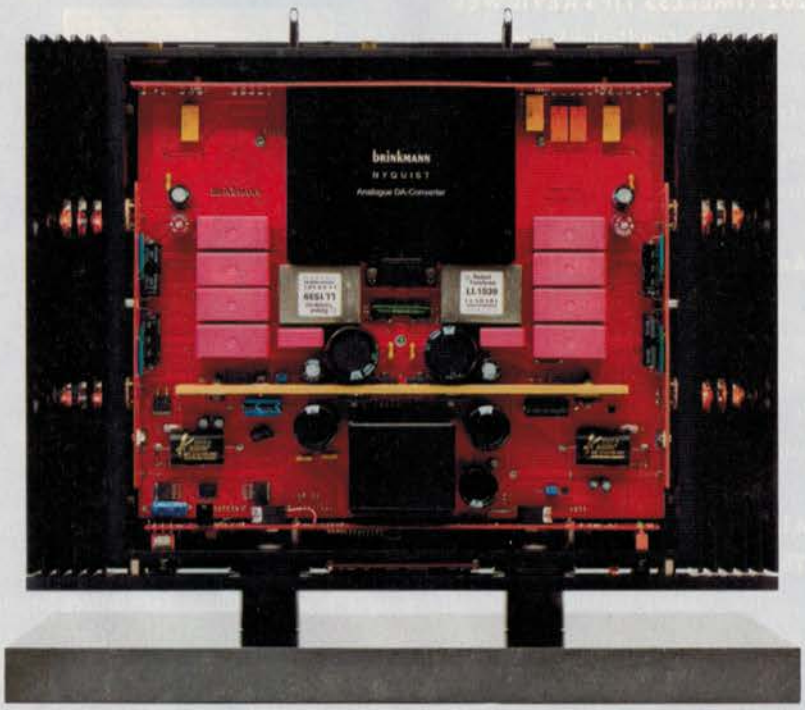
MICHAEL FREMER

Brinkmann Audio Nyquist

D/A PROCESSOR



What? Johnny-come-lately turntable manufacturer Brinkmann Audio now makes a DAC? Are they desperate? What sampling rates does it support—16⅔, 33⅓, 45, and 78? I guess the vinyl resurgence is over! Why else would *Brinkmann* make a DAC?

If that's what you're thinking, consider that Helmut Brinkmann began designing, manufacturing, and marketing electronics well before he made the first of the turntables for which his company is best known in the US.

The Nyquist is a thoroughly (almost) modern streaming DAC and headphone amplifier in a surprisingly small case, its compactness partly due to its outboard power supply. It's named for Harry Nyquist (1889–1976), the Swedish-born American electronics engineer who wrote such papers as "Certain Factors Affecting Telegraph Speed" (1924) and its nail-biter sequel, "Certain Topics in Telegraph Transmission Theory" (1928). Also named for him is the "Nyquist frequency," which digital scolds claim as proof that CD sound is "perfect." Nyquist's theorem mathematically proves that all you need to perfectly reconstruct the original analog waveform within the audioband—*ie*, 20Hz–20kHz—is a sample rate of at least twice 20kHz. As the CD sampling rate of 44.1kHz is slightly more than twice that of the highest frequency audible to humans, it must therefore be perfect. When you argue that higher-resolution audio produces better sound, their usual response is, "What are you, a bat? Humans can't hear past 20kHz."

Brinkmann claims to have optimized its MQA algorithm parameters.

Clearly, those people have not heard the Brinkmann

SPECIFICATIONS

Description Streaming digital-to-analog converter and headphone amplifier with tubed output stage. Tube complement: four Telefunken PCF803 (NOS, two per channel). Digital inputs: AES/EBU (XLR), S/PDIF (RCA), optical (TosLink), Ethernet (RJ45), USB Type B (high-resolution audio). Analog outputs: balanced (XLR), single-ended (RCA). Formats supported: MQA and PCM up to 384kHz (DXD), DSD64 and DSD128 via DoP (DSD over PCM), DSD256 natively. Frequency response: N/A. THD, I/M: <0.01%. Signal/noise: >100dBA. Channel separation: N/A. Maximum output voltage: ±12V (balanced). Analog output impedance: 10 ohms, balanced. **Dimensions** Nyquist: 16.5" (420mm) W by 3.75" (95mm) H by 12.2" (310mm) D. Weight: 26.5 lbs (12kg). Power supply: 4.75" (120mm) W by 3.2" (80mm) H by 6.3" (160mm) D. Weight: 7.1 lbs (3.2kg). Granite base: 26.5 lbs (12kg). **Serial number of unit reviewed** 7N009A. **Price** $18,000. Approximate number of dealers: N/S. Warranty: 3 years, parts & labor (not including shipping to and from factory). **Manufacturer** Brinkmann Audio GmbH, Im Himmelreich 13, D-88147 Achberg, Germany. Tel: (49) (0)8380-98115. Fax: (49) 8380-981233. Web: http://brinkmann-audio.com. US distributor: Brinkmann USA. Web: www.brinkmann-usa.com.

