

I want to upgrade my A/V receiver but plan to wait until high-end brands like Anthem and Cambridge Audio provide support for HDMI passthrough of the HDR10, Dolby Vision, and Hybrid Log-Gamma (HLG) high dynamic range formats. Am I making the right decision?

Estuardo / via e-mail

That all depends on how important HDR figures into your future viewing habits. While current A/V receivers with HDMI 2.0a connections, Anthem’s MRX 1220 included, are capable of HDR10 format passthrough, the Dolby Vision and Hybrid Log-Gamma HDR formats aren’t necessarily supported by HDMI 2.0a. HLG support was included in the proposed HDMI 2.0b specification, but that version has since been rolled into the forthcoming HDMI 2.1 spec. It’s anticipated that products with HDMI 2.1 ports will start to appear in 2018.

Dolby, meanwhile, has issued a compatibility SDK (software developer kit) that “several manufacturers have already used to obtain passthrough compatibility on upcoming products,” according to the company. And by upcoming products, Dolby doesn’t mean 2018 models, but ones that will arrive in 2017. Which manufacturers? At present, the list includes Yamaha, Denon, Pioneer, and Onkyo. Not only that, but select 2017 models from the same companies will also support HLG passthrough via a future firmware update.

What about Anthem and Cambridge Audio? According to Anthem, the company’s current HDR10-compatible MRX series receivers and AVM 60 preamp/processor should be getting a firmware update to make them Dolby Vision- and HLG-compatible as early as July 2017. As for Cambridge Audio, its current CXR series receivers use HDMI version 2.0 connections, which aren’t compatible with any flavor of HDR. Happily, the arrival of products with next-gen HDMI 2.1 connections, which support all HDR formats, including ones that employ dynamic metadata, will put much of the uncertainty surrounding HDR compatibility to rest.

What’s the problem with HDMI Audio Return Channel (ARC)?

I’ve heard that most people simply give up on ARC and use an optical digital audio connection from their TV to their receiver instead because they can rarely get it to work between devices, especially ones from different manufacturers. What can the HDMI Forum do to improve the situation?

Phis Tomaskovic / via e-mail

The HDMI Forum already has taken steps to improve the situation by drafting the HDMI 2.1 specification. The new HDMI spec incorporates a long list of advancements to ensure compatibility with future technologies such as 8K/60fps and 4K/120fps video, but also addresses several limitations in the existing HDMI 2.0a spec, including ones surrounding ARC.

A key feature that HDMI 2.1 will bring is Enhanced Audio Return Channel (eARC). With eARC, audio signals benefit from higher bandwidth to support everything from Dolby Digital Plus and lossless Dolby True HD/DTS-HD Master Audio bitstreams to object-based formats like Dolby Atmos and DTS:X. This development is particularly important as more of us start to stream movies with multichannel and object-based audio soundtracks through our TVs, as opposed to playing them on physical discs.

Another aspect of eARC is advanced device control. ARC, which was first introduced in the HDMI 1.4 spec, relies on the HDMI CEC (Consumer Electronics Control) protocol. A problem with CEC is that different manufacturers use their own unique implementations (Bravia Link, Viera Link, etc.). CEC is also an optional feature that’s not required for certification of products by the HDMI Forum. HDMI 2.1, in contrast, will include a robust auto-detect mechanism plus more advanced audio signal control capabilities than what the current CED specification provides.

HDMI 2.1 will require a new cable to support its full range of features. However, according to an HDMI Forum FAQ, some 2.1 features such as eARC can be made available on products with HDMI 2.0a connections via a firmware update (depends on manufacturer implementation). Also, new HDMI cables are not required for eARC—regular high-speed cables with Ethernet will do the trick.

Delta Offers Deluxe Headphones

Delta flyers in first and business classes are in for a treat. The airline has upgraded their headphones to a version of the LSTN Sound Co’s Troubadour, a full-size over-the-ear model with wooden earcups and noise cancellation. Similar (but not identical) products sell on the LSTN website starting at $149. The partnership will support the Starkey Hearing Foundation, which has provided ear care and hearing aids to 22,000 people around the world. The audio bling is part of an effort to improve the flying experience, which also includes chef-curated meals, seasonal wines, and (be still, my heart) high-capacity overhead bins. The headphones are taking wing in flights between New York, Los Angeles, and San Francisco. And no, you can’t take them home.—MF

Samsung Bows Wood-Framed TV

We’ve lived with wall-mounted TVs long enough that they’ve become a cliché—or worse, a visual intrusion. Samsung addresses that problem with a TV called The Frame. This wooden-framed TV imitates a framed picture with an “art mode” that lets you select from 100 different still images in 10 categories, including landscape, architecture, wildlife, action, and drawing. Interchangeable bezels tailor the frame to your room’s décor. And of course connections are wireless to avoid spoiling the effect. This Quantum Dot QLED Ultra HDTV is available in sizes from 55 to 75 inches for $2,799 to $6,799.—MF
RIVA WAND SERIES

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RIVA INTRODUCES THE NEXT GENERATION OF MULTI-ROOM! WAND SERIES GIVES YOU BEST IN CLASS AUDIO WITH THE FREEDOM AND THE FLEXIBILITY TO LISTEN TO ANYTHING YOU WANT, HOWEVER YOU WANT & WHEREVER YOU WANT

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The Rule of Cool

It's a paradox, that's what it is. Technology, by nature, charges forward. Its unstated goal is to obsolete itself as fast as possible. If you're into technology, the only real place to be is on the cutting edge. You must be an early adopter, own the latest and greatest, and camp overnight at the Apple Store. The paradox is that if you are one of those people, you might be envied, or even admired. But you are not cool.

People ooh and aah because you have version 9.2 while everyone else has 9.1. And if you have 9.2.1, they might be blown away. But you are not cool.

You are definitely not cool if you have 9.0, 8.9, or 8.8. You are also not cool if you have 7.0, 6.0, 5.0, 4.0, or 3.0. In fact, you are viewed in much the same way as a puppy that has an unfortunate accident on the kitchen floor. People just shake their heads. Not up and down. Sideways.

Then something interesting happens. If you have 2.0, people start to take notice. You are viewed as being odd, eccentric, quirky. 2.0? Seriously? Wow—can I take a look at that? I haven't seen one of those since I was dating my first wife. You are driving a roadster rapidly through the suburbs, on the outskirts of your local town. People just shake their heads. Not up and down. Sideways.

Then, casually, at a very posh party, with dainty appetizers that cost more apiece than a good cheeseburger, where absolutely everyone has 9.2s, you casually reach into your pocket and pull out your 1.0. Whoa. The room starts to buzz. Check it out! This guy has a 1.0! Everyone looks up from their cutting-edge but commonplace 9.2s and stares. You have a genuine bona fide 1.0. The Macdaddy. The One. You, my friend, are cool.

People who are into audio completely understand the Rule of Cool. Your friends are thoroughly impressed by your made-in-China X5000 receiver and its 5,000-watt power rating, 0.00000001-percent THD, and nine output channels. A technological tour de force, that's what it is. There is no finer audio receiver anywhere on the face of the earth.

But it's another piece of gear that fills them with disbelief and desire—like Venus de Milo holding out her arms to offer you a cold beer on a hot day—your made-in-Binghamton MC275 power amplifier and its 2 x 75 watts, 11 vacuum tubes, and specifications that are unimportant because anyone with one ear can clearly hear how God Almighty good it sounds. First introduced in 1961, this 67 pounds of McIntosh booty is the treasure that all your friends covet. Why? Because it is so incredibly cool. Quick! Your house is on fire and there's only time to grab one piece of gear! Which one? Your newest receiver, or your oldest power amplifier? Easy question.

Audio people know all about cool. Interestingly, now phone people might be catching on. After endlessly chasing the next 9.2, a new trend might be emerging. Vintage cellphones are making a comeback. Consider the Nokia 3310. This turn-of-the-century phone is a very modest piece of technology. Seeking to capitalize on its old-schoolness, the 3310 is being put back into production. This technological lightweight (but mildly updated) 3310 can't hold a candle to modern phones, but that's the whole point.

I'm sure I'll start seeing my local hipsters casually flaunting their new retro phones, nostalgic for the good old days of elementary school. But actually, I'm a little skeptical of the coolness of their effort. When they come out with a phone with 11 vacuum tubes, that weighs 67 pounds, let me know. That would be cool.

Roku Updates OS

Roku's new operating system brings new features. The search platform ties into 300 streaming channels. More Ways to Watch uses content recognition to recommend programs or streams, including those delivered by antenna. If you'd rather not have Roku monitoring your viewing, it can be turned off. Live TV Pause shows thumbnails during forward or reverse fast-scanning of buffered live video, and now includes closed captioning. You can also create labels on the home screen for connected devices.—MF

Bose Cans Accused of Spying

The Bose Corp. has been accused of spying through its headphones. The problem, if it is a problem, lies in the Bose Connect app. Kyle Zak filed suit in a Chicago federal court claiming that Bose is using the app, supplied free with his QuietComfort 35, to collect data and “send it anywhere.” The lawsuit contends that “one’s personal audio selections—including music, radio broadcast, podcast, and lecture choices—provide an incredible amount of insight into his or her personality, behavior, political views, and personal identity.” The suit seeks $5 million in damages and a halt to the data collection. Bose is contesting the suit.—MF
Your music, however you listen, no matter the source.

Created without compromising any of the LS50’s award-winning acoustic capabilities, LS50W features audiophile-grade amplification and sound processing, as well as extensive connectivity.

LS50W is driven by factory-optimised 230-watt x2 amplification and features four 192kHz/24-bit high resolution DACs. Combining KEF’s Uni-Q driver technology with a time-correcting DSP crossover, LS50W brings a true high-fidelity listening experience to active streaming audio.

Plus, with a wide array of connection options available and a dedicated app offering three levels of customisable EQ control settings, the LS50W is now a complete state-of-the-art audio system.

us.kef.com
Top Four System Install Mistakes

Beyond designing and installing new A/V systems, one of the things my installation company does is perform service calls on existing systems. Whether it has been installed by the homeowner themselves, a trusted friend/family member, or some other “professional,” we routinely run across the same kinds of installation issues when we pull open the rack or cabinet and start digging into the guts of the gear.

When I started jotting down a list of the biggest mistakes we run across, I tallied quite a few items. Some of them were obvious things like having a coffee table full of remotes instead of a single, universal controller, not having a true 4K source to feed a new TV, incorrectly positioned speakers, or having a system that is just too small for the listening/viewing space.

However, the following four are the biggest I encounter over and over. These mistakes can range from poor performance to actually damaging your gear. Fortunately, most of these issues are pretty easy to rectify, and once you’ve identified the problem, hopefully you can take the proper steps to correct it!

Multiple Routers
The router is the captain of your network, doling out a unique IP address to each device and routing traffic where it needs to go. In all but the rarest exceptions—say, some security requirement of a company’s Virtual Private Network (VPN) for remote access—you should only have one router in your system. When you have multiple routers, you have the potential for separate networks where devices can’t communicate with each other, causing traffic collisions, dropouts, conflicting IP addresses, and more. I recently visited one home that had four routers installed, and not surprisingly, network performance and reliability were a nightmare. The reason many people are tempted to add a second router is to either increase the number of hardwired Ethernet connections at a location or to increase Wi-Fi range. Instead of adding a second router, you should add a switch or wireless access point (WAP) to increase your network’s capabilities.

Wire Management
Our industry gives Best Rack awards because proper wire management not only looks good and shows pride in the install, it makes the system far more serviceable in the future. At the bare minimum, wiring should be labeled behind your gear so you know where it runs from and to. That way, if something ever gets disconnected, you’ll know immediately where to reconnect it. Even if this is just writing on some colored electrical tape with a Sharpie, you should be able to quickly identify each cable. Another part of proper wire management is leaving enough wire length so you can pull the gear out and work on it, which is especially helpful if your system is located in a cabinet. It’s a real gut punch when you go to turn a piece of gear around to see something and several wires come unplugged. Even worse if they aren’t labeled...

Wrong Settings
The best gear in the world won’t perform up to its capabilities if it is incorrectly configured. And it breaks my heart when I go into someone’s home and see they have been watching an upscaled 480i channel on their new TV because the resolution wasn’t properly set on the cable box. Or when I see a surround system that’s set to stereo mode—or something even worse like Stadium—for TV/movie watching. Another common mistake is finding incorrectly configured speaker settings, with poor bass management—often not sending any signal to the subwoofer. While automated setups found in many modern systems like Audyssey, YPAO, ARC, MCACC, DCAC, and others might not be perfect, they certainly create a good starting point for most users and will help identify mistakes like miswired speakers.

Poor Ventilation
If you are met with a sirocco-like blast of air every time you open your audio cabinet, that’s a red flag. Heat is the number-one killer of electronics, and it can come in the form of little to no airflow, or by having pieces of gear stacked tightly on top of each other, or by dust-clogged ventilation fins. If you notice components locking up or suddenly shutting off after playing for a while, heat is probably the culprit. Rule number one is to never set any gear on top of heat-producing components like amplifiers and receivers or always-on devices like cable/satellite DVRs. Replacing solid cabinet doors with louvered doors can help, but you might need to force some airflow using a fan by a major brand. It is supported by webOS 3.0 for 2016 models and webOS3.5 for 2017 models. To use Sling on an LG TV, look into the smart TV platform of a major brand. It is supported by Walmart-owned Vudu will convert your Blu-ray or DVD titles via smartphone. Using the Mobile Disc-to-Digital feature on the Vudu mobile app, scan the barcode on the packaging. It’s not free—you’ll pay $2 per title for standard-def or $5 for high-def. You can scan more than one title at once, but there is a 100-disc limit per account and per year. You can perform the scan only at home or at your Vudu billing address, with GPS monitoring your location. Conversion is available for 8,000 titles from major studios.—MF

Installation mistakes can actually damage your gear.
MartinLogan excels at doing things that have never been done, like integrating exotic Folded Motion™ driver technology, inspired by our legendary high-end electrostatic designs, into the affordable Motion® Series and reference Stealth™ Architectural Series. Smooth, refined sonic performance with stunning dynamic range and jaw-dropping clarity – MartinLogan magic in an application to suit every lifestyle.

Premium sound solutions for every space.

martinlogan.com
John Mellencamp Continues to Explore His American Roots With Sad Clowns & Hillbillies

John Mellencamp has never been known to pull his punches. "I saw through the music business very early, with the 'Johnny Cougar' thing," he says, referring to the cringe-worthy stage name given to him by a former manager in the 1970s. "I had the reputation of being very difficult—but I'm not, really. I'm just doing what most guys don't do, which is stand up for yourself."

Rather than succumb to the constant chart-driven pressures of the hitmaking machine, Mellencamp did indeed stand up to reclaim his name in the ensuing decade, establishing himself as one of our most poignant observational songwriters in the process. And his skill at depicting the litany of American tomfoolery and social malaise is once again on pointed display in Sad Clowns & Hillbillies (Republic).

From the double-wide drawl of "Grandview" to the whispery barbed-wire hiss of "Easy Target" to the rootsy country-folk blend of "Sugar Hill Mountain"—one of the album’s featured duets with Carlene Carter—Sad Clowns is a relatively happy amalgamation of fine analog sounds. "We try to keep it as organic as we can," Mellencamp says of the mix he and veteran engineer David Leonard worked on in Belmont Mall, in Belmont, Indiana—since the early 1980s. When did you know you wanted to have your own studio?

JM: When I would go to those big recording studio complexes in the late '70s and early '80s, I would run into a lot of guys with attitudes and egos. I didn't like that. I mean, you've got to have a certain ego to do what I do, but there's one guy who's in charge here—and that's me. And the truth of the matter is, I've always had the best bands. I welcome everybody's input, but I say things very bluntly.

MM: Do you want people to listen to your music on vinyl? Does it still matter to you how they do it?

JM: I do have a record player, and I get nice turntables and amps to give as gifts to people. But today's music world is so obtuse to me. Don't you still consider as your talismans? MM: [Bob Dylan's] Highway 61 Revisited (1965), of course. That, and Blue, are probably the biggest ones for me. I still remember Highway 61 from when I was in high school, because there was a skip in "Desolation Row." And to this day, whenever I hear "Desolation Row," I wait for that skip.

An extended version of the Metter-Mellencamp Q&A, including a discussion about how John gets that natural deep "character" in his vocals, appears in the Reference Tracks blog on soundandvision.com.
The design brief was simple: build the most powerful, versatile, easy-to-use integrated amplifier imaginable; do it without compromising sound, reliability and a great user experience; and price it so fairly that it becomes a hands-down choice, even when compared against units at many times the price.

Once you experience what it can do—especially with our Debut or Uni-Fi loudspeakers—your world of sound just might be altered forever. Learn more at elac.com.

It’s not what you’d expect from a speaker company.

