JASON VICTOR SERINUS

Métronome Technologie AQWO

SACD/CD TRANSPORT AND D/A PROCESSOR

In an era when polar opposites compete as absolutes, it can be a challenge to acknowledge the different and equally valid ways in which audiophiles approach musical truth. But the reality is that our perceptions of how reproduced music should sound are determined, to a large extent, by how we approach the live experience. For live acoustic performances, some of us prefer a direct, up-close sound, where highs are most vibrant, the spatial nature of sounds is most distinct, swells in volume can sometimes seem assaultive, and detail is most easily perceived. Others would rather sit farther back or in the top balcony, where highs mellow out while lower octaves remain strong, and the resonance of the performing acoustic adds warmth and glow to the musical experience. The collective skill of the architects and acousticians who designed our favorite halls, as well as the background noise created by air circulation equipment, also play a large part in the formulation of our sonic expectations.

What impressed most were not individual details but rather the collective impact.

Amplified music, regardless of genre, can be an entirely different ballpark—hey, concerts often take place in stadiums and arenas where distance from speakers and stage, as well as the quality of amplification, are crucial to our expectations. Do the speakers distort or the woofers predominate when everyone starts playing at once? Is the sound system maximally colorful, or does it have a high noise floor that lends a gray patina to everything? What microphones are they using? Are the

SPECIFICATIONS

c|AQWO DAC
Description D/A processor with switchable tube output and outboard power supply. Inputs: 2 S/PDIF (RCA), 2 AES/EBU (XLR), 2 optical (TosLink), I2S (HDMI), USB (44.1 to 384kHz, DSD up to 22.5MHz). Analog outputs: XLR balanced, RCA single-ended. Sample rates: 44.1 to 384kHz, DSD up to 22.5MHz on I2S (HDMI) and USB, 44.1 to 192kHz on S/PDIF (RCA), AES/EBU (XLR), optical (TosLink). Output voltage: 1.4/2.5/3.0V RMS. Output impedance: 100 ohms. Power consumption: 90VA.
Dimensions 16.93" (430mm) W × 4.72" (120mm) H × 16.54" (420mm) D. Weight: 26.5lb (12kg). Elektra power supply: 16.93" (430mm) W × 3.15" (80mm) H × 16.54" (420mm) D. Weight: 30.9lb (14kg).
Finish Silver, Black.
Serial number of unit reviewed C|A003.
Price $26,000.

t|AQWO TRANSPORT
Description Top-loading, dual-laser, upsampling/resampling SACD/CD transport with outboard power supply and remote control. Digital outputs: 1 S/PDIF (RCA), 1 AES/EBU (XLR), 1 optical (TosLink), I2S (HDMI). Power consumption: 50 VA
Dimensions 16.93" (430mm) W × 4.72" (120mm) H × 16.54" (420mm) D. Weight: 29.1lb (13.2kg). Elektra power supply: 16.93" (430mm) W × 3.15" (80mm) H × 16.54" (420mm) D. Weight: 30.9lb (14kg).
Finish Silver, Black
Serial number of unit reviewed T|A014.
Price $24,000.
Approximate number of US dealers: 10. Warranty: 2 years parts and labor.

Manufacturer
Métronome Technologie, Kalista Audio, ZA Garrigue Longue, 81600 Montans, France.
Tel: (33) (0)5-34-26-11-33, (0)7-77-22-44-03.
Web: kalista.audio.
US distributor: Wynn Audio, 20 Wertheim Court, Unit 31, Richmond Hill, Ontario L4B 3A8, Canada.
Web: wynnaudio.com.

PHOTOS: MÉTRONOME TECHNOLOGIE

sound engineer's ears intact, or have they been irreparably damaged from years of working with loud bands? Anyone who regularly attends live concerts has experienced what happens when the sound engineer sits under the balcony or at the very back of the performance space and calculates tonal balance (and volume!) on something very different than what those up front hear.