Nyquist—or other similarly equipped DACs—decode a high-resolution MQA file.

The Nyquist Decodes All

The Brinkmann Nyquist costs $18,000. It decodes MQA and PCM signals up to 384kHz (DXD, DSD64 and DSD128 via DoP (DSD over PCM), and DSD256 natively. In short, if you've got the digits, the Nyquist can deal with them.

According to Helmut Brinkmann's untitled white paper about the Nyquist,[1] it has "individually optimized signal paths for every format." DSD is not converted to PCM. Instead, after a "very precise re-clocking," the signal is sent to a discrete (non–IC-based) DSD DAC, followed by a "soft analog filter" that's "steep enough to reduce the noise energy to a level that will not impact the audio components which are 'Downstream' in the playback chain, but not so steep, as we take great pains to preserve the air and openness of sound for which DSD is famous."

In his white paper, Brinkmann writes that while he tested several DSD DAC chipsets, none compared to the sound of a discrete DSD DAC. Non–signal-degrading relays automatically switch between PCM and DSD.

The PCM and MQA signal paths differ only in the additional signal processing required for MQA. All PCM and MQA signals are upsampled eightfold, to 352.8 or 384kHz, within a powerful, 16-core processor that also decodes MQA files. The upsampled signals are then reclocked and routed to two ES9018S Sabre DAC chips, one per channel. The eight DACs in each ES9018S are operated in parallel to produce a single, very powerful DAC. While each ES9018S chip includes a variety of features that can perform a wide range of tasks and phase-locked-loop (PLL) functionality, all of these have been switched off. For upsampling, jitter reduction, and other functions, the Nyquist has separate, more powerful processors, each with its own individually designed power supply.

The clocks, specifically designed for high-definition audio, have ultra-low levels of phase noise and are placed very close to the DAC chips, to help minimize jitter. The PCM upsampling filters are claimed to cancel pre-ringing, about which there remains a great deal of controversy, best discussed elsewhere. Brinkmann claims to have optimized its MQA algorithm parameters to further reduce time smear.

All of the digital-processing hardware and software is contained within an easily removable subassembly referred to by Brinkmann as the Nyquist's digital *module*.[2] This module alone, which also includes an Ethernet input for streamed data, includes 11 dedicated power supplies. The Nyquist also includes a special high-voltage power supply for its analog

1 See www.brinkmann-audio.com/inhalt/en/whitepaper/nyquist.pdf.

2 The module bears the label Analogue DA-Converter, visible through the Nyquist's clear top panel; its rear panel, which also comprises a portion of the unit's rear panel as a whole, bears the label dac-module.

MEASUREMENTS

I measured the second sample of the Brinkmann Nyquist with my Audio Precision SYS2722 system (see the January 2008 "As We See It," http://tinyurl.com/4ffpve4), using both the Audio Precision's optical and electrical digital outputs, and USB data sourced from my MacBook Pro running on battery power with Pure Music 3.0 playing WAV and AIFF test-tone files. Apple's USB Prober utility identified the DAC as "Nyquist" from "Brinkmann Audio," and confirmed that the USB port operated in the optimal isochronous asynchronous mode. Apple's AudioMIDI utility revealed that, via USB, the Nyquist accepted 16- and 24-bit integer data sampled at all rates from 44.1 to 384kHz. The optical input locked to datastreams with sample rates up to 96kHz, the AES/EBU and S/PDIF inputs locked to streams of up to 192kHz-sampled data.