The Verdict

“ELAC’s EA101EQ-G amp/DAC nails the sweet spot of price, performance, and worthwhile features with surprisingly audiophile sound and the added value of auto-EQ and app-enabled subwoofer crossover/blending.” —Sound & Vision, April 2017

ELAC EA101EQ-G INTEGRATED AMPLIFIER

- ABC Technology (Auto Blend & Calibrate) blends subwoofer with main speakers and calibrates optimum room correction
- 80 Watt-per-channel BASH™ amplification with DSP
- Full-featured smartphone control
**New Gear**

**THIS MONTH’S HOT STUFF...**

**Oppo UDP-205 Ultra HD Blu-ray Player**

Think of the UDP-205 as a supercharged version of the award-winning UDP-203 Ultra HD Blu-ray player, revered for its reference-quality video performance and ability to handle multiple audio and video formats and discs. Seeking to deliver the best of both worlds, Oppo has elevated audio performance to reference level with the addition of a high-precision digital clock, jitter-reduction circuit, and built-in headphone amplifier. **Audio Gone Wild:** Digging deeper reveals the player’s audiophile heart—a pair of ESS Technology’s flagship ES9038PRO 32-bit DACs that feed both standard RCA and balanced XLR stereo outputs. To ensure the upgraded audio section gets a thorough workout, Oppo has added optical, coaxial, and asynchronous USB digital inputs. All this behind an elegant brushed aluminum faceplate. **Price:** $1,299

**Bowers & Wilkins DB Series Subwoofers**

England’s most famous speaker brand uses three words to sum up its new DB Series of subwoofers: Precision, accuracy, and power. The line starts with the compact DB3D ($2,500) and moves to the mid-sized DB2D ($3,500) and, finally, the DB1D ($4,500)—B&W’s most powerful subwoofer yet. All models are rated down to 10 hertz and feature dual, opposing 8-, 10-, or 12-inch drivers driven by 1,000 (DB3 and DB2) or 2,000 watts. **Diamonds Are Forever:** At the core of all three models are the Aerofoil bass drivers used in B&W’s 800 Series Diamond speakers and a custom processor with dynamic equalization. Setup is described as simple thanks to a dedicated app that guides you through the process. Available in gloss black, satin white, or rosenut woodgrain. **Price:** $2,500 to $4,500

**Elite Screens • (978) 664-2870 • elitescreens.com**

**Elite Aeon AR100H-CLR Ceiling Light-Rejecting Screen**

In case you haven’t noticed, today’s projection screens are getting more specialized, even sophisticated. Take Elite’s 100-inch AR100H-CLR. Intended for use with a tabletop ultra-short-throw projector that sits inches from the wall, the screen’s “serriform microstructure” is said to prevent overhead lighting from washing out the image by absorbing 95 percent of the ambient light coming from above. **Contrast This:** The 16:9 screen is hailed for its lightweight split-frame construction, wide viewing angle, neutral color temperature, and killer contrast, which is described as 100 times greater than that of standard matte-white screens. Its “edge-free” thin-bezel design also looks great; Elite even throws in an LED backlighting kit. **Price:** $999 ($799 for the 90-inch AR90H-CLR)

**Elite Screens • (562) 483-8198 • elitescreens.com**

**J•Bowers & Wilkins DB Series Subwoofers**

England’s most famous speaker brand uses three words to sum up its new DB Series of subwoofers: Precision, accuracy, and power. The line starts with the compact DB3D ($2,500) and moves to the mid-sized DB2D ($3,500) and, finally, the DB1D ($4,500)—B&W’s most powerful subwoofer yet. All models are rated down to 10 hertz and feature dual, opposing 8-, 10-, or 12-inch drivers driven by 1,000 (DB3 and DB2) or 2,000 watts. **Diamonds Are Forever:** At the core of all three models are the Aerofoil bass drivers used in B&W’s 800 Series Diamond speakers and a custom processor with dynamic equalization. Setup is described as simple thanks to a dedicated app that guides you through the process. Available in gloss black, satin white, or rosenut woodgrain. **Price:** $2,500 to $4,500

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**Oppo • (650) 961-1118 • oppo.com**

**32 SEPTEMBER 2017 soundandvision.com**
To elevate on-the-go audio fidelity, Pioneer recommends pairing the XDP-30R music player ($400) with a set of matching earbuds. Matching because the SE-CH5BL ‘buds ($90) support the player’s 2.5mm balanced-audio output, which is said to reduce noise and improve stereo separation. Both also sport a 3.5mm minijack for connecting to standard unbalanced devices. Made of aluminum (black or silver), the player has onboard Wi-Fi and Bluetooth for hassle-free streaming and supports resolutions up to 192-kilohertz/32-bit plus 5.6-megahertz DSD files in addition to providing ready access to Tidal and TuneIn internet radio.

**Gigabytes Galore:** The player’s 16 gigabytes of internal storage is expandable to 528 GB with two 256-GB micro SD cards. The icing on the hi-res cake? A patent-pending “airflow control port” that’s said to improve tonal balance by adjusting low-frequency sound pressure in the earbuds.

**Price:** $400, $90

### Onkyo NCP-302W Wireless Speaker

Don’t let the understated look of the NCP-302W fool you. There’s a lot going on in this foot-long speaker, starting with its 1-inch balanced-dome tweeter and dual 3.25-inch woofers. Bluetooth streaming capability, dual-band Wi-Fi connectivity, and resident support for TuneIn internet radio and the streaming services Pandora, Spotify, Tidal, and Deezer. **Pick Your Platform:** App-controlled wireless distribution to speakers in multiple rooms is possible through the FireConnect protocol—which is compatible with a number of Onkyo products—and DTS Play-Fi, both of which must be enabled via a firmware update. The NCP-302W also supports Google’s Chromecast platform, which makes it possible to cast music from a smartphone, tablet, or laptop to the speaker (once Chromecast is enabled via a firmware update).

Available in black woodgrain or white with a natural woodgrain trim.

**Price:** $350

### Pioneer • (844) 679-5350 • pioneerelectronics.com

### Onkyo • (800) 229-1687 • onkyousa.com
New Gear

THIS MONTH’S HOT STUFF...

✦ Epson Home Cinema 1450 3LCD Projector
You won’t need to install blackout shades to fill a nice 100-plus-inch screen with bright images in your entertainment space. Better yet, Epson says its Home Cinema 1450 projector (model V11H836020) is so bright—with a rated output of 4,200 lumens—that you can leave the lights on while watching a movie or playing a video game. It may not be the fanciest-looking projector, but it is reasonably priced, fairly compact at 15 x 11.5 x 5 inches, and “easy to set up”—inside or outside. Go Big: Widescreen 16:10 images up to 260 inches (diagonal) are possible thanks to the 1.6x optical zoom, and the projector is capable of simultaneously displaying images from two sources. Lamp life is rated for up to 10,000 hours in Normal mode. Price: $1,500
Epson • (800) 463-7766 • epson.com

✦ Vizio SB3621 Soundbar System
The latest in Vizio’s popular soundbar line, the 36-inch-wide SB3621 supports Bluetooth streaming and can be mounted on the wall (bracket included) or placed on (or in) a cabinet while its companion wireless subwoofer is tucked away in a corner. Onboard processing includes Dolby Digital and DTS Studio Sound, which creates a virtual surround sound experience, enhances dialogue, and eliminates annoying volume fluctuations. Pump It Up: The system is rated to deliver sound-pressure levels up to 100 decibels with bass that dips down to 50 Hz. Optical and coaxial inputs are provided along with an analog minijack input and a full set of cables. For another 100 bucks, you can upgrade to Vizio’s SmartCast-enabled SB3651, a 5.1 system that adds an HDMI input and comes with a pair of rear surround speakers. Price: $150
Vizio • (855) 833-3221 • vizio.com

✦ Samsung UBD-M9500 Ultra HD Blu-ray Player
Now that 16 percent of American households own a 4K TV with 11 percent planning to buy one this year, it’s time to get the Ultra HD (UHD) party started. Building on last year’s UBD-X8500 player, the UBD-M9500 adds Bluetooth streaming and support for 360-degree videos shot on Samsung’s Gear 360 camera to an already solid mix of features that includes HDR10 high dynamic range playback, dual HDMI outputs, and UHD upscaling. Get Smart: The player doubles as an entertainment hub with a simple interface that provides access to Netflix, Amazon, and YouTube, while making it possible to mirror the TV screen on any mobile device connected to your network. What’s more, a Blu-ray-to-mobile feature lets you stream to a phone or tablet even while something else is on the TV screen. Price: $400
Samsung • (800) 726-7864 • samsung.com

34 SEPTEMBER 2017 soundandvision.com
MarkAudio-Sota Cesti MB Speaker
The entry-level model in a new line of finely crafted speakers, the Cesti MB combines Italian style with British engineering in a speaker designed and built in China. The company prides itself on constructing its speakers from scratch using custom drivers and crossovers and super sturdy cabinets made of laminated dual-core panels. **Two-in-One:** Instead of a classic tweeter/woofer pairing, the 13-inch-tall MB uses a 4.4-inch “all-range symmetric driver” and proprietary “minimalist control network” to deliver a range of frequencies that extends from 40 Hz to 25 kHz with a “rich midrange” in between. The Cesti MB is available in glossy white, black, or red and comes with a 30-day money-back guarantee. **Price:** $1,595
MarkAudio-Sota • (844) 202-4278 • markaudio-sota.us

Sennheiser Flex 5000 Wireless Transmitter
Have a favorite set of headphones you wish were wireless? The Flex 5000 transmitter/receiver will do the trick with a minimum of fuss without breaking the piggy bank. Plug the transmitter into your TV (or other source component) and your headphones into the receiver/volume controller, and you’re free to roam about, untethered at last. Cleverly, the transmitter doubles as a charging dock for the receiver, which is good for up to 12 hours when fully charged. **Mo’ Better Wireless:** Nixing wires is wonderful, but Sennheiser goes a step further, providing listeners three “hearing profiles” to choose from plus a TV speech mode designed to reduce background noise and enhance dialogue intelligibility. Optical digital and analog inputs are included along with a set of MX 475 earbuds to help you get the wireless ball rolling. **Price:** $200
Sennheiser • (877) 736-6434 • sennheiser.com
Dayton Audio Epique CBT24 Speaker System

AT A GLANCE

Plus
- Remarkable, panel-speaker-like stereo imaging
- Neutral tonal balance
- Complete absence of "floor-bounce" thickening

Minus
- Curtail bass requires subwoofer support
- Needs custom-or auto-equalization for best performance
- Modest subwoofer localization

Dayton Audio Epique CBT24

PRICE $1,995 pr (assembled); $1,295/pr (kit)

AND NOW FOR SOMETHING completely different: Dayton Audio’s Epique CBT24.

What’s an Epique CBT24? A 24-driver, no-crossover, one-way tower loudspeaker that stands 5 feet tall yet is no more than 3.5 inches wide over its full, dramatically arched length. A tower speaker with a unique geometry, pedigree, visual aesthetic, and equally unique technical story (and even marketing plan).

The CBT24 is the first product in a new Epique line offered by Dayton Audio and is sold via that brand’s Parts Express website (parts-express.com), known for its array of direct-to-consumer parts, drivers, kits, and assembled and kit forms. (We opted for the former: They don’t pay me enough to screw 48 tiny drivers into baffles and then wire them without making a mistake, and as for woodworking…). But in point of fact, the CBT24 reviewed here, is entirely the baby of D.B. Keele, a well-known electrical scientist who has worked at various times for Harman (the JBL parent), Electro-Voice (twice), Crown/Techron (where he developed the TEF spectrum analyzer) and the U.S. Navy (navigation technology). Yet, if the name sounds familiar, it’s most likely because Don Keele was also Senior Editor and lead loudspeaker reviewer for Audio—the most technical of S&V’s several progenitors—through much of the 1990s. Full disclosure: I also freelanced for Audio at roughly the same time. I admired Don’s work, and though we met only at trade shows, he was unfailingly and cheerfully generous with his time and his seemingly limitless knowledge and expertise, which I occasionally solicited by phone and for which I was grateful then and remain so today. That said, we’ve neither met nor conversed for at least a decade.

The CBT24 is the commercial manifestation of an acoustical principle Keele has been refining for decades, the constant-beamwidth transducer; a concept enshrined right in the speaker’s name. The ideal—which he first encountered, underwater, in the Navy while working with surveillance tech (presumably sonar), is a sound source whose spectral content, and thus its perceived timbre, remains substantially unchanged whether you hear it (or measure it) from straight ahead or off axis to one or the other side. This is a popular speaker-design goal—difficult to realize via conventional designs—because in typical listening rooms much of what we hear is reflected sound from a speaker’s off-axis output, and if this is substantially different in tonality than the direct sound reaching our ears straight from the loudspeaker, the realism suffers.

Another design ideal is to eliminate sound vertically off axis, that is, angled toward the floor and ceiling. These surfaces, especially the floor, are usually much closer to the speaker than the walls are. The speaker is, in most cases, standing on it, so the floor is the closest of all. In nearly all conventional designs, this induces “floor-bounce” as this first-reflection sound bounces back into the path of the direct output. It interferes both by reinforcing frequencies whose wavelengths are close to this reflection’s total angular distance and by attenuating adjacent ones. (The mechanism is analogous to interfering ripples in still water: Throw a quarter into a swimming pool near one wall, and watch the patterns as the ripples bounce off the wall, creating areas of deeper waves and regions of flat water.) Floor-bounce usually results in a strong peak/dip somewhere around 150 to 300 hertz, usually with adjacent ripples, that...
THE VERDICT
A genuine rarity—a truly distinct take on consumer loudspeaker design—Dayton Audio’s Epique CBT24 delivers exceptional performance with exceptional stereo imaging. Extremely unusual looks and the need for modest equalization and a subwoofer shouldn’t deter adventurous listeners.

combine for the strongest single coloration in the vast majority of real-world installations.

Keele’s CBT24 claims to address both of these issues with constant-beamwidth transducer magic. His design places 24, 2.5-inch drivers, spaced as closely as their physical dimensions allow, along an arched baffle just 3.5 inches wide, which describes about 36 degrees of the arc of a vertical circle. A circle whose diameter, its chord measuring some arc of a vertical circle. A circle whose dimensions allow, along an arched spaced as closely as their physical design places 24, 2.5-inch drivers, beamwidth transducer magic. His both of these issues with constant-

coloration in the vast majority of combine for the strongest single equalization and a subwoofer shouldn’t deter adventurous listeners.

CBT24 sounds like. The answer—or answers, since there will be multiples—are not quite so simple. Multiples, because Dayton Audio freely admits that the CBT24 requires equalization to show its best. To that end, they, in their Parts Express persona, also loaned us a miniDSP, an inexpensive ($105) two-channel 2-in/4-out digital equalizer. This is most used by speaker hobbyists as an onboard digital crossover/ equalizer/delay, but in this case, Dayton preprogrammed it with simple, stereo-in/out compensation for the CBT24’s roll-offs at both the bass and treble extremes. I had no data for this smile-shaped curve, nor did I measure it (see our measurement results in the Test Bench box), but the data set is downloadable from Dayton’s Epique page for you and yours to tap as needed. The company also claims that you can get fairly close with simple tone controls, though I feel the need to point out that tone-control curves can vary a good deal from design to design and often change “shape” from low to high settings, so I should think Dayton’s designed, downloadable EQ is clearly preferable. In the absence of this, and perhaps as a preference to this, Dayton also recommends the auto room-correction scheme in virtually every modern A/V receiver, which I also tried and about which I’ll say more later. As for the bass end of things, I determined that my long-term sub, the SVS PB12-Plus—a cylindrical design with massive output to below 20 Hz and very flexible crossover/ filtering facilities—would suffice for the “with-sub” portion of the program.

I set up the CBT24s in my studio’s usual tower locations, about 9 feet apart and some 3 or 4 feet from the front wall at floor level—this put the backwards-arcing top within a foot of the wall—and 10 or 11 feet from my listening seat. The speakers arrive with simple wooden bases that screw securely into their bottom ends (you’ll want a power-driver, as the screws are long and fine-pitched), and despite their somewhat entomological look, the CBT24s proved perfectly stable, even on my room’s carpeting. The CBT24 bases have no provisions for floor pads or carpet spikes, and I employed none, but adding either would be a simple matter. (My sub remained in its long-proven location, to the right of and behind the right speaker.)

The CBT24s are plainly finished in semi-gloss black enamel, with many a visual bell nor whistle. There’s no grille, so the main visual element is that arc of 24 little, dark gray, inverted domes. It’s a look that’s a visual bell nor whistle. There’s no grille, so the main visual element is that arc of 24 little, dark gray, inverted domes. It’s a look that’s.

Despite their svelte profile, the CBTs played quite loudly.
Test Bench
Dayton Audio Epique CBT24 Speaker System

EPIQUE CBT24 w EQ (purple) +3.53/–3.16 dB, 200 Hz to 10 kHz; –3 dB @ 88 Hz; –6 dB @ 79 Hz; impedance minimum 4.52 ohms @ 625 Hz, phase angle –32.39º @ 208 Hz; sensitivity 88 dB, 500 Hz to 2 kHz.

EPIQUE CBT24 wo EQ (red) +3.78/–7.73 dB, 200 Hz to 10 kHz; –3 dB @ 110 Hz; –6 dB @ 91 Hz; impedance minimum 4.52 ohms @ 625 Hz, phase angle –32.39º @ 208 Hz; sensitivity 88 dB, 500 Hz to 2 kHz.

MINIDSP EQ (blue) Electrical output.—MJP

SPECS
Driver: 2.5-inch aluminum-magnesium inverted-dome full-range (24) • Dimensions (WxHxD, Inches): 3.5 x 60 x 25 (depth incl. base) • Weight (Pounds): 27.5 (each)

trying to think the speakers out of sight behind an imaginary screen—
I heard what might have been a very respectable but substantially bass-limited mini-monitor, though one with an unusually broad stereo image. There was not much bass below 120 Hz or so, so pop/rock like the Sheffield Drum Record System, or Knopfler’s “Baloney Again,” a fine, tight-perspective studio mix with a nod to naturalistic imaging, each instrument inhabited its own space in the broad, rather tall image. And Knopfler’s unmistakable bass-baritone was all there, his rich, slightly nasal tone color and expressive, articulate phrasing hanging solidly, three-dimensionally front and center, with all its characteristic roundness and depth on full display.

Or were they? I set up a carefully level-matched A/B with my everyday Energy Veritas 2.3 stand-mount monitors, running full-range, and the long-discontinued Canadians clearly showed a fuller, heavier sound to both the lower half-octave or so of Knopfler’s voice and to the strongly recorded but delicately played Fender bass that underpins the track. And yet—and this is difficult to convey in words—the actual tone color of both the voice and the bass were identical, and in every other regard the timbral match was exceedingly close, though the CBT’s deeper/broader/rounder image was always in evidence.

I cross-checked this finding with numerous other recordings, as well as with a favorite quick-ref option—TV announcers—and the results were consistent. Despite their near-perfect timbral match, the CBT24s always sounded, well, not lighter exactly, in the bass, but less forward, less weighty, almost less thuddy than the Energys, even though the Veritas are very far indeed from being bass-heavy or boomy.

The conclusion I reached was obvious: floor-bounce. Even though my Energys are a thoroughly engineered design of superb accuracy, both by ear and by measurement, and were mounted on stands at the recommended height and placed at a distance carefully derived from years of listening, they are no doubt still subject to floor-bounce. As noted, this produces a hump/dip somewhere around 150 to 200 Hz. The CBT24s, according to both my ears and Dayton Audio’s published curves, did not: Their response (as shown on Dayton’s website) looks, and then sounded, smooth, without a serious squiggle in its 6 dB/octave roll-off below about 200 Hz. In consequence, midbass-rich music—like most pop and much jazz—sounded not precisely more lifelike, but somehow less recorded.