As someone who spent 10 years living in East Oakland, where my next-door neighbors on both sides spent hours ogling cars with the biggest bumper-shaking woofers in the hood, I know that some people consider heavily inflated, out-of-control bass the norm. To them, the mightiest audiophile speakers would seem ridiculously inadequate and far too tame.

All these thoughts came into play as I approached Métronome Technologie's unquestionably musical new AQWO SACD/CD-playing system, which combines their c|AQWO digital-to-analog converter ($26,000) and t|AQWO upsampling/resampling SACD/CD transport ($24,000). This is equipment in a price range attainable only, or mostly, by those who can afford to sit in any seat in the house. The c|AQWO is in the same price range as my two reference DACs, the dCS Rossini digital-to-analog converter ($24,000) and the (recently upgraded) EMM Labs DV2 integrated digital-to-analog converter ($30,000). Ditto the t|AQWO: Its US price is very close to that of my reference dCS Rossini upsampling CD/SACD transport ($23,500), which even uses the same Denon/Marantz CD/SACD mechanism. Typically, I pair both Rossini units with the Rossini Clock ($7500), which increases the price of the dCS system. Similarly, for file playback, I pair the EMM Labs DV2 with both the dCS Network Bridge ($4750) and the Rossini Clock, which increases *that* system's price. And then there's the price of all the cabling that powers and connects those units, which amounts to enough live-performance series subscriptions to last multiple lifetimes.

Speaking of price: While the c|AQWO lacks a volume control and must be paired with either a line-level preamp or an integrated amplifier—I used the Audio Research Reference 6 preamp ($15,000)—the Rossini and DV2 DACs include excellent volume controls and can be used *without* a preamp. To level the playing field when comparing the three DACs, after setting the Rossini and DV2's volume controls to 0dB and effectively removing them from the signal path, I used the Ref 6 to control volume.

Even as my head was spinning from trying to calculate the ultimate cost of each setup, I realized that, while switching between three DACs and two transports, consistency of methodology and setup was essential for a fair review. Equally important was ensuring that, as I moved cables back and forth, I took care to move the right set. Only once did I blithely connect the Rossini to my reference D'Agostino Progression monoblocks while the volume was turned all the way up. Happily, I reacted quickly

MEASUREMENTS

I measured the Métronome t|AQWO and c|AQWO using my Audio Precision SYS2722 system (see the January 2008 "As We See It"[1]), making sure that the transport and the processor were each powered from the appropriate Elektra power supply. Although the c|AQWO offers choices of six different reconstruction filters, three different output levels, tube or solid-state circuitry, and both balanced and unbalanced outputs, except when I say otherwise, the measurements were performed from the balanced solid-state outputs set to the highest level, with the Sharp Roll-off filter.

Looking first at the t|AQWO transport, its error correction was one of the best I have encountered—there were no glitches in its output until the gaps in the data spiral on the Pierre Verany Digital Test CD reached 2.5mm in length. (The Compact Disc standard, the so-called Red Book, requires only that a player cope with gaps of up to 0.2mm.)

Turning to the c|AQWO, the optical and coaxial S/PDIF inputs and the AES/EBU inputs locked to datastreams with sample rates up to 192kHz. Apple's USB Prober utility identified the processor as "Combo384 Amanero" from "Amanero Technologies" and indicated that the Métronome's USB port operated in the optimal isochronous asynchronous mode. Apple's Audi MIDI utility revealed that, via USB, the c|AQWO accepted 32-bit integer data sampled at all rates from 32 to 384kHz.

With the output set to 3V, a 1kHz tone at 0dBFS resulted in balanced output levels of 5.92V, solid-state, and 6.03V, tube, into 100k ohms. The unbalanced, solid-state output level was 3.04V, which suggests that the output level labeling in the touchscreen menu is based on the single-ended output. This was confirmed by examining the other output levels. With it set to 2.5V, the unbalanced output was 2.49V, the balanced 4.98V, and with it set to 1.4V, I measured 1.4V, unbalanced, and 2.8V, balanced. While the solid-state output preserved absolute polarity at all three level settings, the tubed output inverted polarity.

