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Wadax Akasa DC Cables and Reference PSU Power Supply

The creative minds at Wadax have developed two new upgrades to their Reference digital platform that, improbably, improve what was already the state of the art in digital playback. Robert Harley reports.



Wadax Reference DAC and Reference Server Upgrades: Akasa DC Cables and Reference Power Supply Unit

Exploring the Frontier

Robert Harley

I've now heard five iterations of the Wadax Reference digital front-end components (Reference DAC and Reference Server), with each configuration progressively elevating the state of the art in digital playback. I started with the Reference DAC, a 206-pound, \$166,420 digital-to-analog converter in three chassis (two of those chassis are massive power supplies). The Reference DAC, in my experience, set a new standard in digital playback, rendering instrumental timbre, dimensionality, bass power and texture, and dynamics with unprecedented realism. (You can read my full review in Issue 312.) We named the Reference DAC Overall Product of the Year Award co-winner in 2021.

And then I added the Wadax Reference Server (\$68,800) connected via USB, which took the performance up a substantial notch (reviewed in Issue 326). The next upgrade was replacing the USB interface with Wadax's custom Akasa optical interface (\$27,400) between the DAC and server, a move that required adding an optional board to the DAC's modular architecture.

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This bi-directional interface realized a staggering improvement in every aspect of the sound—far greater than any other interface upgrade I'd experienced. The Akasa interface is absolutely required to realize the full performance potential of the Wadax pair.

I had happily lived with this setup for many months, thinking that it was the end of

the line. The Reference DAC and Reference Server connected via the Akasa interface were significantly better than any other digital I'd heard. The pair's bass performance was phenomenal, combining power, weight, and dynamics on one hand with texture, finesse, and resolution on the other. The Wadax duo rendered timbres with a rich density and saturated tone color, devoid of the thin and threadbare textures often heard from digital. Resolution was phenomenal, but not in an analytical way. But perhaps the Wadax's greatest achievement was in how it revealed depth, bloom, air, and dimensionality. The flat, cardboard-cutout soundstaging associated with digital was replaced by a wonderful expansive quality that let you hear the size of the venue and presented individual instrumental images as surrounded by air and what Jonathan Valin calls "action"—the bloom around an instrument expanding outward with the note's dynamics and pitch.

But the creative minds at Wadax were far from finished. In this follow-up, I'm going to report on two significant upgrades to this platform. The first is the Akasa DC cables that connect the DAC's outboard power supplies to the DAC (\$20,400 each, two required). The second is the addition of the \$52,700 Reference PSU (Power Supply Unit) to the Reference Server. The server has an integral power supply that can be upgraded with the external unit. You can upgrade the Reference PSU with the addition of one Akasa DC Reference cable (\$20,400). The Reference PSU is housed in a chassis the same size as the Refer-

Specs & Pricing

Akasa Reference DC Cable

Price: \$20,400 each for 1m (two required for Reference DAC, one required for Reference Server's Reference PSU, custom lengths available)

Reference PSU

Dimensions: 18.9" x 10.43" x 17.1"

Weight: 100 lbs.

Price: \$52,700

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ence DAC and weighs 100 pounds. I will describe the products' technologies in the sidebar.

For those of you adding it up, the fully realized five-chassis 350+ pound Wadax Reference digital front end comes in at a breathtaking price of \$376,520. But that staggering sum—along with lots of rack space—gets you the absolute state of the art in digital replay.

Listening

First up were the Akasa DC cables that replace the stock cables connecting the two outboard power supplies to the Reference DAC. When I learned of this upgrade, I thought: "How much difference could DC cables make?"

I installed the Akasa DC Reference cables as soon as they arrived and listened but didn't take notes because I was involved in other projects. After about six weeks of listening to the system with the Akasa DC cables, I switched back to the stock cables and then performed some comparisons.

I should no longer be surprised by anything in audio, but replacing the stock DC cables with the Akasa cables resulted in a wholesale improvement of what was already the state of the art in digital playback. Although Wadax supplied me with information on the cables' design, I still can't wrap my head around why cables carrying direct current should make such a difference. Nonetheless, what I heard after replacing the stock DC cables with the Akasa Refer-

ence DC cables was nothing short of astonishing. The immediate impression was one of greater clarity, transparency, resolution, and the feeling of removing a scrim between you and the music. The midrange through the treble was more open and airier, with greater life and presence. There was an apparent increase in midrange and treble clarity and light that fostered the impression of greater immediacy; yet, at the same time, textures were more liquid and lush. A slight overlay of hardness with the stock cables was stripped away, revealing even greater beauty to timbres. The track "Two Hearts" sung by the amazing Samara Joy on Terri Lyne Carrington's album *New Standards, Vol. One* was particularly revealing of the way the Akasa cables reveal greater harmonic beauty, more warmth and body, increased textural density, and greater liquidity of timbre. Her voice was simply purer and more realistic with the upgraded cables.