The Brinkmann's maximum output level at 1kHz with the volume control set to "0,0dB" was 1.7V from the balanced output jacks, 848mV from the unbalanced jacks, and 7.47V from the headphone jack, with the volume set to "88" out of a maximum of "90." (When you select the headphone output with the front-panel button, the main outputs are muted and the volume display is set to "1," with the maximum being "90.") With the volume control set to its maximum of "10,0dB," the levels were 5.1V balanced and 2.54V unbalanced; *ie*, 9.5dB higher. Although the Nyquist's manual says that the volume control can be set to offer up to 20dB of attenuation, the control on our sample could not be set below "0,0dB." The balanced and unbalanced outputs preserved absolute polarity (*ie*, were non-inverting) with Phase set to "0°," the XLR jacks being wired with pin 2 hot. The headphone output inverted polarity with Phase set to

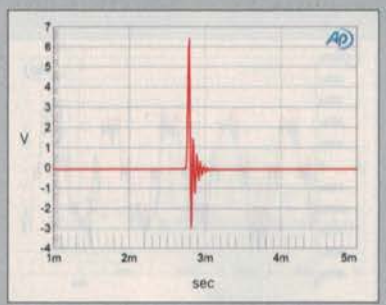


Fig.1 Brinkmann Nyquist, impulse response (one sample at 0dBFS, 44.1kHz sampling, 4ms time window).

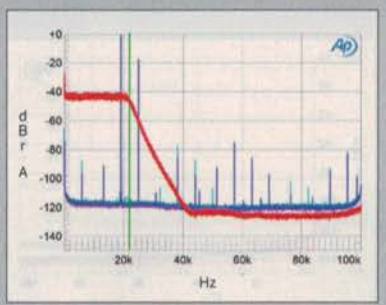


Fig.2 Brinkmann Nyquist, wideband spectrum of white noise at –4dBFS (left channel red, right magenta) and 19.1kHz tone at 0dBFS (left blue, right cyan), with data sampled at 44.1kHz (20dB/vertical div.).

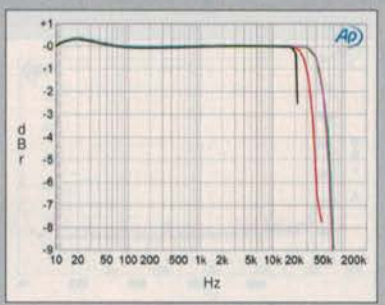


Fig.3 Brinkmann Nyquist, frequency response at –12dBFS into 100k ohms with data sampled at: 44.1kHz (left channel green, right gray), 96kHz (left blue, right red), 192kHz (left cyan, right magenta), 384kHz (left blue, right green) (1dB/vertical div.).

circuits, including the DAC output.

In addition to streamed software updates, this design permits in-the-field module exchanges by the user as new technology becomes available: a new hardware standard, DAC chip, DSP technology, etc. Finally, the Nyquist supports the Roon music player, with which, by now, everyone reading this should be familiar.

From Brinkmann's white paper: "During the research and development period, our main reference for Nyquist's Sound Quality were Brinkmann turntables, as we feel our 'tables achieve a uniquely natural and organic analog sound. We designed Nyquist to share this 'Brinkmann DNA'."

Now, before any digital heads explode from having read that a turntable was the "main reference" for a DAC, hear *this*: The Nyquist's output stage comprises four long-life, new old stock (NOS) Telefunken PCF803 tubes, originally developed in the 1960s for use in color TVs. Each tube incorporates a pentode and a triode, and is also used for analog gain control. Turntables and tubes? Now feel free to explode!

The Nyquist's main enclosure comes with a thick granite base.

Setup and Use

As with Brinkmann's optional, tubed power supply for its turntable motors, the Nyquist's main enclosure comes with a thick granite base to place it on. Combined, the Nyquist and its base measure 16.5" wide by 12.2" deep by 3.75" high. (The Nyquist's outboard power supply measures 4.75" wide by 6.3" deep by 3.2" high.) Also included is a nicely machined remote control: With its six buttons you can select the input, switch the phase (absolute polarity), mute the output, and adjust gain. It also lets you switch between the headphone and main outputs. The Nyquist comes with a *hand-built* power cord designed and tuned by Helmut Brinkmann.

On the rear panel, which is compact and attractive in a businesslike way, are single-ended (RCA) and balanced (XLR) analog outputs; USB, S/PDIF (coaxial), optical (TosLink), and AES/EBU (XLR) digital inputs; an RJ45

measurements, continued

"0°." The output impedance from the unbalanced jacks was a low 9 ohms at 1 and 20kHz, increasing slightly to 23 ohms at 20Hz. The balanced output impedance was higher but still low, at 15 ohms at 1 and 20kHz, 29 ohms at 20Hz. The output impedance from the headphone jack was a relatively high 30 ohms across the audioband.