And now I’ll move on to imaging. Put plainly, the Epique running full-range, and the long-

discontinued Canadians clearly showed a fuller, heavier sound to both the lower half-octave or so of Knopfler’s voice and to the strongly recorded but delicately played Fender bass that underpins the track. And yet—and this is difficult to convey in words—the actual tone color of both the voice and the bass were identical, and in every other regard the timbral match was exceedingly close, though the CBT’s deeper/broader/rounder image was always in evidence.

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And now I’ll move on to imaging. Put plainly, the Epique
“All the power most will ever need, with the sound quality you want in a slim, cool-running package. Legacy’s promise of serious power at a fair price is honestly made and fully delivered.”

D. Kumin, Sound & Vision July/Aug 2017

325 watts per channel @ 8 ohms, 650 watts per channel @ 4 ohms
Available as the two channel Powerbloc² or the four channel Powerbloc⁴

“Calibre goes from subtle to bombastic in an instant without ever losing control... This could be the best-sounding speaker at its size... Audition them now!”

What HiFi? May 2017
imaged like no direct-radiating system I’d ever heard, producing the kind of depth, breadth, and float-in-the-ether sound bubble I associate more with panel speakers—electrostatics in particular, and most particularly one of my all-time favorite loudspeakers, the Quad ESL-63 phase-aligned concentric ‘stats. For just one example, an oldie-but-goodie Reference Recordings CD of the too-little-heard Weber Clarinet Quintet painted a seriously lifelike aural portrait. The violins, viola, and cello were each clearly delineated by left-right location and stage depth, but were deliciously united in their grouped-string timbre and woody resonance, while the clarinetist (the brilliant, two-way jazz/classical threat Eddie Daniels), grounded firmly just right of center, soared over and through. This was goose-bumping stuff, and the timbral solidity and continuity of the clarinet in particular, over its full range, was impressive.

Some New EQ

I next wished to know whether an outboard equalizer like the miniDSP was an absolute requirement, or, per Dayton Audio’s recommendation, how the auto-correction found in most modern A/V receivers and preamps could suffice. I set up a Marantz SR7007, a flagship model of a couple years back, to avail myself of its top-level Audyssey MultEQ XT, which, at least in my studio, I’ve found to be one of the most effective such systems. I let the Marantz run its auto setup /room/speaker-EQ correction procedure, exploiting the maximum of eight mic positions, for the 2.1-channel system, i.e., the CBTs with my SVS sub. (I then rebalanced the sub’s level by ear, as I inevitably do with every auto-EQ system.)

I cannot say that the result was indistinguishable from what I heard using Dayton’s recommended equalization preset to the supplied miniDSP. For one thing, making any such A/B comparison was not really practicable. But my sense was that it was very, very close: I heard the same lifelike bass acclivity (without any bass deficit). If anything, the image’s breadth, depth, and detail were better with the Audyssey, likely due to its having measured and corrected, to some degree at least, real-world conditions in my room. Whatever the case, the CBTs sounded terrific with the Audyssey/Marantz correction. I found a new ease in listening into the stereo image on an ultra-familiar track like Norah Jones’ “Come Away With Me.” And the deliciousness of its string bass with no attendant floor-bounce thickening—something most of us are so inured to, we don’t even know we’re hearing it—is difficult to overstake. This track’s opening moments feature brushed ride-cymbal, and I did wonder if the CBT24s might not be highlighting, however slightly, an element of “split” in its timbre, possibly due to a modest response peak, perhaps around 6 to 8 kilohertz. Nevertheless, the air, presence, and detail of the backing track, and the spooky realism of Jones’s holographic voice, were exceptional by any measure.

Despite their swelle profile, the CBTs seemed perfectly happy playing quite loudly—not too surprising for a design with 48 drivers, each rated for 15/30 RMS peak watts power handling. An excellent full-orchestra recording like a Reference Recordings set of the Rachmaninoff Symphony Eludes/Tableaux could clearly deliver its full dynamic shadings, with strong, air-blast brass attacks and powerful crescendo from material like the “March,” even at verifiable front-of-house levels. And concert-level rock was equally well presented. I could dial up the Allmans’ “Fillmore” live set at very nearly you-are-there volume on a hard-punching track like “You Don’t Love Me” (R.I.P., Gregg!), with no complaints from the speakers, or from my ears.

Some additional random thoughts: The CBT pair’s phantom center image, such as on announcers’ voices, was as solid and stable as any I’ve heard. I could stand 7 feet from the right-hand speaker, directly on axis, and still hear a strong origin point for the voice well to the left, though not quite strictly centered. Nevertheless, that’s impressive. Another benefit claimed for the CBT design is near-uniform vertical dispersion of sound. I checked this, casually, via the classic squat-sit-stand test while playing a pink-noise signal. Here, nearly all conventional multi-way speakers’ sound will vary in a “shoo, shee, shaw” fashion as your ears move into and then out of the in-phase lobe(s) of ideally combined non-coincident-tweeter- and-midrange output. (This is something that concerned designers go to some pains to engineer, causing it to be directed to seated-ear height when their speakers are installed and located properly.) From my everyday Energys, the treble formant changed in just this way as my head moved up and down. But via the CBT24s, the mid-treble timbre remained completely unchanged: It became louder as I went from standing to sitting to floor-sitting height—remember, the level-shading of the CBT24s half-array design puts the highest-output drivers at the bottom—but otherwise there was simply no change. I had to put my ear closer than 1 foot away to hear any trace of driver-to-driver lobing, and even that was small.

According to designer Keele, another interesting effect of a CBT design is that its output does not follow the mean-square law that applies to a theoretical point-source, which most conventional speakers are, or more. That is, the speakers’ loudness (in free space) does not fall off the expected 6 dB per doubling of listening distance, but rather by about half that amount. I confirmed this effect semi-scientifically by listening comparisons with my everyday three-way speakers, carefully level-matched at 7 feet, from a bit over twice that distance; from that point, the CBT24s sounded slightly but obviously louder. (Keep in mind that this effect, heard in a room’s reflective space, should be less marked than would be the case in free space.)

I noticed that the CBT24s were in the low range of sensitivity for typical dynamic speakers (again, see our Test Bench for measured details). The design is rated to have a nominal 4-ohm impedance; neither my 150-watt-per-channel power amp nor the Marantz receiver displayed the slightest difficulty in driving them to high levels, and I briefly tried a rated 30-watt-per-channel integrated amp and achieved excellent volume and quality of sound.

And lastly, to return to the CBTs’ stereo image for a moment: Given true stereo production, the image was invariably deep, as well as broad, reaching fully from speaker to speaker (but always remaining in between them), and as you would expect, quite tall. But in the vertical dimension, it was slightly diffuse, lacking a bit of the tight, “flashlight” origin-point—some might call it image specificity—for a centered soloist that the best monitors can conjure. And on the best big-image stereo recordings—like the aforementioned Rachmaninoff—I kept imagining that the depth dimension had a slightly sloped feel, as if the orchestra’s seating stage sloped slightly upward from the proscenium to the backstage direction. This never intruded, though, and I can’t promise that the visual element of the starkly curved CBTs wasn’t influencing my auditory conclusion.

And There Was One

I hate to call any product “utterly unique”; for one thing, unique is that part of speech known as a superlative and thus not susceptible to qualification. (It drives me sputtering-crazy when TV reporters and other so-called professionals refer to this or that as “even more unique”; if it’s unique, there’s only one. Period.) But I dare say that Dayton Audio’s Epique CBT24 is eveniquer than that. Keele’s design, obviously, will not be for everyone. (I mean, just look at them….) Nonetheless, any audiohead who is deeply interested in the evolution of the loud-speaker and in sound reproduction in general will want to hear a set.
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TEST REPORT

Not Your Father’s HDTV

By Thomas J. Norton

LG OLED65E7P OLED Ultra HDTV

PRICE $5,000

LG’S 2017 OLED OFFERINGS FALL into five model groups, with the OLED65E7P positioned roughly in the middle. At $5,000, it’s hardly a Black Friday special, but it’s significantly cheaper than the near-paper-thin 65-inch flagship OLED65W7P (reviewed in our June issue), which commands $8,000.

Unlike that model, which must be hung on a wall, this TV has the added option of mounting on a stand (included). According to LG, all of their OLED sets use the same panels and should offer the same video performance—though with only the OLED65E7P on hand, I had no way to confirm this. They do vary in size and features, but the differences in the latter appear to be small.

And flat is back! OK, it never actually went away—but this year, none of LG’s new OLED sets is curved. In addition, as is the case with other major TV makers, LG has abandoned 3D.

OLEDs, however, need no separate backlight. They’re self-illuminating; each pixel can go black or white or any level in between. This allows the picture to go from full white to totally black, either overall or in any area of the screen, as the source requires. LCDs can’t do that unless assisted by sophisticated LED backlighting, usually some form of local dimming.

LG says that their 2017 OLED sets are brighter than last year’s. But they’re still considerably less bright than comparably priced LCD TVs. Fortunately, our eyes don’t respond linearly to light level; if they did, sunlight (which is orders of magnitude brighter than the brightest TV) would blind us. In other words, to the human eye, a peak TV picture level of 1,500 nits (438 foot-lamberts) will certainly look brighter than 750 nits (219 ft-L), but nowhere near twice as bright.

That said, because OLEDs can shut down completely when the picture requires it, nothing can beat them when it comes to inky blacks. For 2017, LG has added a feature they call a Neutral Black Polarizer. It’s designed to reduce the effect of ambient light on the screen.

Pricey

It’s all about the black
Wide viewing angle
Supports both HDR10 and Dolby Vision

Wide viewing angle
Supports both HDR10 and Dolby Vision

Walk Around
I’ve spoken with more than a few folks who confuse OLED sets with the so-called LED TVs that dominate the market. There’s no such thing as an LED TV. The pixels in such sets—the picture elements that produce the actual image—are liquid crystals. These pixels can be opened or shuttered at different rates of speed, but they produce no light. That’s where the LEDs come in; they sit behind the LCD panel, or at the edges beyond the frame, and provide the required illumination.

AT A GLANCE

+ Plus
- Minus

- Pricey

42 SEPTEMBER 2017 soundandvision.com

This LG OLED is wall-mountable and also comes with a stand.
THE VERDICT

Last year’s OLED sets from LG were so impressive that, apart from their peak white capabilities (an ongoing shortcoming relative to LCD designs), it was hard to see a road ahead for improvements. But LG has found that road, and while the upgrades might prove subtle to most viewers, videophiles will welcome them.

All of LG’s new Ultra HDTVs are fully compatible out of the box with the two major forms of high dynamic range: HDR10 and Dolby Vision. Upgrades are promised for two other HDR formats, HLG, or Hybrid Log-Gamma, is planned for future HDR broadcasting. And Advanced HDR by Technicolor is comparable to Vision, a form of HDR employing dynamic metadata that actively optimizes the HDR effect from scene to scene. When I asked LG, they explained that their 2017 OLEDs use proprietary signal processing that converts the static metadata on HDR formats such as HDR10 and HLG and adds dynamic metadata. I wasn’t made aware of this until the review process was essentially complete; therefore, for all of my viewing and measurements, Active HDR was engaged. That’s not necessarily a bad thing, as I experienced this feature (positively, as it turned out) without preconceptions. (It’s also engaged in the HDR10 default settings and is linked to the Dynamic Contrast control as follows. With Dynamic Contrast setting off, the Active HDR is off, Dynamic Contrast is off. Dynamic Contrast setting Low: Active HDR is on, Dynamic Contrast is off (default). Dynamic Contrast setting Medium: Active HDR is on, Dynamic Contrast is medium. Dynamic Contrast setting High: Active HDR is on, Dynamic Contrast is high.) OLED sets, unlike most LCD/LED designs, retain their visual quality when viewed from off center, just as the now departed plasma TVs once did. This is even more significant now than it has been with 1080p. Viewing a 4K set, you might want to sit closer to the screen than before to better appreciate the added resolution—and the closer you sit to an LCD TV, the narrower its optimum viewing area becomes.

The OLED65E7P’s audio system is above average for a flat-screen set, sometimes surprisingly so. Just don’t expect it to sound both loud and clean when confronted with the mayhem of an action film. There’s no deep bass, either; still, the set does a reasonable job of disguising that fact. The system is spec’d as 4.2-channel with Dolby Atmos sound (via Dolby Digital Plus for streamed content; a firmware update will provide support for Atmos via Dolby TrueHD on Blu-ray). But if you want to hear what Atmos was designed to do, expect to pony up for an outboard, Atmos-capable audio system. And if you’re streaming an Atmos source from the set’s internal apps, take comfort in the fact that the TV will pass the signal from its ARC (Audio Return Channel) to an external system.

The set can decode Ultra HD sources using either the HEVC (H.265) or the VP9 video compression codec. H.265 is universal (to my knowledge) on Ultra HD Blu-rays; VP9 is common from video streaming sites. All of the TV’s HDMI inputs are HDMI 2.0a with HDCP 2.2.

While there’s a wide assortment of standard dynamic range (SDR) picture modes, the two ISP Expert modes provide the most adjustability, including White Balance controls (2-step and 20-step) and a color management system (CMS). For 1080p SDR, I used ISP Expert (Dark Room). There’s also a selection called HDR Effect, which simulates HDR on an SDR source, using proprietary technology similar to Active HDR to adjust the image on a scene-by-scene basis for a more convincing HDR-like effect.

For HDR, the set offers a shorter list of picture modes; I chose Cinema (User) for HDR10, which again provided the most adjustments. A Dolby Vision source brings up yet another selection of picture modes. Gamers should note that the LG has Game modes for both SDR and HDR, said to offer a latency of under 25 milliseconds. When the LG senses an HDR source, a small bug corresponding to the type of HDR appears onscreen.

LG’s Magic Remote wirelessly controls an onscreen cursor that you position by moving the remote until the cursor is on the desired adjustment. The remote isn’t backlit, and it operates much like LG’s handsets from last year. But the important controls surrounding the navigation wheel are flush with the remote’s surface and can’t be readily identified by feel. It’s easy to miss them in the dark, and I often did so when feeling for the menu button. The remote offers LG’s voice activation, but as with the company’s earlier TVs, I had no luck getting it to provide any useful functions that couldn’t be done more easily the old-fashioned way.
TEST REPORT

Test Bench
LG OLED65E7P OLED Ultra HDTV

GAMMA control to 2.2 (and on some
when this occurred, I changed the
Gamma for HDR is much
more tightly specified, and the
set’s HDR gamma is otherwise
fixed and not adjustable.

(Delta E is a figure of merit that indicates how closely a
display adheres to the color
standard. Experts generally agree that at
levels below 3 to 4, the result is visibly
indistinguishable from perfect color
tracking.)

HIGH DYNAMIC RANGE (HDR10) AT
4K (3840 X 2160) RESOLUTION
FULL-ON/FULL-OFF Contrast Ratio:
Unmeasurable

At the set’s peak measured HDR white
output of 651 nits (190 ft-L), post-calibra-
tion in the Cinema (User) HDR10 picture
mode, with OLED Light at 100, Contrast
at 85, and Dynamic Contrast on Medium,
the black level, as
in SDR, could not be measured. Effectively, it was
totally black, making the full-on/full-off
contrast ratio, at best, infinite—or,
practically speaking, unmeasurable.

THE pre-calibration grayscale Delta E
values ranged from 0.4 to 3.3. Post-
calibration, the values ranged from 0.1 to
77. These high values might appear alarming,
but for HDR the Delta E values
include the x/y coordinates of the white
point and the luminance at the same
level. Since it wasn’t possible to tweak
the white luminance to fine-tune the
gamma (for HDR, the gamma is now
called the EOTF, for Electro Optical
Transfer Function, and the specified
EOTF is known as the Perceptual
Quantization, or PQ, curve), high
luminance at some values resulted in
high Delta Es. See our online Test Bench
at soundandvision.com for additional
details.

P3 and BT.2020 are the two color gamuts
of current interest for Ultra HD. The tools
for measuring how well a display can
reproduce these gamuts at different
luminance levels (the so-called color
volume) are still limited. But those tools
indicated that while the LG was restricted
in its ability to achieve BT.2020 at high
luminance, the results with P3, while not
perfect, were very good. No UHD
consumer source we know of as yet
goes beyond P3.—TJN

The LG OLED65E7P belongs on
your (very) short shopping list.
The World’s Best Sound Bars?

The ZVOX aluminum sound bars with digitally controlled subwoofers offer a combination of performance, style and features that are unmatched by competitors…at any price. All three models feature extruded aluminum cabinets with subtle contours and a remarkable three inch profile. In comparison, those curvy-for-no-reason plastic sound bars look like children’s toys.

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They sound like high performance home theater systems. Our AccuVoice® system uses hearing aid technology to deliver crystal-clear dialogue. Multiple inputs make the sound bars Chromecast®-ready for seamlessly integrated multi-room wifi audio. aptX® Bluetooth® awaits your phone or tablet. We would not hesitate to compare them to any sound bar, at any price.

Sound & Vision magazine named the SB500 a “Top Pick” in December 2016

Syndicated columnist Don Lindich named the ZVOX sound bar lineup his 2016 Product of the Year.

SB400: 35.5”w x 5.7”h x 3.3”d. Three full range speakers, 4” subwoofer. Bass down to 47 Hz. 118 watt digital amplifier.

SB500: 43.9”w x 5.7”h x 3.3”d. Three full range speakers, two 4” subwoofers. Bass down to 42 Hz. 140 watt digital amplifier.

SB700: 57”w x 5.7”h x 3.3”d. Three full range speakers, two 4” subwoofers. Bass down to 38 Hz. 140 watt digital amplifier.

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TEST REPORT

OLED TVs are prone to image retention from long exposure to fixed images. These might linger as faint afterimages now and then, which generally fade out a few minutes after the picture has passed. Nevertheless, this TV offers a pair of anti-retention features, and I’d be inclined to use them, with the same cautions here that applied to plasmas—particularly now that we have ultra-bright HDR sources to contend with. Avoid extended exposure to bright, stationary images and stay away from torch-like picture modes such as Vivid; an OLED isn’t your best choice for a sunroom set! The only time I saw afterimages, which faded in a couple of minutes, was with high-luminance white window test patterns.