What I heard after replacing the stock DC cables with the Akasa Reference DC cables was nothing short of astonishing.

Frankly, there was a thinness to her voice with the stock cables that you'd never detect unless you heard the system with the Akasa cables. This combination of greater immediacy and smoothness was immensely rewarding.

The bass was noticeably tighter and better defined with the Akasa DC cables. The bottom end was more precise and articulate in both dynamics and pitch. As a result, I heard more of the bass player's contribution, which engendered a heightened sense of a band playing together. The rhythmic flow was more pronounced. The difference was like what you hear from good and poor loudspeaker placement in a room.



Music with a lot of percussion was revelatory of the Akasa cables' superior resolution and greater openness. The transient attacks were more vivid and present, yet also reduced in etch. I also heard an extra puff of air around the transient that added to the sense of realism. The Reference DC cables more fully resolved the mechanism and materials creating the sound—wood striking wood, wood striking metal, hands on stretched skins, the metallic component of timbales, for examples. This quality heightened the feeling of realism and musical energy.

I also heard more space and bloom around instruments and voices. On the aforementioned Samara Joy track, her vocal as well as the other instruments in the spare arrangement occupied their own spaces in the soundstage with a more tangible sense of air between the images. Her voice was also more three-dimensional; the impression of the image having depth—not just where the image was positioned in the soundstage but also depth of the image itself—made for more lifelike three-dimensional body. The overall presentation was more open and expansive, with greater transparency and illumination.

Beyond these specific descriptions, there was an ease, a flow, a musical rightness with the Akasa DC cables that's hard to describe. The sound was gentler yet more vivid, which may sound like a con-

tradition in terms but reflects the Akasa cables' simultaneous increase in timbral liquidity and greater openness and presence.

Moving on to the Reference PSU for the Reference Server, I also installed this upgrade and listened to it for about six weeks before going back to the stock internal supply for side-by-side comparisons. First up was experimenting with AC polarity. As mentioned, the Reference PSU allows you to invert the incoming AC's polarity via the front-panel touchscreen. In my system, inverting the polarity produced a wider soundstage, but the bass was less defined, and midrange textures were not as liquid. I preferred the non-inverted setting, although my experience suggests that this feature will be useful to other users depending on their AC power.

The Reference PSU rendered improvements remarkably like those of the Akasa DC cables—a more transparent window on the music. Timbres were more liquid, the bass better defined, and the soundstage more expansive. In fact, the similarities were striking, so I won't reiterate them. Surprisingly, however, I thought that the Akasa DC cables rendered an improvement much like and comparable to adding the Reference PSU.

Conclusion

I've written in the past about how miniscule objective changes in an audio signal

can have a significant effect on musical perception. That is, there's not a linear relationship between the objective magnitude of a change in the signal and the musical perception of that change. The objective differences in the Reference DAC's analog output signal between the stock DC cables and the Akasa Reference DC cables, and between the Reference Server's internal power supply and the external Reference PSU, must be infinitesimally small; yet their effect on musical perception is profound.

The Akasa DC Reference cables and the Reference PSU have, surprisingly, improved upon a platform that I had already considered the state of the art in digital playback. If you heard the Reference DAC and Reference Server without these upgrades (as I did for many months), you would say they had no shortcomings. But the addition of the Akasa DC Reference cables and the Reference PSU takes their performance to a new level of realism and musicality.

If you own any of the Wadax Reference components, you must audition these latest upgrades. And if you are fortunate enough to be thinking about acquiring these masterpieces, the Akasa DC cables and Reference PSU should be considered mandatory. The fully loaded Wadax digital front end is, in my view, the highest expression of audio art and engineering.

Technology

LET'S FIRST LOOK AT the Akasa DC Reference cables that connect the two external power supplies to the Reference DAC, and the single Akasa DC Reference cable that connects the optional Reference PSU to the Reference Server. Note that the term "Akasa" is used for both the DC cables and the optical interface between DAC and server, although they are completely different components.

According to Wadax, the Akasa DC Reference cables and Reference Power Supply are the result of fundamental research into how DC generation, transfer, and grounding propagate through the digital and analog signal paths to affect the final analog output signal. The company says that the DC cable is subject to external influences including microphonic effects when the cable vibrates from sound striking it as well as vibration emanating from the chassis to which the cable is connected. Another potential source of degradation is electromagnetic interference (EMI) or noise induced in the cable when the cable acts as an antenna. There's also the issue of capacitive coupling from stray capacitance across the entire cable length.