Fig.1 shows the Brinkmann's impulse response with 44.1kHz data. Like every other MQA-capable processor I have measured, it is typical of a short, minimum-phase reconstruction filter. Tested with 44.1kHz-sampled white noise,[1] this filter rolls off slowly above the audioband (fig.2, magenta and red traces) until well above the Nyquist frequency of 22.05kHz (vertical green line). Because of the filter's slow rolloff, the aliased image of a 19.1kHz tone at -1dBFS (fig.2, cyan and blue traces) is suppressed by just 18dB. I usually use a 19.1kHz tone at 0dBFS for this test, but the Nyquist overloaded at this level. All MQA-enabled processors seem to have a reconstruction filter that with 44.1kHz data trades off reduced rejection of aliased images at the top of the audioband for an optimized time-domain performance.

The Brinkmann's frequency response, tested with spot tones at -12dBFS with data sampled at 44.1, 96, 192, and 384kHz, is shown in fig.3. (The balanced and unbalanced, outputs behaved similarly, the headphone output rolled off a little faster, reaching -1dB at 20kHz with data sampled at 44.1kHz.) All the rates feature a very slight rise in the low bass and an output that rolls off above 20kHz, with the steepest rolloff occurring with 44.1kHz data (green and gray traces). At the higher sample rates, the rolloff is both slow and a little premature, reaching -3dB at 37kHz with 96kHz data (cyan and magenta traces), and at 54kHz with 192kHz data (blue, red).

1 My thanks to Jürgen Reis of MBL for suggesting this test to me.

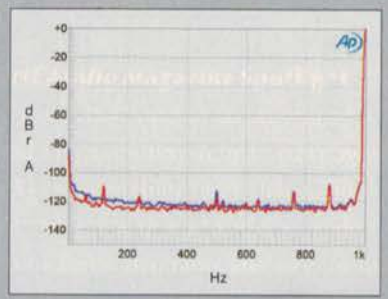


Fig.4 Brinkmann Nyquist, spectrum with noise and spuriae of dithered 24-bit, 1kHz tone at 0dBFS (left channel blue, right red; -20dB/vertical div.).

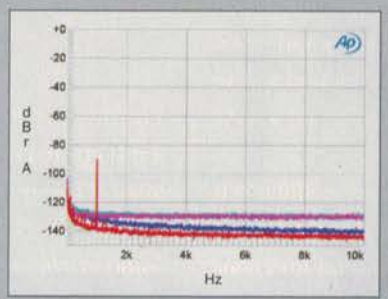


Fig.5 Brinkmann Nyquist, spectrum with noise and spuriae of dithered 1kHz tone at -90dBFS with: 16-bit data (left channel cyan, right magenta), 24-bit data (left blue, right red) (20dB/vertical div.).

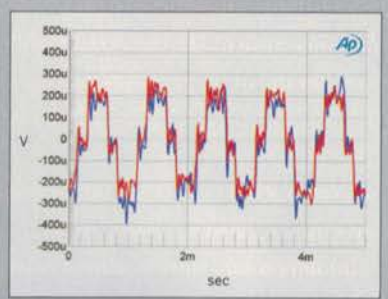


Fig.6 Brinkmann Nyquist, waveform of undithered 1kHz sinewave at -90.31dBFS, 16-bit TosLink data (left channel blue, right red).

Ethernet jack; and the power-supply jack.

On the front panel, large volume and input-selection knobs flank a screen that displays the selected input, the format (PCM, DSD, MQA), the sampling frequency, the volume setting in dB, and the signal polarity. To the right of all this are the On and Mute buttons, and at far left are a ¼" headphone jack and a button to activate the headphone amp. And that's it.

The Nyquist's glass top plate lets you view much of its guts, though the digital module is enclosed within its own casework. All of the main circuitry seems to be on a single large, horizontal circuit board, with smaller vertical boards at either side; these contain the horizontally positioned tube sockets and tubes. Vents in the side panels and massive heatsinks keep the tubes running cool.

The Nyquist was easy to install and a pleasure to use, despite the usual problems of getting a computer and a digital audio component to shake hands, which took some time to sort out. Push the On button and the screen displays "Nyquist" while the circuits stabilize, after which the current settings appear. Push Mute to unmute and you're ready to listen.

The Nyquist worked seamlessly with Roon. It found my network, and Roon connected easily with the Meridian Sooloos Music Server, as well as with the iTunes content on my MacBook Air laptop. With Roon's inclusion of Tidal streaming, the musical possibilities were unlimited. When I plugged a hard drive containing hundreds of hi-rez files into the MacBook, Roon found and played them. Roon's ability to retrieve metadata is truly impressive, but you probably knew that.