Like LCD TVs, OLED sets produce more motion blur than CRTs and plasmas did. You can reduce it with LG’s TruMotion control, but that produces the dreaded soap-opera effect. The feature’s Custom mode offers separate Blur and Judder controls, which helped, but I preferred to leave TruMotion off entirely. Did I see motion blur? Yes, but I never found it annoying.

HD with SDR

The OLED65E7P passed all of our standard video tests except Motion Adaptive 480i SD, which it failed with visible jaggies. On the audio side, the TV delivered both Dolby Digital and DTS in full surround from its Toslink optical audio output (but not their lossless versions, Dolby TrueHD and DTS-HD Master Audio, which can’t be carried over Toslink). I began with the set uncalibrated for color. Apart from being incapable of LCD-like super brightness (though bright enough for any practical use), and no one looking for realistic images will complain), the TV’s performance was stunning. On Blu-ray, the colors in the brightest scenes from the documentary Samsaro (shot on 70mm film) were exceptional. Even in the BT.709 color gamut used for 1080p HD, the bright red robes of the monks and their multicolored mandala, the vividly costumed Asian dancers, and a jaw-dropping shot of the Hall of Mirrors in Versailles all stood out brilliantly. Detail was excellent as well; the set does a beautiful job of upconverting standard HD sources to its full 4K pixel array.

A calibration improved the color a bit, though the visible differences were subtler than the measurements might suggest (see Test Bench). A Pioneer Kuro promotional Blu-ray sampler from 2006—produced on the cusp of the Blu-ray format’s introduction—remains competitive with anything you’ll see today in 1080p SDR. The colors on this disc looked as rich as above, and the resolution was first class.

Prometheus is one of my prime go-to Blu-rays for judging blacks. The starfields and the many scenes in dark caves could hardly have looked better. But I did notice one thing that was different from the performance of previous LG OLED sets. Most of the time, the luminance on the OLED65E7P faded to total black between scenes, as with past LGs. But sometimes, this set faded to a black that wasn’t quite total—a very, very dark gray. Admittedly, this was a distinction visible only in a fully darkened room. Is it a step back? I don’t believe so. The newest LG OLED sets have added finer gradations of grays in the region just above black. In the past, the first step above black might have been read by the TV as black, so the set pulled it down to black even though it was mastered as almost but not quite total black. The 2017 models can now respond properly to these near black gradations—and in a truly dark environment, you can see them. This TV is merely telling it like it is. But I did find one issue. On full dark-field test patterns (I used 5 percent), there were dark vertical streaks on the screen. This was troubling, but I never saw it on any real-world material. That doesn’t mean it will never show up in normal use, only that it should be rare. Was this a sample defect? I don’t think so. I’ve just begun working on a new Sony OLED for our next issue, and while I hesitate to refer to a review still in its opening stages, it had the same problem. Sony OLEDs use LG panels (but different Sony-designed electronics).

Ultra HD with HDR10

We’ve all seen ads promoting HDR. They start with a bland, unimpressive image. Then, with a swipe across the screen, we see—wonder of wonders!—HDR in all its glory. This could hardly be more meaningless, particularly if you’re watching the ad on a computer or a non-HDR set.

Even plain HD can look far better than such material suggests. But it’s also true that 4K with HDR can look even better. For this report, I watched a number of Ultra HD Blu-rays in the HDR10 format, before and after a full calibration, and they consistently ranged from impressive to spectacular. In Oblivion, the hairs of Jack’s stubble, the freckles on Victoria’s face (which I never noticed before), and the dirt and textures on the page of a book Jack is reading were all vividly rendered. The film’s wide swaths of blue sky showed no trace of banding. Post-calibration, fleshtones were convincingly natural (they were slightly too reddish before). And while the HDR wasn’t as immediately obvious on this disc as on some others, it stood out clearly in sunsets, in a night shot of Jack and Victoria’s house/ command post with the shattered moon gleaming above, and (especially) in the dark, underground remnants of the New York Public Library, where Jack fights off the Scavs.

In the World War II spy drama Allied, the LG’s HDR also stood out, but not in a flashy way. The HDR highlights seen in reflections of lights glinting off cars, the shading and shadow details in night rooftop scenes, and the bright lights of the anti-aircraft tracers and fiery plane crashes in a night air raid on London unusually enhanced the film’s drama without distracting from it. The resolution was also superb. The whiskers and other skin textures in the actors’ faces were crisply rendered, as were other small details, such as the red swastikas on the back of German playing cards and the natural, painted-over weather and tear in the woodwork of Max and Marianne’s London house. This Ultra HD Blu-ray was produced from a 4K digital intermediate, which certainly helped make it look as good as it did, but the LG’s contribution was unquestionably significant. The colors here were also

SPECS

Dimensions (WxHxD, Inches): 57.5 x 35.6 x 7.7 (with stand), 57.5 x 34.5 x 2.4 (without stand)  •  Weight (Pounds): 50.9 (with stand), 46.7 (without stand)  •  Inputs: HDMI 2.0a (HDCP 2.2) (4, ARC on Input 2), composite A/V (with adapter), RF (cable/antenna), USB 3.0 (1), USB 2.0 (2), LAN (Ethernet)  •  Outputs: Toslink optical  •  Other: Wi-Fi, RS-232 (minijack)

• Without the stand, the OLED65E7P’s screen measures 2.4 inches deep.

• The non-backlit remote sports a sleek metallic finish and dedicated Netflix and Amazon buttons.
true across the board, from fleshtones to natural green foliage, skewed only by the subtle sepia tone of the transfer—common to films set in this time period.

Back when I reviewed the most recent 2016 LG OLED set, I noticed some HDR peak white clipping (though only on the most difficult material). But not here. None of the sources I watched—including the rolling surf and bright cloud scenes on a Samsung HDR test disc that had given the 2016 set some problems—showed any visible signs of it.

I also sampled the HDR Effect (User) mode mentioned earlier, which simulates HDR on SDR material. While I'm still skeptical of such simulations (and it's not at all clear how to calibrate for them!), the mode often worked surprisingly well—though better on some sources than others. I had mixed feelings about it and would likely reserve it for certain material (such as animation, where it was most effective). But tastes will vary here, not to mention how the mode might skew the intent of the content's creator.

Some viewers will love it, while others might exile it to the outer darkness reserved for pan and scan on widescreen movies and colorization of black-and-white films.

The OLED65E7P is ready for Dolby Vision, the primary competitor to HDR10 (the latter exclusive to all Ultra HD Blu-rays as of mid-2017). During my evaluation, no UHD Blu-rays with Dolby Vision had yet been released (the first discs have since come out). Nor are there fully developed tools ready to properly calibrate a display for Dolby Vision. LG did provide us with a few minutes of Dolby Vision material on a flash drive; viewed without calibration, it looked as good as anything I've seen from HDR10. But without a direct comparison with the same material encoded in HDR10, it's not possible to come to any definitive answer on how the two formats match up.

Conclusions

Is this the perfect Ultra HDTV? Of course not; there's as yet no such thing and likely never will be. But for now, in most of the ways that count, this is as close to it as I've experienced. Might we see a better TV next year, or even next week? Sure, anything's possible in the fast-moving world of home video.

Only in peak brightness capability does LG's OLED set take a back seat to the LCD/LED competition—and some might argue that this doesn't count for much, considering the currently available, real-world UHD/HDR program material. So if you're on the hunt (and have the budget) for the best, the LG OLED65E7P belongs on your (very) short shopping list.

The ultra-thin picture-on glass bezel frame gives the OLED65E7P an all-screen look.
Beryllium Makes It Better

Test Report

Paradigm Persona 3F Speaker System

By Darryl Wilkinson

Paradigm's new Persona Series consists of four towers (ranging from the 3F at $5,000 ea to the 9H at $17,500 ea), a Persona C center ($7,500), a Persona B bookshelf/stand monitor speaker ($3,500 ea), and a Persona SUB powered subwoofer ($6,500). So, yeah, while not stratospherically insane, the new Persona speakers are definitely on the outer reaches of what most folks would consider the "affordable" realm. The 5.1 channel system Paradigm sent to me included a pair of the Persona 3F towers, the Persona C center channel, a pair of the Persona B monitor speakers, and the Persona SUB. If you do the math, that totals up to—brace yourself—$31,000, and that’s not counting the rest of the necessary electronics and, at minimum, a folding chair to sit on. Paradigm doesn’t apologize in the least about the cost, either. In fact, they feel that the Persona Series is not only a luxurious indulgence to own, but that it represents “a classic example” of Paradigm performance and value.

When there are loudspeakers out there that cost more than $100,000 the outer shell of each Persona cabinet. (Paradigm uses a viscoelastic adhesive between the layers that gets cured using radio-frequency energy. I have this image in my mind of a giant microwave oven located in the employee break room where the speakers are taken to be cured—except when it’s lunch time.) The remainder of the process of making a Persona Series speaker is pretty much hands-on until the final quality control checks are completed. Each speaker, by the way, comes with a certificate signed by the three Paradigm folks who performed the quality control checks along the way.

AT A GLANCE

Plus
- Beryllium tweeter and midrange drivers
- Hand-polished, high-gloss finish
- Slender, curved cabinets

Minus
- Expensive
- Heavy

PARADIGM, THE CANADIAN loudspeaker company founded in 1982, has a long and respectable history of building excellent-sounding, great-looking speakers at relatively affordable prices—not outrageously expensive but not stupidly cheap, either. Somewhere along the way, though, somebody at Paradigm accidentally said out loud at a company meeting: “What if cost were, well, not an object, but at least less of an object? What if we combined all our best technologies and maybe threw in a bit of new stuff, too? Just how awesome of a speaker could we make? We should try that someday.” And thus the company’s latest and greatest-ever series of speakers was born.

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The Persona 3F stands tall and proud at 44 inches.
**THE VERDICT**

Paradigm set out to create the best, state-of-the-Paradigm-art speakers the company has ever produced, bringing together top-notch cabinet construction and finishing capabilities and advanced driver technologies in hopes of achieving something greater than the sum of its already great parts. They’ve succeeded.

**SPEAKER SYSTEM**

**PARADIGM PERSONA 3F SPEAKER SYSTEM**

**PRICE:** $31,000 as reviewed (Persona 3F, $5,000 ea; Persona C, $7,500 ea; Persona B, $3,500 ea; Persona SUB, $6,500)

Paradigm Electronics Inc. • (905) 564-1994 • paradigm.com

Personas are available in four finishes: two high-gloss (Vanta Black and Harmony White) and two metallic-gloss (Aria Blue and Sonic Silver).

Since Paradigm sent an all-Vanta Black system, I can't vouch for the appearances of the other three. I can say, however, that the Vanta Black finish is to die for. I want to say it's the quality of finish you'd find on an expensive, luxury automobile, but in truth the finish is, I don't know, softer than that. Paradigm talks about the “incredible brilliance, depth, and luster” of the finishes; and, despite sounding a bit hyperbolic, that description is actually an understatement for the Vanta Black option. Gorgeous, stunning, awe-inspiring—take your pick. They all apply.

For some reason, I feel compelled to lick the speakers, as if they were the shiniest, most enticing pieces of black licorice I've ever seen. (I, uh, didn't actually lick the speakers... really...) Quite frankly, I'm not sure I'm worthy enough to have speakers that look this good.

None of the speakers' front baffles are covered by removable grilles, which I'm sure is partly because there's no way to design a grille that wouldn't detract from the beauty of the speakers. This leaves the entirety of the machined aluminum matte-gray baffles completely visible. The tweeter and midrange, however, are covered by individual metal grilles (the Persona C has a single grille that quickly dissipates heat. Best of all, it's super cheap! Well, sadly, not so much on that last point. Beryllium is expensive—really expensive in speaker-design terms. Even though it's been used in speakers since the 1970s, its use is still usually restricted to professional audio loudspeakers or reference-level home speakers from a limited group of high-end companies such as Revel, TAD, Focal, and (now) Paradigm.

But there's beryllium—and then there's beryllium. Although the element is the same, beryllium transducers will behave differently depending upon the manufacturing process and grain structure in the finished beryllium diaphragm material. (Some so-called “beryllium” drivers are actually made from beryllium alloys.) Paradigm uses Truextent beryllium in the

THE PERSONA C houses an unusual array of four woofers.
Persona Series speakers because it’s 99.9-percent pure beryllium with a highly uniform grain structure. In fact, Tru-extent beryllium is claimed to have the highest stiffness-to-density ratio of all commercial driver materials, which means beryllium drivers have the potential to remain pistonic to higher frequencies and have minimal resonance in the driver’s operating range.

Every Persona Series speaker includes a 1-inch Truextent beryllium dome tweeter with a PPA grille. But the Persona Series offers even more beryllium for your buck. The cone material for the 7-inch midrange drivers in the Persona 3F (and the rest of the Persona towers), the 7-inch bass driver in the Persona B, and the 4-inch midrange driver in the Persona C are all made from Truextent beryllium. Incorporating both beryllium tweeter and beryllium midrange diaphragms in the same speaker is almost as rare as beryllium itself, especially in speakers that Paradigm says allows for so much additional excursion that it provides a 3-decibel—or 50 percent—gain in potential maximum output. Also included are a Shock-Mount Isolation Mounting system (a butyl-rubber driver fastening system that uses isolation inserts and gaskets to decouple the driver from the cabinet) and a 1.5-inch high-temp tandem voice coil (for increased excursion, better control, and improved thermal management).

It Ain’t Heavy, It’s My Subwoofer

There are very few times when saying that an audio component could be used as a boat anchor would be a compliment. But in the case of Paradigm’s Persona SUB, this 118-pound (9.2 pounds of which a total of six 8-inch woofers are arranged on alternating sides of the hexagonal Persona SUB subwoofer.

When the system is fired up, the speakers simply don’t exist.
belongs to the hard ferrite magnet/motor structure—per driver), 20.25 x 20.5 x 18.875 hexagonal cabinet, 1700-watt, six 8-inch driver sub-subwoofer-woofer (my term) is massive enough that it could be used as a boat anchor—for one of those giant, vacation cruise ships. Hell, since Paradigm rates the Persona SUB as having in-room low-frequency extension down to—hold onto your foundation—12 hertz (+/- 2 dB from 19 Hz to 220 Hz), it could probably be used for sonar at the same time. (You’d need some long audio and AC cords with a good GFCI outlet, though.)

What’s up with the six-sided, cabinet design? (Well, the cabinet is really eight-sided, if you count the top and bottom—but that’s being too OCD for our purposes here.) The Persona SUB’s six low-frequency drivers (with pure-aluminum cones and overmolded surrounds)—all active, mounted two per side, one above the other, on alternating side panels—are radially aligned relative to the cabinet and pair-to-pair. In other words, the magnets all point to the same internal center point. This configuration—which Paradigm employed previously in their Signature Series SUB 2 (review at soundandvision.com)—creates opposing forces of near-equal magnitude as the drivers move inward and outward in unison. The effective cancellation of unwanted vibration is so good that the Persona SUB will likely rattle your teeth before the cabinet makes the slightest twitch. Surprisingly, it does all this without requiring any extensive bracing inside the Persona SUB’s cabinet. (Not that there’d be any room for it if it did.)

The top panel and two of the Persona SUB’s six side panels are available in the aforementioned Persona Series finishes. The baffles of the driver-mounted sides feature the same machined, painted aluminum matte-gray finish as the front baffles of the other speakers in the line. So, if the Persona SUB is visible in the room, which is likely considering its size, the family resemblance is unmistakable. The final remaining side, most likely to be facing the wall, contains the input jacks, adjustment control knobs (level, cut-off frequency, and phase), and the power cord connection.

There’s also a USB-mini port for connecting a computer attached to the included calibrated Anthem Room Correction (ARC) microphone. ARC, developed by Paradigm’s sister company, Anthem, is a room correction system that, as with most room correction techniques, is designed to digitally correct the sub’s output in order to minimize the (usually deleterious) effect your room’s acoustics have on the Persona SUB’s performance. Using Anthem’s free ARC software, a Windows 7 (or later) computer, a custom calibrated microphone, and microphone stand (both included with the Persona SUB), you take between five and ten measurements at different locations in your room. The software on your PC does the rest—it also allows for tweaking, if you so desire—and then downloads the optimized parameter values into the Persona SUB. (After that, you can use the microphone for Calibrated Karaoke Nights with your soon-to-not-be-friends…)

**Speakers? What Speakers?**

I’d expected that Paradigm would have engineered a level of acoustic performance to match the Persona Series speakers’ luxe fit and finish, and I wasn’t disappointed. For all their visual beauty, whether I was listening to music or watching a movie, the Persona system did that mystifyingly magical act—one that all the greatest speakers aspire to—of disappearing completely from perception and leaving behind only the music or movie soundtrack. As either a stereo pair or as part of the full system, the Persona 3Fs lacked even the smallest taint of noticeable coloration or tonal imbalance that might have drawn my attention away from the sweet reality of the acoustic performance in front of me and pulled me kicking and screaming back into the mundane reality of drivers, cabinets, placement, etc. After several months of living with the Persona 3F system, I still marvel at the fact that, when the system is fired up, the speakers as a physical entity simply don’t exist. (So much for enjoying the luxe fit and finish, eh? You only get that when the system is off.)

Gregory Porter’s 2016 release, *Take Me to the Alley*, has a number of exceptional tracks, with two of the most notable being the bonus duets “Holding On [featuring Kem]” and “Insanity [featuring Lalah Hathaway]”. The 3Fs showed them off, beginning with the finger snaps at the start of “Holding On,” which were strong, dynamically crisp, and holographically placed at dead center. The bass beat beneath Porter’s opening vocal was powerful and well projected, but it carried a subtle warmth and inner detail that I hadn’t previously heard on other systems. The big “wow,” however, came when Porter’s low, evocative vocals begin their interplay with Kem’s lighter, slightly higher-pitched contributions, where the well-delineated voices emerged from a the Persona 3F’s stunningly open and natural stage. The effect was even more compelling on “Insanity” during the back and forth between Porter’s smooth baritone and Hathaway’s soaring, sultry phrasings. Meanwhile, the upper-register notes from the piano in the background on this track were succint and sharp, while the lower-register keys were open, full, and sustained. The plucks of the guitar strings on this track were also beautifully well defined, and the tapped cymbal fixed in the left channel offered an appropriately characteristic shimmer.