The second source of compromised performance comes not from external factors but from the cable design itself. Every cable has an equivalent impedance that is determined by the cable's conductor material, dielectric, and geometry. This equivalent impedance reacts with the high-speed current variations to generate noise in the cable. According to Wadax, this noise has a wide power spectrum and has voltage and current components.

The Akasa DC Reference cables' design was informed by this research. The cable starts with a heavy-gauge eight-conductor array made from a custom alloy with single-crystal casting. Most cables are "drawn" rather than cast. In drawn cables, the conductor material (usually copper) is pulled through a die that forms the conductor's shape and diameter. This process creates a chevron-shaped grain pattern in the metal (this grain is also called "crystal"). The grains are discontinuities in the material. The signal must traverse these discontinuities, each one acting as a miniature diode. The grain's chevron pattern is why drawn cables are directional—they sound different depending on which direction the chevron pattern is facing. Cast conductors, by contrast, are not formed into their shape by pulling the metal through a die but rather by melting the metal and casting it into its final shape. This process results in a more continuous structure in the metal. The metal has a single grain (crystal) that is stretched out along its length. You may have heard of OCC copper, an initialism for Ohno Continuous Cast, the first audio conductor to be made with this technique back in the 1980s by a Japanese researcher.

The conductors in the Akasa DC Reference cables are made from a custom metallurgy based on a silver-gold alloy (zero copper content) that has a purity of "seven nines" (7N), meaning that it is 99.99999% pure. There are eight of these heavy-gauge conductors in each cable. The cable is mechanically damped across its length with a variable-frequency damping design with very



low hysteresis (memory).

The cables' terminations are something to behold. They are massive, custom, CNC-machined connectors built with an outer structure and a vibration-controlled subchassis inside. Wadax reports that in its research its designers were surprised by how much termination vibration degraded performance, leading them to develop this extraordinary connector.

Let's look next at the Reference Power Supply Unit (PSU) for the Reference Server. The Reference Server was initially introduced with an internal power supply. But Wadax was looking to the future, providing a DC input jack to make possible a future upgrade by adding an external supply. Why an external supply? First, an external supply can be much larger than one that must fit inside the server's chassis. A large external chassis means the layout can be optimized, and there's additional real estate for more (and more sophisticated) regulation stages, as well as a larger power transformer. Moreover, separating the power supply isolates the server's electronics from radiated noise, mechanical vibration, and grounding reactions with the circuits supplied with DC.

The Reference PSU has reportedly been improved in key areas. The noise floor has been lowered by a whopping 20dB below the internal supply's already low noise (20dB is a huge amount). This supply is the quietest Wadax has ever built, with a noise floor so low that it's a challenge to measure for even the most sophisticated test instrumentation. Wadax calculates that the RMS noise on its DC output is 100nV, measured over a bandwidth of 0.1Hz–20kHz. (One hundred nanovolts is a tenth of a millionth of a volt.) In addition, the noise modulation has reportedly decreased; the noise level doesn't fluctuate with current demand. The Reference PSU also has a lower output impedance to maximize current transfer speed. The supply is reportedly immune to temperature shifts.

The massive chassis is machined and segmented into three parts with extensive mechanical damping. There are nearly 1500 parts inside the Reference PSU, and it weighs in at a whopping 100 pounds. The goal was to create the ultimate power supply that delivers noise-free direct current to the circuits that is impervious to varying load, vibration (acoustic and mechanical transfer), and temperature.

As mentioned, the front-panel's 5" color display shows the polarity of the incoming AC and allows you to flip that polarity (180° inversion) via the front-panel touchscreen. This is the same as turning over a non-polarized AC plug, which critical listeners have been doing for years. The AC polarity has an effect on grounding and the supply's overall performance, thus the need to provide a polarity reversal. You simply listen with the AC polarity inverted and not inverted and choose which sounds better. **tbs**

WADAX

Different By Design



“The Wadax Reference DAC is not only the best-sounding DAC I’ve heard, it’s the best sounding by a considerable margin.”

Robert Harley, Editor-in-chief,
The Absolute Sound, Issue 312, January 2021

At the heart of every WADAX DAC lies our unique, proprietary musC Chip digital decoding process. Employing a sophisticated, load-sensitive, feed-forward error correction algorithm, it eliminates the parasitic time, phase and amplitude errors that disrupt and distort digital recordings. No other DAC works this way – which is just one reason why no other DAC can sound like a Wadax.

You will find equally radical innovations in every Wadax product, from our proprietary AKASA optical interface to power supplies so quiet that you need to model their noise performance – because you can’t measure it.

These advances have created a step-change in digital audio performance – a revolution acknowledged by reviewers around the world.

WADAX

Not ‘digital’ – not ‘audio’ – just music.