However, as is all too common in computer audio, the Nyquist's instruction manual is sketchy in terms of overall connectability and use. Although the manual tries to be Roon friendly, what's printed there isn't exactly what appeared on the Roon setup screen. If you're at all experienced with streaming, you'll figure it out.

Sound

Before reading my description of the Nyquist's sound, remember the words of a former audio writer who famously wrote that tubes do *not* belong in an audio system "unless you are a tweako cultist. There is nothing in audio electronics that cannot be done better with solid-state devices than vacuum tubes." Now, forget those words.

Anxious to get the review process started, Brinkmann first sent a non-streaming Nyquist that, after a few weeks' use, developed a software glitch. Switching too quickly among the inputs, or even abruptly changing the volume, made the display's information break down and the unit freeze up. As with many microprocessor freeze-ups, pulling the plug, waiting a few minutes, and powering up again solved the problem but didn't get rid of it. The solution was a replacement unit that included streaming functionality, and with the glitch corrected.

The response with 384kHz overlays the 192kHz response in this graph, but looking at it in more detail, it reaches -20dB at 95kHz compared with 88kHz with 192kHz data. Channel separation (not shown) was excellent, at >110dB below 20kHz, though the Nyquist's random noise floor (fig.4) was higher in in level than I usually find, with some spuriae present at 120Hz and its harmonics.

This noise was also higher in the left channel (blue trace) than the right (red) when I examined how the noise floor dropped in level as I increased the bit depth from 16 to 24 with a dithered 1kHz tone at -90dBFS (fig.5). Perhaps the tubes in the left channel were noisier than those in the right? Even so, the Brinkmann's resolution in the right channel in this graph appears to be around 18 bits' worth. With an undithered 16-bit tone at exactly -90.31dBFS (fig.6), the three DC voltage levels described by the data were well distinguished, though a little bit of waveform asymmetry is apparent in this graph. With undithered 24-bit data, the result was a noisy if somewhat asymmetrical sinewave (not shown).

I usually test a processor's linearity with a full-scale, 24-bit 50Hz tone, but, as can be seen in fig.7, the Nyquist produced a surprisingly high level of odd-order distortion, with the third harmonic the highest in level, at -54dB (0.2%). The volume control was set to "0,0" for this graph; increasing it to "10,0" didn't change the picture. If I reduced the level of the 50Hz tone by 3 or 6dB, the level of the third harmonic dropped by the same 3 or 6dB and the spectrum looked the same. Repeating the test with a 1kHz tone gave a more respectable picture (fig.8), with the third harmonic now lying at -70dB (0.03%). With the punishing 600 ohm load (not shown), the right channel's distortion didn't change appreciably, but the left-channel distortion both increased and was now dominated by

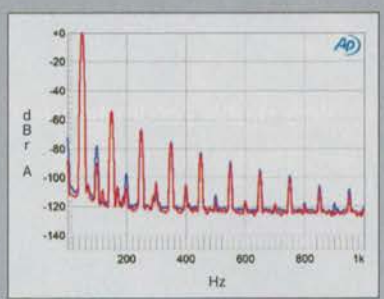


Fig.7 Brinkmann Nyquist, spectrum of 50Hz sinewave, DC-1kHz, at 0dBFS into 100k ohms (left channel blue, right red; linear frequency scale).

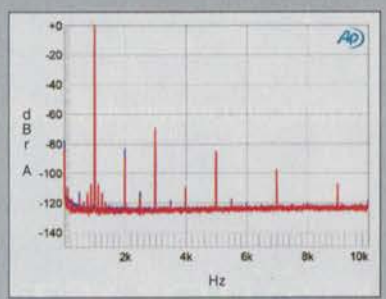


Fig.8 Brinkmann Nyquist, spectrum of 1kHz sinewave, DC-1kHz, at 0dBFS into 100k ohms (left channel blue, right red; linear frequency scale).

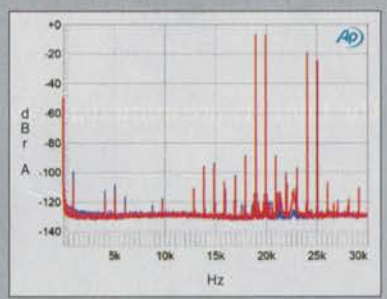


Fig.9 Brinkmann Nyquist, HF intermodulation spectrum, DC-30kHz, 19+20kHz at -1dBFS into 100k ohms, 44.1kHz data (left channel blue, right red; linear frequency scale).