A synth-infused pop track like “No Harm Is Done [featuring Tunji Ige]” on Christine and the Queens’ eponymous album was a great demo to experience the Persona 3Fs powerful dynamics and immensely extended soundstage. This song is a sonic free-for-all with an absolutely pounding bass beat, but it never caused the 3Fs (sans Persona SUB) to show any signs of distress or fatigue regardless of the volume level. In fact, my ears gave up before the woofers in the Persona 3Fs did. During the refrain, Christine’s vocals went from rock-solid dead center to suddenly expand out (with overdubs) in a contiguous arc that stretched from my left...
The Lionization of the Persona C

Integrating five speakers (and a sub) into a single, cohesive, enveloping environment is a daunting task to achieve. This Persona Series system, though, had things heavily (taken literally and figuratively) in its favor. As noted earlier, the Persona C is one dead-serious center channel. In my opinion, most systems prioritize compact size over performance and under-engineer their center channels in comparison with the front speakers. Thankfully, Paradigm’s engineers and designers said the politely Canadian version of “F it” and proceeded to build what is essentially a horizontal, and even heavier, Persona 3F. The result is an awesome, if large, center channel that, like the Persona 3F, it’s modeled on, absolutely vanishes in acoustic space. In The Girl with All the Gifts, for example, the dialogue—regardless of its placement across the front soundstage—was clear and forceful, with the LCR speaker complement being so well blended that I never sensed any audible clues that there were three distinct sources in front of me. The same was true of the important-plot-detail-revealing car crash in Incarnate. The subtle noises, especially to the center right, were part of a flawless panorama across the front of the room.

Most impressive of all, though, was the system’s performance with the movie Lion. The first half of the movie follows Saroo, a five-year-old Indian boy who tragically gets lost in Calcutta, 1,600 kilometers from his home; at this point the story is driven more by visuals and soundscapes than by dialogue. The entire system beautifully handled the crucial reproduction of the multitude of subtle sonic details that are the building blocks of the soundtrack. When Saroo desperately tries to find his brother, Guddu, or his mother in the over-crowded Calcutta train station, the buffeting sounds of the jostling mob weighed in at a hefty 84 pounds. The soundstage—was clear and forceful, with the LCR speaker complement being so well blended that I never sensed any audible clues that there were three distinct sources in front of me. The same was true of the important-plot-detail-revealing car crash in Incarnate. The subtle noises, especially to the center right, were part of a flawless panorama across the front of the room.

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Not long after, Saroo is forced to run from a group of men who are trying to capture the homeless children sleeping in the halls of the train station. The sad sound of the violin in the score, along with the echoing noises from the scared, scrambling children as they are taken, played across the front speaker trio without a break or change in tone. Then, dead center, the sounds of Saroo’s running footsteps and heavy breathing were small but very audible. The hopelessness of the situation is then punctuated by the sound of smoke being quickly and disgustingly exhaled from the mouth of the guard at the end of the tunnel. The Persona system rendered each of these effects with appropriate subtlety and a naturalness that put which Nicole Kidman, as Sue Brierley (Saroo’s adoptive mother), talks with a now-grown-up Saroo (Dev Patel) about her decision to adopt children. The dialogue without losing the intimacy and grief present in the conversation was one of many moments of the Persona C’s greatness. Although I wanted to lean in to be part of the intimacy, I didn’t need to thanks to the tonal balance and clarity. And that clarity and timbre-match with the rest of the system remained remarkably consistent across the width of the seating area in my theater.

As wonderful as the Persona C was, the Persona Bs were also fantastic in their role as surround speakers. Early in The Girl with All the Gifts, there’s a scene that starts in one end of a long hallway that contains the children’s rooms. As the camera proceeds down the hallway, the ceiling lights “snap” on, one after the other. The sound of the lights ominously moved through my room across the ceiling. Not long after, as “the girl” is eating grubs, the ominous background music was everywhere in the room, including above me, with no sense of directionality or speaker placement. Much later, when the sounds of the feral kids as they surround one of the adults— with evil intent— was so real that I almost crapped myself. (Seriously.) After I gained my composure, I wrote in my notes about the way the soundfield extended up and into the ceiling. It made the performance of the Persona 3F system the closest thing to the sense of Dolby Atmos envelopment that I’ve experienced without actually having Dolby Atmos. I noticed the same effect with the wonderful soundtrack in Moonlight. Invariably, whenever music became the dominate element in a soundtrack, it seamlessly filled the room— around me, as well as above me— in a way that was very reminiscent of what you’d hear with a system featuring overhead speakers. Wide-open outdoor scenes, such as when the kids are playing soccer, had much the same results in the delivery of ambient effects. Returning again to Lion, I watched the scene at the beginning of the movie when the young Saroo is standing in the middle of a swarm of butterflies (or moths), marveling at the beauty of it all. The Persona system made the sound of that enveloping swarm a reality in the room— forming a complete circle at ear level and even extending into a dome of sound above.

The Persona SUB, not surprisingly, was able to thoroughly energize the room with bass when asked to do so. But, more surprisingly, it blended with the rest of the system into nonexistence. With the low revving of the engines and the massive power of Furiosa’s semi truck in Mad Max: Fury Road, the Persona SUB absolutely rose—or should I say, lowered— itself to the challenge. As a result of the ARC room correction software, there was never a point at which the Persona SUB either lost or gained undue emphasis from 80 Hz on down. Although it’s been a long time since I’ve taken a listen to the classic depth charge scene in U-571, I think the Persona SUB did the most accurate and intensely affecting re-creation of the underwater explosions above and below the water. (OK, I’ve never really been depth-charged, so I can’t say with 100 percent certainty about the accuracy, but it was emotionally effective.)

Conclusion
What can I say? There are damn few speaker systems that I’d consider selling my children—or myself—for medical experiments to acquire. But the Persona 3F and the rest of the speakers in this Paradigm Persona system are so astounding, so unequivocally brilliant in their performance that they will convince your ears that they don’t exist, despite what your eyes will try to tell you. OK, maybe that’s not totally worth selling my children for, but it’s certainly worth the price tag. Yes, I’ll say it. $31,000? Is it a true value in a loudspeaker package? Or is it a total luxury for your eyes and ears? Take your pick. Either way, you’d be correct.
Making Waves

Nakamichi Shockwafe Pro 7.1 Soundbar System

**PRICE $500**

**FOUNDED IN 1948, NAKAMICHI became best known in the 1970s for building the booming audio industry’s highest-end cassette decks, both under the company’s own name and for other brands. Nakamichi pioneered three-head decks, which used the extra head to read and monitor a recording in progress. The company has also dabbled in CD changers, A/V receivers, and even TVs, and they provided audio systems for the Toyota Lexus from 1989 to 2001. Hong Kong–based Grande Holdings has owned the brand since 1998. Today, Nakamichi has, among other products, a line of soundbars. They include models selling for less than $100, but there are also some more ambitious entries, among them the Shockwafe Pro 7.1, which comes with two surround speakers and a subwoofer.**

**Top Two**

The Shockwafe Pro 71 ($500) isn’t Nakamichi’s top soundbar system. The company plans to launch the Shockwafe Ultra 9.2 DTS:X this fall ($1,000), which ups the ante with 9.2 channels, 1,000 watts of power, dual 10-inch subwoofers, support for DTSX, and other features. So many soundbars are unimaginative rectangular solids. The Shockwafe, viewed from the side, is instead an asymmetrical hexagon. Behind the metal grilles of the 45.5-inch-wide sealed plastic enclosure are five separate subenclosures. Those for the left, center, and right channels have two 2.5-inch full-range drivers each. Then there are the smaller subenclosures for the side tweeters. The LCR drivers face forward, while the side tweeters are angled outward, and just slightly upward and forward. Designed to reflect off walls, ceiling, and floor, they probably center their output on the side walls just a little in front of, and above, the listener, though that may depend on your room and seating position.

The side tweeters are served by their own amplifiers and fed signals determined by a proprietary algorithm to derive “special front effects surrounds.” In other words, they make the bar sound wider and more immersive. They are distinct from the other three front and two surround channels, but do not reproduce discrete channels from the original mix—hence, the somewhat pentagonal enclosure. It houses amplification for both itself and the surrounds, which plug into it with supplied 26.2-foot cables with RCA plugs at both ends. A wireless connection mates bar and sub. When knuckle-rapped, the bar, surrounds, and sub all revealed plasticky cabinet colorations, though considerably less for the bar, which is slender, subdivided, and packed with drivers and amps.

The系统's surround decoding includes Dolby Audio—which, in this case, means Dolby Digital and Dolby Pro Logic II—and DTS 5.1. It does not include the lossless or height-capable formats—but players include the ability to extract and play only the basic core track within Dolby TrueHD, Dolby Atmos, DTS-HD Master Audio, and DTS:X programs. So watching Blu-rays with your HDTV or Ultra HDTV shouldn’t be a problem. Connectivity includes two HDMI inputs with 4K passthrough and one HDMI-ARC output; digital coaxial, optical, and analog minijacks are also provided. Bluetooth lets you play music from your phone without a tether. The system is rated to play as low as 35 hertz, but with few details provided. See our Test Bench measurements.

The top of the bar includes limited controls: power, source, volume plus/minus, and the demo mode (more on that later). The remote is full sized and decent looking, with big buttons, legible labels, and a small orange backlight LCD. It fires at a 45-degree angle to compensate for the tilt needed to read the LCD. There are dedicated buttons for a half-dozen EQ categories: Movie, Music, Sports, Game, TV, and Night. A single button cycles through inputs. The four-way rocker and center button are for navigation and channel. Oddly, and...
THE VERDICT
The Shockwafe Pro 7.1 is a beautifully designed soundbar that delivers solid surround performance, especially with movies.

SOUNDBAR SYSTEM
NAKAMICHI SHOCKWAFE PRO 7.1 SOUNDBAR SYSTEM
PRICE: $500
Nakamichi USA • (415) 805-6913 • nakamichi-usa.com

surround volume, and surround balance. For casual setup, you might use the built-in demo mode. It consists of a channel identification and a snippet of orchestral music for each channel, culminating in all-channel music. It does not, however, include a steady test tone that would support an SPL meter reading. So I used the tones on my trusty old Avia test DVD.

My first impressions (with both demo mode and test disc) were that the center, surround, and sub levels were too high out of the box. I corrected them, though the system uses large increments, making settings approximate. With indicators on the remote’s LCD running from 00 to 10, and with 05 set out of the box, I reduced the center and sub levels to 03 and the rear (surround) level to 04.

Associated equipment included a Panasonic DMP-BD87 Blu-ray player and an iPad mini.

A Fine Bar
In its less exaggerated EQ settings, this was a fine-sounding bar that aced all the essentials, including good reproduction of both speaking and singing voices, a frequency balance that flattered most music, and strong imaging. Because the system has discrete surround speakers, surround effects were strong, though timbre matching was just OK; the surrounds had more coloration than the bar. Even so, the surrounds dramatically enhanced the net effect of the system: That’s the generic genius of true, unfaked surround sound. Thanks to the bar’s width drivers, it sounded wider than it looked, and that helped keep the front of the soundfield from keystoning. Although the sub isn’t bad for the system’s price, the bar deserves better. But you can’t upgrade the sub...
At just 3 inches high, the soundbar will blend unobtrusively into your décor.

Because the bar lacks a wired sub-out, and amps for the surround channels are stashed in the sub.

I tormented Jason Bourne (DTS:X), the latest in the Matt Damon franchise, with Movie EQ experiences. The system defaults to the Action submode, but that’s not the best choice. That became evident in a scene with a speaker addressing an audience from a stage. The room reverberated, which sounded so natural in the flat DTS EQ submode, became convoluted and unnatural in the Action and Drama submodes (the latter cuts the sub level). Action and Drama also added some midrange congestion in the front, as well as higher surround levels than DTS EQ. The Dolby EQ sub-mode, in this non-Dolby material, sounded identical to DTS EQ.

By the time I got to In the Loop (DTS-HD Master Audio), with Tom Hanks reprising his role as Professor Langdon, the settings were dialed in and the system was impressive. The synthesized bass lines that constantly punctuate the soundtrack had just the right weight and fullness. Male voices were no longer localized in the sub. And I marveled at how the bar’s side tweeters expanded the front of the soundfield without drawing attention to themselves. The fact that the center channel went tweeterless didn’t seem to be an issue. I had to use test tones to hear a timbral difference between the sub.

That explained why Moser’s cello stood out so starkly from the center and left/right, and it was slight—not enough to destroy the magic. I got so caught up in the cheesy supernatural thriller that a character’s sudden plunge through a ceiling made me gasp. I was having a good time.

Best When Flat

Of the four Music submodes, the two that provided the flattest and most listenable results were Dolby EQ and DTS EQ. They seemed to be identical to the same-named Movie submodes and worked fine with non-Dolby and non-DTS material from CDs and Bluetooth. SW (Shockwave) Music is the bar’s "signature DSP mode," designed to deliver greater width and immersion. I found it spatially disorienting compared with the flat submodes. The Bass Boost submode distractingly called attention to the sub. I concentrated on the flat ones.

First, I auditioned Johannes Moser’s recording of Elgar’s Cello Concerto in E minor and Tchaikovsky’s Variations on a Rococo Theme via the CD layer of a hybrid SACD. Consequently, I was surprised to hear activity in the surround channels; the Panasonic Blu-ray player isn’t SACD-capable, and CDs are a two-channel format. The bar was therefore using its Dolby Pro Logic II listening mode, a component of the new Dolby Audio designation. That explained why Moser’s cello stood out so starkly from the...
SPECS

Soundbar:
- 2.5 in full-range treated-paper cone driver (2 left, 2 center, 2 right), 1 in Mylar cone side tweeter (2)
- 150 watts RMS total
- Inputs: HDMI (2, 4K passthrough), digital coaxial (1), digital optical (1), analog stereo minijack (1), USB (1, update only)
- Outputs: HDMI (1, ARC)
- 45.5 x 3 x 3.3 in (WxHxD), 7.25 lb

Surround Satellite:
- 2.5 in full-range treated-paper cone driver (1)
- RCA speaker-level input from subwoofer cabinet
- 4.3 x 6.7 x 3 in (WxHxD), 1.1 lb

Subwoofer:
- 8 in treated-paper cone woofer
- Proprietary wireless input
- 7.9 x 12.3 x 16.7 in (WxHxD), 15.5 lb

SOUNDBAR (purple) +1.77 /–6.43 dB, 200 Hz to 10 kHz; –3 dB @ 174 Hz, –6 dB @150 Hz.

SUBWOOFER (blue) Close-miked response, normalized to level @ 80 Hz: lower –3 dB @ 37 Hz, –6 dB @ 34 Hz, upper –3 dB @ 95 Hz.—MJP

Test Bench

Nakamichi Shockwafe Pro 7.1 Soundbar System

The Nakamichi Shockwafe Pro 7.1 is greater than the sum of its parts.

orchestra: The instrument, in the center of the mix, got partly rechanneled to the two center drivers. Despite a lack of lower midrange warmth, the bar made Moser’s attack and articulation stunning. But his prominence did leave the orchestra underemphasized, especially in quiet passages, when the cello shouted it down.

Center volume is adjustable, but only on a system-wide basis. One setting affects both the Dolby EQ and DTS EQ submodes, both the Movie and Music versions, and what’s right for movies isn’t necessarily right for music.

In Bert Jansch’s Edge of a Dream, DPLII treated the lead vocals of Jansch and guest Hope Sandoval as it had treated the cello, with plenty of center emphasis, though his cracking acoustic guitar came through in just about the right proportion. I don’t mind DPLII; it’s by far the most natural sounding of the stereo-to-surround rechanneling modes. But the lack of a straight 2.0- or 2.1-channel mode forces you to use it. The user interface allows you to shut down the surround channels, but that doesn’t affect DPLII’s redistribution of the LCR channels.

I ran Bluetooth pairing for the iPad mini, noting that the system cleverly uses voice prompts, and that pairing works only when the Bluetooth input is selected. Hiromi, the Japanese jazz sensation, generally records with a trio, and Move (ALAC from CD) is no exception. This time, I didn’t find the center channel intrusive, though the cymbals were way too prominent in the surround channels.

Again, they could be shut down. After that, the rhythm section sounded good—but the deliciously incisive piano sounded even better. When I wandered away from the sweet spot to answer e-mail, the system’s off-axis response filled the room beautifully.

The Nakamichi Shockwafe Pro 7.1 is an intelligently designed soundbar system that can be tweaked to sound great, albeit one that excites my urge for tinkering. How I would love to add a straight 2.1-channel mode for music and put the surrounds and sub in slightly better-damped enclosures. The bar is a step or two above the surrounds and sub—if rated separately, the bar would get five stars and the rest three stars—but Nakamichi was right to concentrate their resources in the bar. This is, after all, a $500 system, and one that works really well. In the classic sense, it’s more than the sum of its parts, especially with movies.

This is the first Nakamichi product I’ve reviewed, and I’ll be very curious to see how the company’s soundbar line develops in the future. The Shockwafe isn’t just a strong statement. It’s the first chapter in a potentially fascinating story—the story of how an old-school brand tackles the soundbar category with gutsy, unorthodox thinking and takes the home theater world by storm.

Audio Editor Mark Fleischmann is the author of Practical Home Theater: A Guide to Video and Audio Systems, now available in both print and Kindle editions.
Sony STR-DN1080 A/V Receiver

PRICE $600

IT'S BEEN SEVERAL YEARS SINCE I've had a Sony A/V receiver in my rack, so when the STR-DN1080 arrived on my porch, I was eager to see what the foundational brand's 7.1-channel Dolby Atmos/DTS:X model had to offer. Sony has been synonymous with consumer electronics for so long that today—in the more specialized corners of the field, such as home theater—it's easy to overlook the company that was such an early player in the game. But Sony still has an enviable market position, as well as design and engineering firepower aplenty to compete in any sphere they choose.