The balanced output impedance in solid-state mode was 195 ohms at 20Hz and 1kHz, dropping to 174 ohms at 20kHz. In tubed mode, the balanced output impedance was a high 1440 ohms at 20Hz, reducing slightly to 1326 ohms in the midrange and treble. The unbalanced tube-mode output impedance was a low 215 ohms at 20kHz,

1 See stereophile.com/content/measurements-maps-precision.

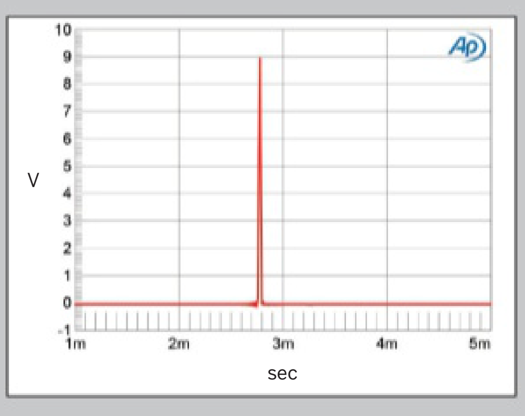

Fig.1 Métronome c|AQWO, Super Slow Roll-Off filter, impulse response (one sample at 0dBFS, 44.1kHz sampling, 4ms time window).

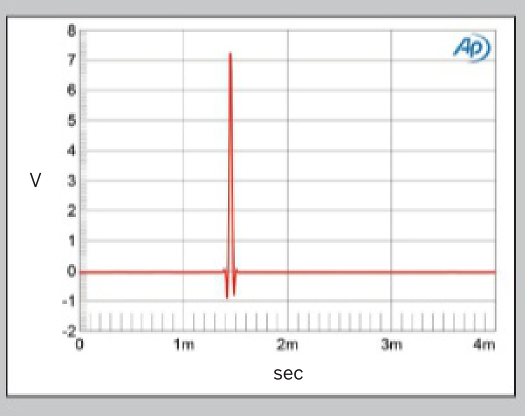

Fig.2 Métronome c|AQWO, Slow Roll-Off filter, impulse response (one sample at 0dBFS, 44.1kHz sampling, 4ms time window).

enough to be able to laugh at my mistake and continue with this review.

The Métronome story

Métronome Technologie was founded in 1987 by Dominique Giner, a woodcrafter and hi-fi lover who registered the company in 1992. The name derives from Giner's first bookshelf loudspeaker, the 15.75"-high MT1, which was shaped like a métronome.

The company's first "official" products were CD players, which Giner developed in partnership with French company Jadis. Métronome remained small until 2002, when the eye-catching looks of their first "Kalista by Métronome" CD transport brought them global notoriety. In 2013, Giner sold the company to Jean Marie Clauzel, who retained the company's engineering team after Giner retired as product designer two years later.

"Because I was trained by him, I feel quite confident designing the new products," Clauzel told me at the start of a Skype conversation that included Wynn Wong of North American distributor Wynn Audio. "I'm not an electrical engineer, but I love music, and have people with me in the design office. Before Métronome, I was mostly in agriculture—I'm an agronomist. It was quite a challenge to move into electronics, but it has enabled me to [be reborn]. It's also a change to have clever people around me, because me alone, I'm not like the big people in the industry, like Dan D'Agostino and many others. I'm not able to do things by myself. It's really teamwork."

Since Clauzel came on board, every Métronome product has been "renewed." First came the Kalista line, which was augmented with streaming and network products. Métronome's AQWO, Classica, and Digital Sharing lines followed suit.

After trying in vain to figure out what the letters "AQWO" might stand for, I asked Clauzel. "I imagined the name AQWO when I was designing this new range of products," he replied by email. "I definitely wanted to stop using names composed entirely of letters and figures

measurements, continued

rising slightly to 224 ohms at 1kHz and to a still-low 267 ohms at 20Hz.