During the exchange of review samples, I was told that, along with the inclusion of streaming, other upgrades had been made, including a major improvement in sound quality. I was happy to hear that, because the original Nyquist sounded way too tubey: murky and rolled-off on top. The second sample sounded way better.

MQA Sound

Listening to MQA files supplied to me for this review or streamed from Tidal HiFi/Master made two things clear: Those who claim they can't hear a difference between CD-resolution files and hi-rez MQA files either haven't bothered to listen, or don't want to admit that their claims of "CD sound is perfect" are just plain wrong.

MQA has been convincingly demonstrated at Consumer Electronics Shows, and most recently at an event sponsored by New York City dealer Innovative Audio, where Wilson Audio Specialties' Peter McGrath, an accomplished recording engineer, played unprocessed hi-rez files of his simply miked orchestral recordings, followed by the time-corrected MQA versions. The differences were profound, and obvious to all attending: The MQA versions had greater image solidity and three-dimensionality, and wider perceived dynamics. More like a good LP. McGrath even surmised that vinyl's superior performance to CD in the time domain may account for why, on the best LPs, dynamics appear to be wider, even if the measurements say otherwise.

Had this been CD sound in 1983, I'd be all in with digital.

As for MQA's ability to "fold" and "unfold" very large files for streaming and playback, hearing 24/96 and 24/192 files streamed through the Nyquist via Tidal was an ear-opener. Had this been CD sound in 1983, I'd still be an LP guy—but I'd also be all in with digital.

In many reviews, I've mentioned the Modern Jazz Quartet's *European Concert* (2 LPs, Atlantic 2-603). This 1960 live recording is one of my favorite MJQ albums, and Swedish engineer Gösta Wiholm nailed it. And there it was on Tidal as a 24/192 stream. For the first time, I heard this familiar recording free of the occasional vinyl blemishes, and not restricted by the glaze and two-dimensionality of "Red Book" CD resolution. The sound was clean, pure,

measurements, continued

the second harmonic, at -60dB (0.1%).

With an equal mix of 19 and 20kHz tones, the combined waveform peaking at 0dBFS, the Nyquist's "leaky" reconstruction filter produced a slew of aliasing and intermodulation products (not shown). Reducing the signal level by 1dB produced a much cleaner spectrum (fig.9), with very low intermodulation distortion. However, the aliased images of the two tones are not suppressed by much. Fortunately for the Nyquist, music almost never has content approaching 0dBFS at the top of the audioband.

The Nyquist's relatively high level of random noise obscured the result when I tested for the DAC's rejection of word-clock jitter. With 16-bit J-Test data via the AES/EBU input (fig.10), it's difficult to see whether the odd-order harmonics of the low-frequency, LSB-level squarewave are at the correct level (sloping green line). However, of more concern in this graph are the sideband pairs at ±120, ±240, and ±1376Hz. The first two pairs are obviously related to the frequency of the full-wave-rectified power supply, the third pair of unknown origin—but all persisted, regardless of what input I used and whether I fed the Brinkmann 16- or 24-bit data. If the power-supply-related sidebands were due to inadequate jitter rejection, they would decrease in level if I reduced the signal frequency. However, when I analyzed the Nyquist's output while feeding it 20, 10, and 5kHz tones at -6dBFS, these sidebands remained at the same level. This means that they are more likely due to inadequate supply filtering on the DAC chip's voltage reference pin.

I admit that it's difficult to predict how these measured shortfalls will affect the sound quality, as the spuriae are mainly low in absolute terms. I do note that Michael Fremer wrote that he suspected that "John Atkinson's measurements will show that the noise floor of the Nyquist's tubed output stage, though inaudible as hiss, results in less than full resolution of hi-rez files." And when he described the Nyquist's balance as "soft and warm," I wasn't surprised.