At $600, the STR-DN1080 is smack in the middle of upper-entry-level A/V receivers, the area most folks explore when assembling a first (or second) serious home theater. What that sum buys you today is utterly gob-smacking: not just the Dolby Atmos/DTS:X capability already mentioned, nor a claimed 100-plus watts per channel from seven channels, nor proprietary auto-setup/calibration/EQ, nor both Apple AirPlay and Google Chromecast built in, nor network/Wi-Fi on board (of course), but also Bluetooth with Sony's proprietary lossy LDAC codec, for which the company claims 96/24 sonic equivalence within its wireless ecosystem (which includes wireless/multiroom speakers, portable hi-res players, and wireless headphones); video 4K and HDR passthrough via HDMI 2.0a ports that are all HDCP 2.2 compliant, and a raft of multiroom options, including second zone via HDMI from its "B" HDMI output, itself a nice fillip on a receiver in this range.

With a feature set like this, you might think there's little that the STR-DN1080 can't do, and basically you'd be right. But there's one limitation, and it bugs me. The new Sony—in common with just about every similarly priced "Dolby Atmos/DTS:X-ready" competitor—has only seven channels of onboard power. Fair enough: For $600, you don't get eggroll. But there's no line-level height output that would permit an outboard two-channel amplifier to power a second pair of elevated speakers for a fully 5.1.4-channel object-surround system. And who among us doesn't have an unused stereo receiver or integrated amp somewhere under a bed? Granted, the costs in DSP, hardware, and perhaps even licensing fees associated with adding those extra RCA outputs is probably prohibitive at this competitive price point, especially for a feature that might never get used. And yes, I know both Dolby and DTS sanction a 5.1.2 configuration that this receiver fully supports, so neither Sony nor the competition is doing anything "wrong" or deceptive. I just believe, as many do, that to get the full Atmos experience (Dolby's flavor is the one I have the most experience with), you need all four height channels, and not having a path to grow into them is unfortunate.

OK, I'm climbing down off the soapbox now.

Setup

In light of the above, I set up the STR-DN1080 in an Atmos 5.1.2 layout, with elevation module "ceiling bounce" speakers located atop my front left/right pair. Connections couldn't have been simpler: speakers to decent-grade multi-way posts for all channels, HDMI cables from my set-top box and universal disc player to two of the receiver's six HDMI inputs, and a few odds and ends like subwoofer and network cabling. (Later on, I also tried the onboard Wi-Fi, which discovered and joined my home network without a hitch.) The STR-DN1080 provides composite-video paths for two inputs and one output (plus one each of optical and coax digital-audio inputs), but as is increasingly standard in the HDMI age, that's it for legacy connections. The front panel offers the receiver's only USB

• The Sony's one USB port is located toward the lower left corner of the front panel.
input, a minijack for the supplied setup mic, and a full-sized, quarter-inch headphone jack. That setup mic serves Sony’s D.C.A.C. EX (Digital Cinema Auto Calibration EX) routine, a system that includes Speaker Relocation & Phantom Surround—said to be able to conjure up phantom surround-back speakers and to compensate for non-ideal speaker locations. It also delivers a choice of three room/speaker-equalization options, as well as an “in-ceiling” mode that’s said to lower the sound of ceiling-mount front LCR speakers (a feature I am not equipped to confirm). The mic itself is a truncated “T” with a stereo pickup, which Sony says provides a better view of response over a larger listening area from the single measurement position that the system allows.

D.C.A.C. EX proceeded faster than any other auto-cal system I’ve encountered: The entire process including setup took less than three minutes from start to finish. And the results were quite good. The AVR got the levels and distances for my five full-range speakers spot-on. (The subwoofer level was far too high by my lights, and the sub’s distance was off, too, but those results always seem to be the case, regardless of auto-cal brand or system.) The receiver did, however, set all five speakers to Large. I could accept this for my Energy Veritas 2.3 fronts, which in my studio measure quite flat to below 40 hertz, but it seemed questionable for my center and surrounds, which both roll off substantially below 80 Hz or so. (I eventually reset these manually for my preferred 60-Hz crossover.)

D.C.A.C. EX provides three different curves derived from the EQ/cal results: Engineer, Full Flat, and Front-Reference. The first is designed to cleave to Sony’s listening room standard; the others are self-explanatory. In this particular instance, I found I preferred the last, as it provided a very subtle brightening/clarifying effect, and not much else. Full Flat seemed a bit too bright, while Engineer was very similar to Front-Reference in my setup. My standard disclaimer applies: Any auto-cal/EQ system will perform differently in every room and with every speaker array (and even with small changes in speaker location), so as always: Try it for yourself.

SONY STR-DN1080 A/V RECEIVER
PRICE: $600
Sony • sony.com

Listening, Viewing
Relatively affordable A/V receivers have long impressed me with the quality and quantity of their amplification, and the STR-DN1080 was no exception. In pure-direct, full-range stereo playback, it delivered excellent sound, and lots of it. An über-familiar recording like Steely Dan’s “Black Cow” (from the remastered Aja CD) arrived fully dynamic, conveying the beautifully round, incisive attack from the distinctive unison of clavinet and bass in the opening bars, a surprising level of detail and transparency on the laid-back drums, and brassy definition from the horns in the middle eight—all of which, a decade ago, would have won praise for a receiver of twice the price. And this receiver had no problem playing seriously loud: Full-blown party level was eminently clean and still quite punchy.

Sony endows the STR-DN1080 with a range of different “audio optimizing” DSP functions, headlined by a DSEE (Digital Sound Enhancement Engine) HX mode that, according to the company, “restores signals in the micro region of compressed sources, upsampling and expanding bit depth to the equivalent of a maximum of 192 kilohertz/24 bits for expressive sound quality closer to the original.” I have always been deeply skeptical of these algorithms, which nearly every receiver maker seems to include in some form. You can upsamp and reformat digital audio all you want, but you’re not going to magically conjure data that isn’t there: A 160-kilobit-per-second MP3...
have to find, charge, and operate my phone. As to direct streaming, the STR-DN1080 cheerfully played everything my Mac OS X TwonkyMedia DLNA server sent its way, whether DSD, FLAC, Apple Lossless, MP3, or uncompressed WAV/AIFF. (The Sony is as file-format omnivorous as any other receiver I've encountered; it plays virtually everything.) It did so with welcome stability and with speed that was downright sprightly compared with that of many other streaming receivers I've reviewed. Streaming sound quality from my library was, of course, superior: A DSD 5.6-megahertz Nordic recording of Beethoven's Piano Sonata No. 32, Op. 111 displayed all the transparency and detail, impressive timbral realism, and pitch-black silences that I expected, as well as an enveloping, piano-bench perspective that was highly involving.

And then, of course, there's movie sound. Upsampled to 96/24 is still a 160-kbps MP3—and still sounds like it. That said, Sony's DSEE HX didn't do any harm perceptible to my ears, so if other listeners find it euphonic, so much the better. And I don't suppose writing or licensing a few lines of code—more likely a few hundred or even a thousand lines—will raise a receiver's cost very much.

The Sony's video processing is fairly limited. The Home setup screen's HDMI menu states, somewhat cryptically, “If you connect a 4K-compatible TV, 4K upscaling to HDMI is enabled automatically,” but my Vizio M55-C2 didn't report 4K video from any 1080 sources. Via the receiver, the Vizio screen displayed passthrough 4K just fine from my Oppo BDP-105D disc player—but only when I set the player's video option to force 4K output. Setting it to auto-4K didn't do the trick, which suggested that the Oppo and the Sony had a failure to communicate properly. And if I forced both 4K output from the Oppo and upscaling within the Sony, the result was reported as 4K by the Vizio's Info pop-up, but it occasionally displayed blocky, pixellated, sub-480-lines quality. My set-top box, with maximum output resolution of 1080p, stubbornly displayed in 1080 no matter the setting of the receiver's HDMI scaling menu.

After a few days of this, I finally discovered the mysterious Help Guide, an online hypertext manual that offers a good deal more detail than the printed booklet supplied with the receiver. Here I learned (though only in a footnote) that the receiver's upscaling operates only upon 1080p/24. So when I set the Oppo to force 1080p/24 output, the Sony up scaled it to 4K as promised—but since my set-top box's sole 1080p option is fixed to 60 Hz, that one remained a no-go. In Sony's defense, the Help Guide is clearly directed from the printed booklet's "Manuals Provided for This Product" page, via a long HTTP address and a Q-code graphic. If only the many “See Help Guide” references scattered throughout the booklet had continued "(see page 6)," I'd have found it a lot sooner.

Sony's approach to streaming audio for the STR-DN1080 is unusual. Only computer file streaming, via DLNA or an equivalent server, is directly on board without the use of an associated gadget such as a smartphone or tablet. Everything else must be cast via a Spotify link (which requires Spotify Premium); the built-in Chromecast (formerly Google Cast) service, which allows you to throw content from any Android-compatible device; or Apple AirPlay. Chromecast worked fine via the low-end Android tablet at my disposal, casting Google Play Music without a hitch. Apple AirPlay from my iPhone 6 worked with equal transparency. I didn't have a Sony LDAC-Bluetooth source or headphone/speaker—the STR-DN1080 can be set as either a Bluetooth receiver or transmitter, and it includes NFC touchless pairing ability—but regular Bluetooth worked fine, though with the expected, decidedly finite fidelity. I understand where Sony's coming from: For many listeners, music consumption has become a smartphone-based endeavor, so designating the smart device as the universal source makes a certain amount of sense. But some older-school audio types may find this off-putting; I know I missed being able to set a few of my preferred internet radio streams as favorites, for one-touch music without having to find, charge, and operate my phone.

As to direct streaming, the STR-DN1080 cheerfully played everything my Mac OS X TwonkyMedia DLNA server sent its way, whether DSD, FLAC, Apple Lossless, MP3, or uncompressed WAV/AIFF. (The Sony is as file-format omnivorous as any other receiver I've encountered; it plays virtually everything.) It did so with welcome stability and with speed that was downright sprightly compared with that of many other streaming receivers I've reviewed. Streaming sound quality from my library was, of course, superior: A DSD 5.6-megahertz Nordic recording of Beethoven's Piano Sonata No. 32, Op. 111 displayed all the transparency and detail, impressive timbral realism, and pitch-black silences that I expected, as well as an enveloping, piano-bench perspective that was highly involving.

And then, of course, there's movie sound.
Here, my demands are pretty well defined:
I want competent, dynamic playback in the latest Dolby and DTS flavors, so that I can fully enjoy the best home delivery of up-to-the-minute sound design. The STR-DN1080 did not disappoint: The Dolby Atmos soundtrack of *Deepwater Horizon*—a reference-quality Blu-ray both visually and sonically—came across with terrific dynamism, as well as a height dimension that was prominent nearly throughout. I have to admit that I didn’t really feel the lack of rear-height speakers unless I consciously listened for it in an appropriate scene; what’s more, the receiver’s Phantom Surround Back mode seemed to fill this in to a modest but useful degree. (There are Type A and B variants of this, but I can’t say I discerned much difference in my setup, with side-located dipole surrounds.) DTS:X material enjoyed similar quality; I cued up *Fallen*, from my much more limited X library, and encountered sound that was similarly pristine and three-dimensional. In all cases, the Sony displayed plenty of power for full-bore home theater to very substantial levels, even with my modest-sensitivity speakers.

**Ergonomics**

A bit surprisingly, the Sony’s display includes no indicators of bitstream mode (such as Atmos or DTS:X), though keying the front-panel Display Mode stepped through this info, along with source name and listening mode. I found it odd that the remote’s Display key doesn’t duplicate this action. Instead, it brings up an onscreen pop-up to access the Options submenu—something that’s always available more directly via the remote’s dedicated Options key. That said, this does bring up a context-sensitive submenu that offers logical choices of listening mode, Sound Optimizer settings, and so on. And in other modes, it brings up other choices: In FM tuner, for example, there are selections for preset management, tuning, and stereo/mono tuning mode.

Otherwise, I mostly found the receiver easy and straightforward to use. The remote is a dedicated, single-component unit and thus unusually simple and uncluttered. Sony gives you direct access keys for the primary inputs, as well as Watch and Listen keys that bring up graphical onscreen icons for all sources. However, you must pass this way to access home-network streaming or the receiver’s (fixed-storage-only) USB input, which slows arrival appreciably, as both these and the Home screen require several seconds to come up and exit.

Beyond that, the interface’s response was generally quick and reliable, and I found it a pleasure to operate. Better still, there’s a presets feature that delivers four user-selectable combinations of source, output path, listening mode, cal/EQ curve and options, and a good deal more. Only Preset 1 gets a direct access key on the remote; the others must be reached via the much slower Home menu, and none can be renamed from their defaults (Movie, Music, Party, and Night), nor divorced from their onscreen pictures.

Sony’s S600 solution is comfortably a player in the hotly contested realm of upper-entry-level receivers. It lacks a few amenities that some competitors include, such as a 12-volt trigger output and phono input, but it counters with the brand’s unique higher-resolution Bluetooth and a full suite of Android- and Apple-ready wireless capabilities. (It also omits multiformat video scaling—less of a loss in the current age, when most sources and displays include their own competent scalers.) More important, in my view: Both its fundamental audio quality and its multichannel amplifier output are clean, powerful, and transparent, making this receiver entirely suitable for even a solidly serious home theater.

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**SONY’S REMOTE IS PARTICULARLY UNCLUTTERED FOR AN AVR CONTROLLER.**

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**Test Bench**

**Sony STR-DN1080 A/V Receiver**

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**SPECS**

**Power Output:** 7 x 100 watts (6 ohms, 2 channels driven) • **Auto Setup/Room EQ:** D.C.A.C. EX • **Video Processing:** 4K passthrough supporting HDCP 2.2, HDR, scales 1080p/24 to 4K (HDMI) • **Dimensions (WxHxD, Inches):** 17 x 6.25 x 13.15 • **Weight (Pounds):** 20 • **Audio Inputs:** HDMI 2.0a (6), composite video (2) • **Audio Outputs:** Coaxial digital (1), optical digital (1); analog line-level stereo (4) • **Additional:** RJ-45 Ethernet; USB (front); IR-in/out + **Video Outputs:** HDMI 2.0a (2:1, second zone-capable); composite video (1) • **Audio Outputs:** Zone 2 line-stereo; mono subwoofer (2); seven-channel speaker (plus Zone 2 stereo) on multi-way posts; 1/4-inch headphone (front)

| Two Channels Continuously Driven, 8-Ohm Loads | 98.9 watts | 121.4 watts |
| Two Channels Continuously Driven, 4-Ohm Loads | 105.0 watts | 132.2 watts |
| Five Channels Continuously Driven, 8-Ohm Loads | 65.2 watts | 90.7 watts |
| Seven Channels Continuously Driven, 8-Ohm Loads | 64.4 watts | 75.5 watts |

**ON THE WEB**

See soundandvision.com/TestBench for full lab results and technical definitions.

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**The Sony’s audio quality and amplifier output are clean, powerful, and transparent.**
Retro 5.1 Done Right

By Mark Fleischmann

Q Acoustics 3000 5.1 Speaker System

PRICE $900

TUBE AMPS. MONO PRESSINGS. And now, 5.1? Has bedrock surround sound indeed joined the ranks of retro audio technologies? Surround receivers beyond the most entry level nearly always have more than five channels (though their uses vary), while Dolby Atmos and DTS:X have made seven (5.1.2) the new minimum system configuration. What happens when you go in the other direction? The flood of 5.1 speaker sets that I used to review in the late 20th and early 21st centuries has tapered to a trickle. I see fewer new ones at CES and CEDIA, and plain old stereo is dominant at the rest of the domestic and international audio shows. However, the British manufacturer Q Acoustics has been marketing 5.1-channel speaker sets since the company’s inception about a decade ago and continues to actively develop them. The brand’s latest entry is called the 3000 5.1 Home Theatre System.

Cognoscenti

The founders of Q Acoustics previously worked for some fabled British loudspeaker makers, such as KEF, Mission, and Tannoy. The 3000 is one of four Q Acoustics 5.1-channel systems and one of two to be sold in the United States (through their American website or Amazon, among others, with free shipping). The other three systems are the satellite-based 7000i Plus 5.1, also sold in the U.S.; the tower-based Concept Cinema; and the 2000i Cinema, which uses compact speakers with 5-inch woofers, as opposed to the 4-inchers in the 3000. The company also sells soundbars, as well as in-wall, in-ceiling, and outdoor speakers.

The 3000 system consists of four 3010 compact satellites, a 3090C center, and a 3070S subwoofer. (The individual models are priced at $200/pair, $180, and $400, respectively, which would total $800—but when you buy them together as the 3000 package, you get an $80 discount.)

In pictures, these speakers look plain to the point of anonymity. Up close and personal, though, the matte graphite gray vinyl enclosures that housed my samples have a pleasing fit and finish, and the rigorous lack of ornamentation—aside from a slightly paler gray band around the baffle—makes them easy to live with. Optional accessories include the 3000ST stand ($140/pair) and 3000WB wall bracket ($28/each). The speakers do not have keyhole mounts, though there is a threaded insert on the bottom. The sub’s supplied spikes may be made safe for hardwood floors with the included rubber covers.

The 3010 satellite is a two-way design with a 1-inch coated polyester-weave soft dome tweeter (with radiating surround) and a 4-inch paper-aramid (similar to Kevlar) cone woofer, behind a magnetically attached cloth grille. The 3090C center flanks the tweeter with two of the woofers. Both models have plastic-nut binding posts.

\[ \star \text{Rounded corners give the system a pleasing look.} \]
that are staggered at a right angle; inflexible speaker cables with short leads would not be ideal mates. Both have a nominal impedance of 6 ohms. Rated sensitivity is 86 decibels for the satellite, about average for an affordable compact sat, and 89 dB for the center. A decent budget receiver should run them fine, but a beliefer one would run them even better. (To some degree, you could say that about most speakers.)

The subwoofer in an under-$1,000 speaker package is typically the weakest family member. It is here that Q breaks from the pack with what looks like a giant monitor offering two 6.5-inch drivers in a 21-inch-deep rear-ported enclosure. Small drivers, big enclosure. With that cabinet depth, this isn’t a wall hugger, though it might sit alongside a credenza just fine. Amplification is rated at a respectable 140 watts RMS. The company chose not to inflate the number with a peak power rating, even an alternative one.