The six digital reconstruction filters are labeled Sharp Roll-Off, Slow Roll-Off, Super Slow Roll-Off, Short Delay Sharp Roll-Off, Short Delay Slow Roll-Off, and Low Dispersion Short Delay. The Sharp Roll-Off filter had a conventional time-symmetrical, linear-phase impulse response with 44.1kHz data (not shown). With the Super Slow Roll-Off filter selected, which was one of the filters JVS had preferred in his auditioning, the Métronome's impulse response was a time-perfect pulse (fig.1). The Slow Roll-off filter, which JVS also liked, was a linear-phase type but with just one cycle of pre- and post-ringing (fig.2). The Short Delay Sharp Roll-Off and Short Delay Slow Roll-Off filters are respectively long and short minimum-phase types (not shown), while the Low Dispersion Short Delay filter, which JVS liked with some recordings, was a hybrid type (fig.3), similar to what some Stereophile reviewers have preferred with other DACs.[2]

With 44.1kHz-sampled white noise (fig.4, red and magenta traces), the Métronome's response with the Sharp Roll-Off and Short Delay Fast Roll-Off filters did indeed offer a fast rolloff above the audioband, though full stop-band attenuation was delayed by one and a half octaves by a peculiar sculpting of the ultrasonic noise floor. While the third harmonic of a full-scale 19.1kHz tone can be seen at –60dB (0.1%), the aliased image at 25kHz of this tone (blue and cyan traces) is suppressed by 100dB. The shaped

2 See, for example, fig.6 at https://tinyurl.com/y4ts9kf8.

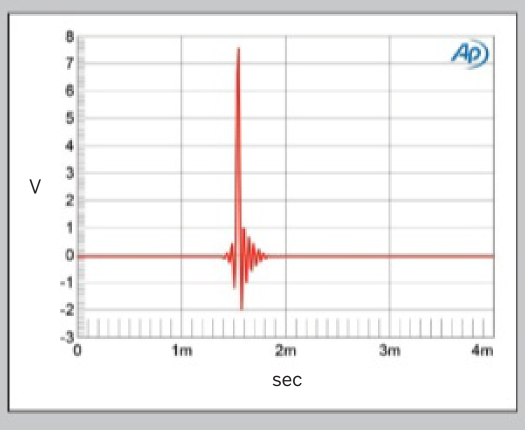

Fig.3 Métronome c|AQWO, Low Dispersion Short Delay filter, impulse response (one sample at 0dBFS, 44.1kHz sampling, 4ms time window).

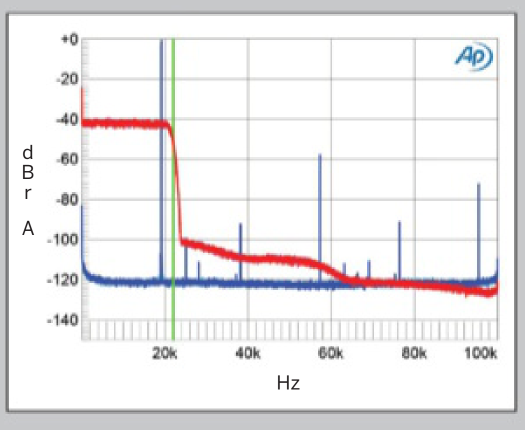

Fig.4 Métronome c|AQWO, Sharp Roll-Off filter, wideband spectrum of white noise at –4dBFS (left channel red, right magenta) and 19.1kHz tone at 0dBFS (left blue, right cyan) into 100k ohms with data sampled at 44.1kHz (20dB/vertical div.).