Overall, I was disappointed by the Brinkmann Nyquist's measured performance. The higher-than-usual levels of random noise, the increase in distortion at low frequencies, and the supply-related sidebands all bothered me. You shouldn't have to make excuses for a DAC costing $18,000.—**John Atkinson**

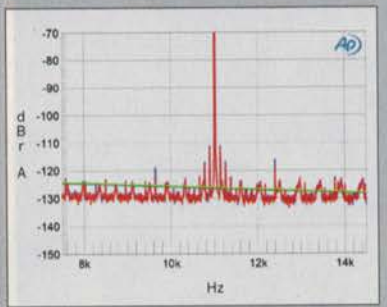


Fig.10 Brinkmann Nyquist, high-resolution jitter spectrum of analog output signal, 11.025kHz at -6dBFS, sampled at 44.1kHz with LSB toggled at 229Hz: 16-bit AES/EBU data (left channel blue, right red). Center frequency of trace, 11.025kHz; frequency range, ±3.5kHz.

spacious, and more transparent than any CD I can recall hearing in terms of verisimilitude of attacks, sustain, and generosity of decays. It was free of unnatural edge, grain, and other digital afflictions, and yet—I hate to sound like a broken record—the LP *still* sounded to me more real, especially in terms of image solidity, three-dimensionality, and harmonic structure.

The bell-like shimmer of Milt Jackson's vibes, John Lewis's touch on the piano—especially when he repeatedly strikes the same key, as he does in Ray Brown's "Pyramid (Blues for Junior)"—and the crisp snap of Connie Kay's snare, sounded delicate, graceful, and a bit velvety through the Nyquist, but still more convincing on vinyl. Nonetheless, the Nyquist's presentation of this streamed hi-rez file was nonfatiguing, and sonically and involving.

Rich Sound

Some observers suggest that it's the artifacts of vinyl playback, not higher resolution or analog purity, that produce these ear-pleasing qualities. If so, it's a happy byproduct of the now antique but still viable process. The production and playback of hi-rez digital files also exhibit consistent artifacts—subtle ones, compared to the in-your-face aberrations that at one time made listening to digital audio so unpleasant for many of us.

Regardless of their resolution, PCM or DSD, the most consistently audible artifact or deviation from "reality" I heard in all of the files I listened to through the Nyquist and through other DACs I've auditioned was a subtle, plasticky texture that produced a somewhat polite, smoother-than-real sound. Gone, though—at least with the best recordings—were the grain, glare, etch, and spatial flatness that made listening to digital music a must to avoid. The Nyquist's tubed output, and whatever else Brinkmann has engineered into it, made listening to older CDs less objectionable, without choking the air and impressive spatial qualities audible in the latest hi-rez digital recordings.

The Nyquist's sound was smoother and more liquid overall, and somewhat warmer in the midbass, than that of the solid-state Simaudio Moon Evolution 780D[3] and dCS Vivaldi[4] DACs, both of which I've reviewed. If the aim was overall listenability, perhaps at the expense of extracting the last molecule of detail, Helmut Brinkmann's fine-tuning has been deftly accomplished.

While those who like a lean, tight, clean sound might find the Nyquist too soft and warm—even those who would happily sink into its rich, relaxing reproduction of the 24/96 versions of such classic albums as Cannonball Adderley's *Somethin' Else* (Blue Note BST 1595). Miles Davis's opening blats on muted trumpet in "Autumn Leaves" should be exclamatory and brash, but not painfully so, and the sound should mellow out when he lays down the melody. When Adderley enters, his breathy improv around the melody should give you a solid alto sax cushioned in reverb.

Older CD transfers get this all wrong. The most recent 24/96 transfer of this essential album's mono mix presents it better than I've ever heard it in digital. (Though when I just want to listen to the music, I'll always play the LP.) The Nyquist's rendering was flattering to this recording and to every Blue Note file I played, if not the last word in detail retrieval.

As long as Brinkmann says he used his turntables as benchmarks in voicing the Nyquist, let me ask: What do you want from your DAC: Koetsu-like richness and warmth, Lyra-like linearity and detail, or something in between?

For instance, when I played James Taylor's cover of Carole King's "You've Got a Friend," from his *Mud Slide Slim and the Blue Horizon* (LP, Warner Bros. 2561), through a Lyra Atlas SL or Ortofon A95 cartridge and the CH Precision P1 phono preamp, it didn't sound as warm and full-bodied as did the MQA version through the Nyquist. I'd never before heard Leland Sklar's bass sound so voluptuous, or Taylor's voice so mellifluous, honey-coated, and round-bodied as it did digitally, through the Nyquist.

The same was true of "My Home Is in the Delta," from Muddy Waters's *Folk Singer*—also an MQA file. The guitar and drums are in greater relief and with better articulation of transients on a vinyl reissue (LP, Chess/Analogue Productions AAPB 1483-45) but would probably not be so when using a Koetsu or other warm-sounding cartridge.