Associated equipment included a Denon AVR-X7200W A/V receiver, Oppo BDP-83SE universal disc player, Micro Seiki BL-51 turntable, Shure M97xE cartridge, Denon PRA-S10 serving as phono preamp, Lenovo Windows 10 laptop, and Moon by Simaudio Neo 230HAD DAC. All movie demos were on Blu-ray.

**Dum Dada Dum**

I try not to make snap judgments, but when this system uttered its first sound—the familiar fanfare of horns and snare drums that accompanied the 20th Century Fox logo on a movie disc—I immediately thought, “I like this!” Followed by, “That must be a soft dome tweeter,” though this was break-in listening, and I hadn’t pored over the specs yet. An openness at the top of the presence region let me know the tweeter wasn’t sounding unduly soft. Although the satellite and center are rated down to 68 and 75 hertz, respectively, –3 dB, I thought the bass was understated until I switched away from my default subwoofer crossover of 80 Hz and instead selected 100 Hz. It was a more appropriate choice for the satellites’ 4-inch woofers. Even 120 Hz might not have been excessive, given the sub’s admirable articulation and damping. Sub volume, in both the surround receiver and the sub itself, needed to be set slightly higher than my customary defaults—indicating lower than average input gain. With tweaks, drums acquired the correct weight, and bass lines evened out (within the limits of my room’s standing wave, with no room correction). This system isn’t a bottom-octave floor shaker, but it produces dramatically and/or musically appropriate bass.

It’s never a bad thing when a system physically startles me, and that’s what happened with the explosions kicking off The Magnificent Seven (2016, DTS-HD Master Audio). They resounded from front to back, momentarily convincing some primordial part of me that I was in danger, which added to the classic menace of a tale set in a violent time. The sub also excelled at the roll of timpani that ends the first scene and the thunder of hooves that kicks off a later one—always contributing to the overall effect without calling attention to itself. It never unduly localized male voices. The satellites anchoring the four corners of the soundfield drew a colorful picture of the triumphal orchestral score and didn’t lose track of less splashy low-level sounds, such as wind or crickets. I had no trouble sitting back and letting the movie wash over me. This was home theater the way it was meant to be.

The soundtrack of Sully (Dolby TrueHD) isn’t noted for its subtlety, yet it offers fairly involving surround sound with a rich variety of low-frequency effects. These range from disconcerting bonking sounds in the cabin to the on-land crash in a fantasy sequence and the plane’s actual water landing (as Sully carefully describes it) in the Hudson River. With good power handling, strong timbre matching between satellites and center, and the sub’s self-discipline, it all came together for a gripping experience, even though I knew the ending.

The theme music of Sherlock (DTS-HD Master Audio), season 4, has always sounded aggressively bright to me, and the Q system didn’t change that impression, though that didn’t prevent me from enjoying it. Mixed more for television than movies, the program doesn’t have much dynamic range, but it does boast a busy soundfield with copious whooshing effects that depict Holmes’s racing thoughts as well as his inner turmoil. Vivid and colorful, the Q system’s presentation didn’t allow me much distancing from Benedict Cumberbatch’s intense, angst-ridden performance.

**Smooth and Sweet and Fab**

Q’s smooth, sweet, spacious midrange was a good setting for the familiar voices of Love, the mash-up of Beatles songs created for Cirque du Soleil (DVD-Audio, MLP 5.1). It favored blending over differentiation in the isolated vocals of “Because.” The mix and

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**RATING**

**Q Acoustics 3000 5.1 Speaker System**

**Performance**  ⭐⭐⭐⭐⭐

**Build Quality**  ⭐⭐⭐⭐⭐

**Value**  ⭐⭐⭐⭐⭐

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**THE VERDICT**

A sweet-sounding system, with a sub worthy of the satellites, the Q Acoustics 3000 is one of the best under-$1,000 5.1-channel setups I’ve heard.
the speakers worked together to tame some elements that were a tad acerbic on vinyl, such as the slashing string ensemble of "Eleanor Rigby" and the cymbal smashes of "Tomorrow Never Knows." The dovetailing of the satellites’ 4-inch woofers and the sub’s 6.5-inch drivers served Ringo Starr well. These speakers were meant for each other. This seemed like the right moment to demo a drummer-led band. Billy Cobham’s debut solo album, Spectrum (LP), veers between Mahavishnu Orchestra–like intensity (with Jan Hammer’s keys providing the manic repetitive flourishes) and the suave horn charts of Cobham’s subsequent albums. The satellites delighted in both the buzzy, distorted keyboard textures and the sassy timbre of the horns, saxes, and flute. Cobham is a busy and vigorous drummer, and with the sub dialed in, his rolling, stuttering line of percussive thought had just the right combination of punch and decay. With the beats coming hard and fast, the sub’s lack of overhang was refreshing.

Results with orchestral music were mostly positive, with nitpicky reservations about the top end. The multichannel SACD of Ralph Vaughan Williams’ Job and Symphony No. 9, with Sir Andrew Davis leading the Bergen Philharmonic Orchestra, seemed a trifle bright in the brass and strings, but only at the highest swells. I followed it with the stereo SACD of Beethoven’s Symphony No. 9, with Herbert Von Karajan leading the Berlin Philharmonic in the 1963 reference standard, and heard slight stridency only when appropriate—in a brief passage of the first movement when the strings and woodwinds get a little angry. You might want to avoid signal sources that lean to the bright side (mine don’t) and keep the volume to less than bombastic levels.

I’d be dissering the Q system if I didn’t mention how brilliantly it served every section of the orchestra—especially the Bartók concerto’s passages for bassoons, which were underpinned by light, tuneful bass pizzicato. Nor have I mentioned how the 3000 kept me company several evenings in succession with all 10 hours of the Bach Guild’s Big French Music Box (one of those 99-cent Amazon grab bags). The system maintains a high comfort level 97 percent of the time. The other three percent is the price you pay for treble that is not dumb downed or anesthetized. That treble may lack the nth degree of refinement you get in some pricier speakers, especially on loud massed brass and cymbals. But at this price, the system is light-years ahead of average in that regard.

I recommend these speakers to budget buyers with unbridled enthusiasm. They equal or outperform most under-$1,000 sat/sub sets I’ve heard, including a few on our Top Picks list that I’m familiar with. Moreover, this is one of the rare sat/sub sets where the subwoofer is worthy of the satellites. In fact, if you’re in the market for a subwoofer alone, the 3070S is an excellent budget buy at just $400. Q Acoustics really gets it right.

Audio Editor Mark Fleischmann is the author of Practical Home Theater: A Guide to Video and Audio Systems, now available in both print and Kindle editions.
To learn more about the CBT24 and CBT technology, please visit daytonaudio.com/epique

With more than 20 years of experience offering high-quality audio products, Dayton Audio is pleased to introduce its newest line of premier audio products: The Epique CBT24.

Dayton Audio collaborated with Academy Award and Audio Engineering Society Gold Medal winner, Don Keele, to create the CBT24 Constant Beamwidth Transducer System featuring technology based on de-classified military underwater sound research. The CBT24 provides amazingly even coverage in the listening room because of its frequency-independent, extremely uniform three-dimensional sound radiation. This unique design provides broadband constant-directivity coverage and is designed to operate over bare or carpeted floor, eliminating the detrimental effects of floor bounce and minimizing sidewall and ceiling reflections.

The Pros Know Bass

When sound professionals are mixing the soundtrack for the latest Hollywood blockbuster, they turn to M&K for the best bass. After all, M&K invented the powered subwoofer in 1977 – and have been perfecting it ever since.

You can bring the precision, realism and excitement of the M&K’s award-winning freestanding, on-wall and in-wall speakers as well as powered subwoofers into your home theater. With M&K you’ll enjoy all the heart pounding sonic thrills the director intended you to hear.

See the Complete Line of M&K Speakers & Subwoofers at: mksoundus.com
Right or wrong, writer/director Damien Chazelle knew what he wanted. From the cinematographic techniques to the costumes and sets to the staging of the elaborate song-and-dance numbers, he employed every tool at his disposal to bring this uniquely Hollywood tale to life.

La La Land celebrates the daily indignities and full-on humiliations of folks pursuing careers in the entertainment game. A somewhat jaded piano player (Ryan Gosling) crosses paths with a starry-eyed, hopefil actress (the radiant Emma Stone), and while it might not be love at first sight, each sees something in the other that everyone else seems to have missed. Of course they fall in love, and yes, there is a sense of cliché to the boy-meets-girl of it all, but the unique spin on the underlying formula at play is sort of the point. By using the inherently artificial trappings of a bygone medium—the big-screen musical—to tell a story about real life (or something close to it), La La Land gives us something new, often exhilarating, and almost ceaselessly charming. With its bittersweet, knowing nods to the glamour of old-school show biz, it’s ultimately a rather touching fable about chasing dreams and the price of success.

As whimsically promised at the top of the movie, La La Land is presented in CinemaScope, at the especially wide 2.55:1 aspect ratio, specifically. Beautifully shot by Linus Sandgren on good old-fashioned film, the movie displays a warm, inviting layer of grain and a striking color palette that underscores the exaggerated reality of it all. Defty manipulated light and shadow are employed to craft select scene transitions, and the generous distribution of light—largely owing to HDR—lends a dreamlike quality to some of the nighttime scenes. Likewise, minute details can be discerned lurking in the shadows of a night-club, and the outstanding 4K resolution reveals fine nuances, such as unexpected pores on an actress’s face.

The ambitious tunes and score by Justin Hurwitz give the orchestra plenty to work with, and the creative Dolby TrueHD 7.1 mix takes it even further, as instruments are audible all around the listener at times, to better engage the audience. (This track is Dolby Atmos-enabled as well.) The songs are clean and full-throated, obviously recorded in the pristine confines of a studio, yet without that distracting shift and subsequent phoiness that typically tainted the musicals of yore. Instead, they seem to pop out of the soundtrack and rise above the sonic mundanity, appropriately bigger than life. This movie’s music is its heartbeat, further exhibiting a pleasing and credible bass presence that adds just the right note of gravitas.

Audio commentary is provided by former college roommates Chazelle and Hurwitz, and their repartee works particularly well alongside the many individual featurettes that illuminate key points of this spirited production. There are also demos for two of the tunes, and we can jump directly to any of the songs within the film. A Blu-ray of the movie and extras is included, as well as an HD Digital Copy for iTunes and UltraViolet via a unique printed code.

Chazelle renders his earnest ode to the foibles of L.A. life as a sensory experience, one that fairly begs to be seen and heard on this fine Ultra HD 4K Blu-ray.

Chris Chiarella
In the *Harry Potter* universe, *Fantastic Beasts and Where to Find Them* is a school textbook. The movie of the same name provides the back story of its author. I hope there is no test, because I found the movie long and overstuffed. In 1926, a shy British wizard visits New York and loses a briefcase full of magical creatures. He runs into a disgraced witch-cop, her delightful clairvoyant sister, and a non-magical aspiring baker who acts as the audience surrogate. There are also magical politicians, non-magical politicians, the threat of an evil wizard, a witch-hating cult, and something tearing up Manhattan. Creatures’ abilities are too often dictated by the plot requirements, and character motivations don’t always make sense but may be clarified in the inevitable sequels.

The elaborate visuals were computer generated, and on a large 4K screen, the additional detail in the effects is appreciable. Some of the Beasts have fantastic colors, and that is where wider color gamut is exploited, along with the Oscar-winning costumes. HDR helps amp up the contrast to make fire, magic wand beams, and lightning jump out. The images are uniformly sharp, but the color temperature changes based entirely on the location, clearly an artistic choice. Sold separately based entirely on the location, clearly an artistic choice. Sold separately.

James Newton Howard’s score propels the action nicely. In the opening credits, it’s spread out among the speakers, matching the orchestral positions of the instruments. The Dolby Atmos mix is exceptionally directional. Magic clouds swirl about. Sounds are precisely placed to match onscreen action, such as when a foundation cracks in the top left wall, then over your right shoulder, and finally directly in front of you. The movie also ticks off several Atmos demo clichés including magical bugs flitting around, thunderstorms, and rain falling from the ceiling speakers. The one flaw in the mix is that some of the dialogue was hard to understand. The problem is not entirely technical: The two main characters are shy, and the actors often mumbled their lines. But the movie was confusing enough without having to wonder, “What did he just say?”

Extras are all on the non-4K Blu-ray Disc, and the best are pieces on costume design and the sheer scale of the sets. The deleted scenes were deleted for a reason, though hard-core *Potter* fans will want to watch the Suitcase Celebration segment to hear the U.S. wizard school song. A Digital Copy of the film is included for the WB Movies All Access app and UltraViolet.

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*Fantastic Beasts and Where to Find Them* is an outstanding Blu-ray 3D version as well, converted from 2D. The sparse supplemental package is housed on the Blu-ray Disc and includes an excellent making-of featurette, an interview with Doss’s son, a salute to veterans from Gibson, about five minutes of deleted scenes, a theatrical trailer, and of course, the obligatory UV Digital Copy. It’s easy to see why this film garnered six Oscar nominations. Highly recommended.

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*Hacksaw Ridge*

One of the bloodiest battles in World War II happened on Okinawa in 1945, and it definitely wasn’t the place you wanted to be if you didn’t carry a weapon. But for conscientious objector Desmond Doss, this wasn’t an option. While he believed the war was justified—which is why he volunteered—his personal belief was that killing was wrong and he wasn’t going to be a party to it. He was in the war as a medic, and he was there to save lives, not take them. And save lives he did—75 of them over the course of one night when he was stuck behind enemy lines.

Mel Gibson is back, and it looks like Hollywood has forgiven his past behavior as he delivers one of the finest films of 2016 and maybe the best war film since *Saving Private Ryan*. The first act does an excellent job of exploring how Doss came to his beliefs and how he met his beautiful wife, which really personalizes him. The second act follows Doss as he enters basic training and shows the challenges he faces to get to the horrific battle in the Pacific. When all is said and done, you’ll readily understand why Doss won the Medal of Honor.

Although the film was originally finished with a 2K digital intermediate and unconverted to 4K, one would be hard-pressed to complain about the presentation. Detail is exquisite, especially in close-ups, and it looks like much of the 3.4K source format is somehow retained through all the digital processing steps. The wide color gamut is on full display with deeper hues of red and blue, natural-looking East Coast forests, and of course, the hell on Earth that was Okinawa.

The Dolby Atmos soundtrack is a crowd pleaser, from the opening scene until the credits roll. The battle scenes contain a plethora of discrete effects that encompass the room, and when the battleships unleash hell upon the enemy, batten down hatches because it’s going to get loud with copious amounts of thunderous bass. Like *Private Ryan*, the audio on this disc is definitely demo material and really showcases how great Atmos can sound in the home.

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Onboard the starship Avalon, thousands of passengers and crew are bound for a new colony on a distant planet. They’re in suspended animation for the 120-year journey. But passengers Jim Preston and, later, Aurora Lane are awakened 90 years too soon—and the pods can’t be reconfigured to put them back to sleep.

At first, their only companion is Arthur, an automaton bartender. But when the Avalon begins to seriously malfunction, it triggers a third pod to open, this one carrying a crew member. The unlucky three must work together to save the ship, the crew, and the 5,000 passengers still in their sleep pods.

Many critics appear to have been put off by an ethical twist in the story (no spoilers here). And the public, who likely anticipated aliens and space battles, were also disappointed. But Passengers isn’t your routine space opera; at its core, it’s a romance spiced up by a little action and space battles, were also disappointed. But Passengers isn’t your routine space opera; at its core, it’s a romance spiced up by a little action in the third act. It leaves the viewer with a lot to think about, rather than simply trying to recover from an audio/video pummelling.

While a 3D version is included in this box set, a rare occurrence these days, this review is limited to the UHD (mainly) and HD Blu-rays.

The movie was shot digitally at 6.5K, and the UHD transfer is from a 4K digital intermediate. The film doesn’t feature eye-searing color, but the UHD is nevertheless smooth yet crisply detailed. The HDR is sparing, but effective where it matters. My only reservation is that the starfields in some (but not all) of the space shots are a bit underwhelming.

The UHD version offers Dolby Atmos (the HD disc doesn’t), but I listened in 5.1 Dolby TrueHD. The sound isn’t overly dynamic except near the end where the action ramps up. But it’s nevertheless totally convincing. The bass isn’t pervasive, but it’s still challenging, notably in the opening scenes where the ship’s shield smashes into a giant asteroid, overloading my 15-inch subwoofer. Thomas Newman’s beautifully recorded score is a perfect fit for the film, though it’s relatively subdued until that last act.

The extras include several making-of featurettes, a “Booking Your Passage” short (I think I ask more about those pods before signing up!), deleted scenes, and outtakes. • Thomas J. Norton

For centuries, the Order of the Knights Templar has searched for the mythical Apple of Eden. They believe it contains not only the seeds of man’s first disobedience, but the key to free will itself. If they find the relic and decode its secrets, they will have the power to control freedom of thought. Only the brotherhood of the Assassins stands in their way…

I have just quoted verbatim the opening crawl of the film, Assassin’s Creed. It was the simplest way I could convey this movie’s excessively convoluted plot in as few words as possible. And if that wasn’t enough to hook you, it’s unlikely that you’ll derive much enjoyment from this film. Michael Fassbender, Marion Cotillard, and Jeremy Irons are one hell of an impressive pedigree for any film, and their considerable talents bring some much-needed gravitas to bear, but even they are foolishly squandered here. This is a video-game movie. What were you expecting, tea and crumpets with the queen?

Between the 4K presentation and the companion standard HD Blu-ray, it shouldn’t come as any great surprise which version wins here. The HD version is way overlit, much like the game, with very little shadow delineation between background and foreground elements. The 4K version sports a much darker and more realistic picture. Shadow detail is significantly more apparent here, and for a film that spends most of its time in the dark, it’s crucial. That said, both versions still suffer from their own pixilation and motion blur issues, but only minimally.

The 4K version also features a thoroughly enveloping Dolby Atmos surround mix that surpasses the 7.1 DTS-HD Master Audio of its HD counterpart. All of the core elements are there, it’s just that the Dolby Atmos has greater clarity and separation between the dialogue, ambient sound effects, and bass-thumping score. And it’s a much deeper and more resounding bass. If your ears are attuned well enough, strive to listen further into the background, and you’ll distinctly pick up engine hums, wind, breath, and fire.