I'm agnostic about DSD *vs* PCM. I have thousands of SACDs but currently no SACD player that works. The Nyquist handled well the few

3 See www.stereophile.com/content/moon-simaudio-evolution-780d-da-processor.

4 See www.stereophile.com/content/dcs-vivaldi-digital-playback-system.

DSD files I had on hand, producing the smooth, spacious top end DSD enthusiasts prefer and that some detractors consider an artifact of noise shaping. The DSD-*vs*-PCM divide is a crack in the sidewalk compared to the Grand Canyon of analog-*vs*-digital. I'm not jumping in!

Nor am I a headphone guy (other than on airplanes), so I can't compare the Nyquist with other headphone amps—but through my AKG K 701 'phones, which are on the analytical side, it had a pleasingly rich yet detailed sound.

Power Cord Sound

But this battleground I *will* step into: Swapping out power cords produced major differences in the sound. No wonder Brinkmann tuned his own power cord to supply with the Nyquist. Unfortunately, the second sample of the Nyquist didn't include Brinkmann's cord. Instead, I compared Dynamic Design's Neutron 16 power cord, specifically designed for digital audio ($7500), with the digital version of Shunyata Research's ZiTron Sigma ($2138). While the Shunyata's slightly warm sound complements solid-state DACs like the Simaudio Moon Evolution 650D and 780D DACs, the Dynamic Design's more open, crystalline sound proved the ideal match for the Nyquist. Is it worth spending $7500 on an active, shielded power cord for use with an $18,000 DAC—or any DAC, for that matter? That's for you to answer.

Conclusions

Brinkmann Audio's Nyquist DAC is a thoroughly modern, full-featured, modular streaming DAC that's compatible with MQA and Roon and can decode in full resolution whatever you throw at it. Roon's compatibility with Tidal means that the possibilities of streaming music at CD resolution and higher are virtually limitless.

The Nyquist's tubed output gives it a particular sonic personality, though it's subtly drawn to produce a rich, pleasing picture, not one that's overly warm or sloppy on bottom.

I suspect that John Atkinson's measurements will show that the noise floor of the Nyquist's tubed output stage, though inaudible as hiss, allows less than full resolution of hi-rez files. But for those interested in a rich, involving experience of *music*, regardless of the numbers—and especially analog folks who find themselves interested in the world of easily obtained, superb-sounding hi-rez music now available via digital—the Nyquist would look and sound right at home next to a turntable. ■

ASSOCIATED EQUIPMENT

Analog Sources Continuum Audio Labs Caliburn turntable & Castellon stand; Kuzma 4Point, SAT tonearms; Lyra Atlas & Atlas SL & Etna & Etna SL, Ortofon Anna & A95, Miyajima Labs Zero (mono) & Madake cartridges.
Digital Sources Audio Alchemy DDS•Pro CD transport; Moon by Simaudio Evolution 780D DAC; Lynx Hilo A/D-D/A converter; Meridian Sooloos Digital Media System; MacBook Air running Roon, Pure Vinyl, & Vinyl Studio software.
Preamplification Ypsilon MC-10L & MC-16L step-up transformers; CH Precision P1, TruLife Argo, Ypsilon VPS-100 phono preamplifiers.
Power Amplifiers darTZeel NHB-458 monoblocks.
Loudspeakers Wilson Audio Specialties Alexandria XLF & Alexx.
Cables Interconnect: Snake River Audio Boomslang S/PDIF, Stealth Sakra & Indra, TARA Labs Zero Evolution & Zero & Air Evolution, Teresonic Clarison Gold, Wireworld Platinum Eclipse. Speaker: TARA Labs Omega EvolutionSP, Wireworld Platinum Eclipse 7. AC: AudioQuest high-current (unnamed), Shunyata Research Sigma Analog & Sigma Analog HC & Sigma Digital ZiTron.
Accessories AudioQuest Niagara 7000, Shunyata Research Denali power conditioners; Oyaide AC wall box & receptacles; ASC Tube Traps; RPG BAD & Skyline & Abffusor panels; Stillpoints Aperture Room panels; Synergistic Research UEF products (various); Symposium Ultra platform; Finite Elemente Pagode, HRS Signature SXR, Stillpoints ESS stands; Audiodharma Cable Cooker; Furutech record demagnetizer; Furutech deStat; Audiodesksysteme Gläss Pro, Loricraft PRC4 Deluxe record-cleaning machines.—**Michael Fremer**