Extras appear on the HD Blu-ray and consist of a collection of featurettes called “Take the Pledge: Behind the Scenes of Assassin’s Creed,” a series of interviews with director Justin Kurzel, deleted scenes with and without commentary, a gallery of photographs from concept art to on-set production, and theatrical trailers.

Assassin’s Creed is a visual and auditory tour de force. If you don’t get too hung up on the plot, you might enjoy it. • Corey Gunnestad
**TROLLS**

**NO TROLL LEFT BEHIND**

There are many definitions of a troll, but as they appear here, in a form first conceived by a Danish woodcarver in 1959 (and subsequently as popular toys), they’re tiny, cute creatures with spiky, multicolored hair who do little besides sing, dance, hug, and party. The miserable Bergens, their enemies, believe that by eating a Troll they can be happy—at least for a day.

The Trolls were all once captives of the Bergens but escaped decades ago and now ignore the continuing danger. The only cautious Troll is Branch, who by now has warned his fellows so often that he’s become an ignored, grumpy, boy-who-cried-wolf survivalist. But when a Bergen does find and kidnap some of the Trolls, Princess Poppy (the happiest among them), sets off to save them.

*Trolls* is a delightful surprise. It’s brilliantly animated, warmly funny (though not in the laugh-a-minute style of the *Shrek* movies), and chock-full of fun musical numbers. Apart perhaps from a simplistic but harmless message (that all you need to be safe and happy is to sing, dance, hug, and party), it’s an appealing family film that will enchant the kids and make adults—at least those not named Branch—smile.

The 2.35:1 video transfers could hardly be better. The movie leaped off the screen with brilliant color and crisp resolution. It’s mostly brilliantly lit, but the few darker scenes looked fine on both the UHD and HD Blu-ray Discs. I did see small benefits in resolution, dynamic range, and color depth from the UHD, but the differences between the two versions, while visible on careful inspection, are likely to be relatively subtle to most viewers on most displays.

The UHD disc offers Dolby Atmos (the HD version is DTS-HD Master Audio 7.1 only). I reviewed the former, sans Atmos, in 5.1-channel Dolby TrueHD. The audio adds significantly to the film’s appeal. While not as spectacularly aggressive as most action movies, this is nevertheless a reference-quality soundtrack for its music, dynamics, and sometimes surprisingly deep bass.

*DreamWorks* often uses celebrity voice actors, and the lure here is Justin Timberlake as Branch. But it’s late in the movie before he ventures beyond speech. He’s very good in the part, but don’t expect a concert. The extras include interactive “Sing Along” and “Party Mode” selections for the film (the former with subtitled lyrics, the latter adding user-selectable pop-up features), plus almost an hour of brief featurettes. ● Thomas J. Norton

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**HIDDEN FIGURES**

**SOMETIMES, IT IS ROCKET SCIENCE**

Return to a time when “computers” were exceptionally intelligent, hardworking human beings who crunched the daunting numbers needed to advance the space program. Sadly, this was also an era of rampant sexism in this country, as well as deeply rooted racism, especially in the South where the National Aeronautics and Space Administration was headquartered. In 1961, Russian dominance in outer space put NASA at the heart of the Cold War. The fate of the free world, as well as the lives of the brave *Mercury* astronauts, depended upon accurate calculations of thrust, trajectory, and so on, math often performed with pencils and chalk. *Hidden Figures* follows three trailblazing ladies—mothers as well as career women—whose brains and perseverance not only laid the foundation for our victory in the space race but also rewrote the rules for what women of color could achieve in the face of seeming insurmountable discrimination.

The 2.39:1 image was captured on film and has a range of different looks, some stable and crisp in 4K, which is a boon to the text and numbers frequently on display. Other times, it’s grainy and soft, to simulate vintage footage, although some of the transitions are slightly jarring. Through a combination of elaborate props and CGI, the awesome machinery that took America into orbit roars convincingly to life once more. A punchy palette perks up many scenes as well. The benefit of HDR is evident, as when headlights stand out against the night or sunlight reflects off the chrome of the classic automobiles. This is a drama, albeit one with scenes of rockets blasting off and blowing up, but the DTS-HD Master Audio 7.1-channel soundtrack is about subtle scene-to-scene quality rather than boom and flash. The music by Hans Zimmer, Benjamin Wallfisch, and film producer Pharrell Williams is thoughtfully mixed, the combination of score and songs working well to keep the story moving forward. A church service has a distinctive tone and welcome fullness, and voices are spread across different channels for greater, more lifelike involvement. Dialogue is consistently crystal-clear. Worth noting, I had to crank the volume significantly higher than I do for most discs I demo to achieve proper listening levels.

The sole extra on the 4K disc is an audio commentary with director Theodore Melfi and star Taraji P. Henson. The bundled 2K Blu-ray includes this as well as a making-of, deleted scenes with optional commentary, and a look at the filming locations, all in HD. ● Chris Chiarelli

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**TROLLS**

**HD Blu-ray: Fox, 2016**

**ASPECT RATIO:** 2.35:1

**AUDIO FORMAT:** Dolby Atmos

**LENGTH:** 92 mins.

**MPAA RATING:** PG

**DIRECTORS:** Walt Dohrn, Mike Mitchell

**STARRING:** Anna Kendrick, Justin Timberlake, Zooey Deschanel

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**HIDDEN FIGURES**

**BD Blu-ray: Fox, 2016**

**ASPECT RATIO:** 2.39:1

**AUDIO FORMAT:** DTS-HD Master Audio 7.1

**LENGTH:** 127 mins.

**MPAA RATING:** PG

**DIRECTOR:** Theodore Melfi

**STARRING:** Taraji P. Henson, Octavia Spencer, Janelle Monáe

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SING

LETS PUT ON A SHOW

In a city of human-like animals (think Zootopia), Buster Moon, an ambitious koala theater owner, has fallen on hard times. He hasn't had a hit in ages, when he suddenly has an inspiration: We'll pack 'em in with a singing contest! When his loopy lizard assistant mislabels the announcement flyers to offer a $100,000 prize, hundreds of hopefuls show up for the auditions.

There isn't much of a story here (it makes Trolls seem positively Shakespearean), but the fun is in the music. And there's plenty of it. The finalists are an odd bunch: a mismatched pig duo; a punk rocker porcupine; a honey-voiced, blues-singing gorilla; a talented but obnoxious mouse; and (off and on) a foxy Japanese girl-band. While (mini-spoiler) no one actually wins (much less gets the $100,000), they all pull together and put on a show.

The computer animation here breaks no new ground, but the 1.85:1 transfer is superb. UHD resolution is rarely much of an advance over 1080p on a 65-inch screen (as viewed here), but the detail I saw was still beyond criticism. While UHD's wider color gamut is only subtly evident, the color sparkled, particularly deep reds. And though most of the film is brightly lit throughout, limiting the opportunity for bright highlights to punch through and shadow detail to impress, the UHD's high dynamic range nevertheless makes its presence felt. Overall, the UHD disc is superior to the (also excellent) conventional Blu-ray.

I auditioned the movie in 5.1 Dolby TrueHD, but both the UHD and Blu-ray Discs offer Dolby Atmos. There's not a lot of dynamic action here, but the sound is superb. The songs and the impressive orchestral score are both beautifully recorded, which was one of the reasons I enjoyed the movie far more than I did when I first saw it, with mediocre sound, in a local multiplex (the man in the next seat munching on smelly cheese nachos didn't help!).

I do wish that the identity of the actual singers used in the film were easier to find. The only artist who obviously does both the voice work and sings is Tori Kelly. The best female vocalist on the soundtrack, the sorely underused Jennifer Hudson, is limited to snippets at the beginning and the end.

The extras include too short but good making-of featurettes, three mini-movies, and music videos. One of the latter, "Don't Worry 'Bout a Thing" features Tori Kelly—just in case her performance of the song in the movie as an elephant left you wanting more. Thomas J. Norton

ROGUE ONE: A STAR WARS STORY

STAR WARS EPISODE 3.5

The opening scroll of the original Star Wars states, "Rebel spaceships, striking from a hidden base, have won their first victory against the evil Galactic Empire." If you ever thought, "Hey, I'd like to see a movie version of those 17 words," Rogue One is for you. There's plenty of plot-driven action, minimal character development, and ample fan service. It's certainly entertaining. Wisecracking droid K-2SO in particular is terrific.

Rogue One was exhibited at Dolby Cinemas, so a version in 4K with HDR is certainly possible. Disney does not support 4K UHD yet, so the best home version is 1080p Blu-ray. (A retailer-exclusive 3D version is also available.) Fortunately, it looks stunning. The movie was shot on handheld digital cameras to follow the action closely and provide a war-film look, but this does not affect image quality. There's no artificial film grain, but it does not look like video. Blacks are black, and shadows have good detail. On my 106-inch screen, you could count individual blades of grass on a farm and see the faint raindrops on a character's uniform, a detail I missed when I saw the movie in the theater. The image is so sharp that the digital FX used to bring Peter Cushing back from the dead to play Grand Moff Tarkin are clearly visible. It's an astonishing technical feat, but the character doesn't look fully human.

There's nothing technically wrong with the sound: The DTS-HD mix is clean and directional. Explosions—and there are a lot of them—shook my house. But this movie badly needed a home version of the theatrical Dolby Atmos track, with wider dynamic range, more precisely placed sound effects, and generous use of height speakers during battle scenes. When an AT-AT looms over you, it should sound that way, not like it's merely in front of you. I was also struck by how much of the feel of a Star Wars film comes from John Williams' score: Rogue One's music, composed at the eleventh hour by Michael Giacchino, pays homage to Williams' themes but does not stand on its own.

The main disc is gloriously free of previews. A separate disc of extras sadly lacks substance, with not even a mention of the major changes undertaken after principal photography was completed.

A Disney Movies Anywhere code allows playback of the film on all major digital platforms. Avi Greengart
PLANET EARTH II
A BREATHTAKING LOOK AT OUR WORLD

It was about ten years ago that BBC debuted their original Planet Earth on both Blu-ray and HD DVD here in the United States to much critical acclaim. Not resting on their laurels, the Planet Earth team went to work on their next project, appropriately named Planet Earth II. While 1080p was cutting-edge a decade ago, simple HD wouldn’t cut the mustard any longer since we are living in a 4K world that expects wide color gamut (WCG) and high dynamic range (HDR)—or at least readers of Sound & Vision do.

The original series was a giant hit, and the expectations for the sequel were very high, but thankfully, the team at BBC came through with another fascinating look at our planet that is the first TV series specifically designed to be seen in 4K. The three-disc UHD Blu-ray set consists of six episodes spread across two UHD discs, with the third Blu-ray Disc housing the lone supplemental featurette.

Episode 1, Islands, looks at some of the planet’s rarest creatures, such as the pygmy three-toed sloth as well as some young marine iguanas on the Galapagos Islands, who must escape a plethora of racer snakes as soon as they’re hatched. Finally, we visit the sub-Antarctic island of Zavodovski to see where half a million penguins live.

In Mountains, we get a look at some of the most spectacular landscapes the planet has to offer, though they can also be extreme places to survive. It’s here we’ll visit with four snow leopards, follow some grizzly bears, and then soar with golden eagles through breathtaking vistas.

Jungles give us a glimpse of animals competing to survive in some of the richest habitats on the planet. The flooded forests of the Amazon are home to jaguars and a newly discovered species of Araguaia dolphin. Next we see ninja frogs—whose bright colors shine with WCG—as they fight off wasps and then move over to Madagascar and follow the acrobatic Indri as they leap through the forest. When night falls, we witness how the jungle night conceals a strange fungi and witness glow-in-the-dark creatures that have never been filmed before.

Episode 4, Deserts, lets us see how various species have developed coping mechanisms to deal with extreme heat. Lions must sometimes face the tallest prey on the planet, sandgrouse fly 120 miles each day for water, and on visiting Madagascar, we get to see a locust swarm of biblical proportions.

Grasslands cover about one-quarter of the Earth’s surface and support a wide variety of wildlife, but in order to survive, the inhabitants must endure intense seasonal changes.

In the final episode, Cities, we witness the impact that humans are having on the world. While changes are surely taking place, various species have learned to adapt—and sometimes thrive—as the cities continue to grow. These include peregrine falcons in New York city, leopards who hunt in the streets of Mumbai, and millions of starlings in Rome.

Much like the original Planet Earth on Blu-ray, Planet Earth II is the must-have set to show off your 4K system. Most of the footage is shot with native 4K cameras with HDR encoding, which leads to a level of detail and jaw-dropping images that will have all your friends running to their local big box and plunking down their credit card for a 4K display. Not to be forgotten is the wide color gamut, which is constantly on display, whether from the ninja frogs in Jungles or the nighttime shots in Cities that showcase what the future might offer in terms of adapting urban jungles to look more like real ones. Even the overhead drone footage teems with detail as the documentary follows various creatures in their natural habitats or on the hunt for their prey.

The audio track is a lossless DTS-HD Master Audio 5.1 track, which suits the material quite well. David Attenborough’s narration comes through clearly and concisely, and the imaging in the track is well crafted. Additionally, the score from Hans Zimmer adds a Hollywood blockbuster theme to the proceedings and complements the onscreen action.

The lone supplement is housed on a Blu-ray Disc and includes 54 minutes of bonus clips from each episode, showing what the filming crew had to go through to shoot various aspects of the production. In many ways, this was like a seventh episode; it was captivating and informative in and of itself.

It doesn’t get much better than this. Highly recommended.

David Vaughn
“Outside, it’s America.” That’s U2 vocalist Bono, setting the stage for the explosive climax of “Bullet the Blue Sky,” one of the pivotal tracks on the band’s 1987 masterpiece, *The Joshua Tree*. As Bono purposefully charges his way through the denouement of the narrative, ace guitarist The Edge literally dive-bombs the aural equivalent of the lyrical floodlights—let’s call them “flood-licks”—through a series of unrelenting scorched-earth riffs while the track careens to its final U.S. caress. A chilling indictment of late-1980s Reagan Administration foreign policy, “Bullet” is no less stinging today—and but one of the many highlights of a career-defining album now being properly feted in a 30th anniversary super deluxe edition box set available in multidisc vinyl LP and CD options (not to mention 24-bit digital downloads).

*The Joshua Tree* is an album most assuredly deserving of this uber-deluxe-level treatment, and it’s also been released in conjunction with U2’s duly dubbed *The Joshua Tree Tour 2017*, during which the album itself is being played in its entirety for the first time. The 49 tracks on this collection are spread across seven LPs and four CDs, accompanied by an 84-page hardbound book of unseen personal photos taken by The Edge during the band’s official 1986 *Tree* photo sessions with Anton Corbijn in the Mojave Desert.

The *Joshua Tree* was the initial apex of the Irish band’s early love affair with the lure—and the lore—of the ideals, hopes, dreams, and wide-open spaces of these here United States, later chronicled to great effect with the lure—and the lore—of the ideals, hopes, dreams, and wide-open spaces of these here United States, later chronicled to great effect with the lure—and the lore—of the ideals, hopes, dreams, and wide-open spaces of these here United States, later chronicled to great effect with the lure—and the lore—of the ideals, hopes, dreams, and wide-open spaces of these here United States, later chronicled to great effect with the lure—and the lore—of the ideals, hopes, dreams, and wide-open spaces of these here United States, later chronicled to great effect with the lure—and the lore—of the ideals, hopes, dreams, and wide-open spaces of these here United States, later chronicled to great effect with the lure—and the lore—of the ideals, hopes, dreams, and wide-open spaces of 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As much as it might look like it, this is not your father’s long lost amplifier—the one you remember sitting on a rack in the den next to the Dual turntable and AR-3s—recently discovered in a remote corner of the attic. Nope, behind those vintage VU meters is a thoroughly modern USB DAC/integrated amp designed for the post-analog age or, more specifically, the Age of Hi-Res Audio. Simply put, Teac’s mission with the compact AI-503 is to preserve the fine details and nuances of your carefully curated music collection, whether you’re pulling tunes off your home network, a USB thumb drive, or a digital audio player.

Though he couldn’t have imagined it at the time, Dad would love the AI-503’s LDAC-compatible Bluetooth capabilities for wirelessly streaming files up to 96-kilohertz/24-bit resolution from his device of choice, not to mention its dual-mono topology, which extends channel isolation to the preamp and digital-to-analog converters—in this case, a pair of Verita AK4490s (the flagship from Japan’s Asahi Kasei Microdevices), each poised for the highest of hi-res action: 11.2-megahertz DSD and 384-kHz/32-bit PCM. Dedicated clocks running at 44.1 and 48 kHz further preserve audio quality by precisely controlling the timing of audio signals while suppressing jitter and providing asynchronous transfer via USB.

Dad would also appreciate the preamp’s flexible connectivity with analog and USB/optical/coaxial digital inputs—including an analog/digital minijack combo on the front panel—super-efficient ICEpower Class D amplifier (rated for 2 x 15 watts into 8 ohms or 2 x 28 into 4 ohms at 1 kHz with 1 percent distortion), fully balanced architecture, and high-precision volume control, designed to eliminate “gang errors” between the left and right channels and preserve signal purity and channel separation right up to the power amp.

Taking cues from Teac’s UD-503 USB DAC, the AI-503 has a dedicated Class AB headphone amp with separate grounding for the left and right channels, a dedicated 3.5mm headphone jack that supports a four-pole ground connection, and a high-/low-gain switch to accommodate a variety of headphones—from low-impedance in-ear monitors to high-impedance over-ear models (16 to 600 ohms).

All this in a noise- and vibration-resistant 11.4 x 3.2 x 10.4-inch metal chassis (available in black or silver) with aluminum control knobs that weighs only 8 pounds. The AI-503 is ideally suited for headphones or desktop speakers, but Teac says floorstanding speakers aren’t out of the question, though for the latter it will likely make more sense to use its preout jacks to feed an external amp of the kick-ass variety. Price: $1,000.—Bob Ankosko
Breaking Sound Barriers.


From first sketch to final voicing, every step in the SVS Prime and Ultra Series speaker design process is aimed at surpassing the performance benchmarks of costlier speakers. Music, movies and every listening session are rendered with flawless balance, depth and detail for a level of sonic excellence and value that’s unmistakably SVS.

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“Best-sounding affordable speakers I’ve heard. I found myself preferring their precision to the sound coming from considerably pricier speakers.”

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