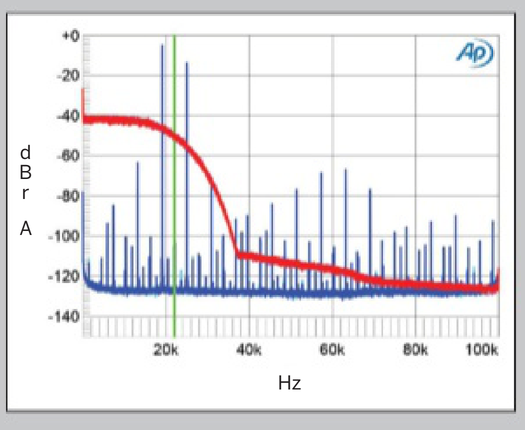

Fig.5 Métronome c|AQWO, Slow Roll-Off filter, wideband spectrum of white noise at –4dBFS (left channel red, right magenta) and 19.1kHz tone at 0dBFS (left blue, right cyan) into 100k ohms with data sampled at 44.1kHz (20dB/vertical div.).

(CD-something…). The idea came when I was thinking about what's most important: listening to music. I liked the ancient Greek verb ἀκούω (akoúô), which sounded good in all languages. I just needed to write it differently, and ἀκούω became AQWO."

When an online translation engine translated ἀκούω as "I hear," I asked Clauzel if the definition was correct. "Absolutely," he said. "But in these ancient languages, the verb has a larger meaning, as in the sense of listening, understanding, and being able to analyze what you hear."

I also queried Clauzel about his favorite music: After all, if a product cannot play its designer's favorite tracks in a manner he deems acceptable, it is not a success. "I'm stuck in the '70s. I listen to a lot of progressive rock, which a lot of people consider second-class music. One of my favorite bands is Queen, but I also listen to Genesis and Pink Floyd. I like music that people sometimes made when they were not in the real world." Asked for favorite tracks and albums, he mentioned Pink Floyd's *Wish You Were Here*, Genesis's *Foxtrot* and *The Lamb Lies Down on Broadway*, and "everything by Queen." He's also a big fan of French singers "who are not well known in the West," including Jacques Higelin, Étienne Daho, and -M-.

Whys and wherefores

Because it's virtually impossible to discern the sound of a new component unless it's the only thing you change in a familiar reference setup, *Stereophile* customarily evaluates only one product per review. But in the Métronomes' case, the t|AQWO transport and c|AQWO DAC rightfully belong in the same review because the transport only outputs DSD and the highest resolutions of PCM via HDMI I^2S (sometimes called IIS), and the c|AQWO has an I^2S[1] over HDMI input. The t|AQWO also has AES/EBU, S/PDIF (RCA), and TosLink outputs, but they are limited to 24/192 PCM and do not carry DSD. If you want to play the hi-rez layer of an SACD, upsample/resample an SACD (DSD64) up to DSD 256 or PCM 24/384, or upsample/resample a Red Book CD (16/44.1 PCM) to either 24/384 PCM or DSD128, you must use the transport's HDMI output.

Neither of my reference DACs—the dCS Rossini or the EMM Labs DV2—has an HDMI port. Nor do DACs from CH Precision, T+A, MSB, Esoteric, and, in very different price categories, Mytek and Benchmark. Some of these companies manufacture transports that can connect to their DACs via proprietary links, but Clauzel prefers a nonproprietary solution.

The AQWO components, then, can be thought of as a CD player/DAC combo that happens to be in two boxes instead of just one (or four including the power supplies). I—and Editor Jim Austin—believe that pairing the t|AQWO and c|AQWO in a single review makes sense.

When questioned about the decision to only send hi-rez PCM and DSD via HDMI I^2S, Clauzel responded, "Trans-

1 My sincere thanks to Nordost for the loan of a Valhalla 2 HDMI cable.

ultrasonic noise floor can also be seen in the response with 44.1kHz-sampled white noise and the Slow Roll-Off and Short Delay Slow Roll-Off filters (fig.5, red and magenta traces). As can be anticipated from the names of these filters, many aliased images of the 19.1kHz tone are visible. The latter was also the case with the Super Slow filter, which offered very little suppression of both images and ultrasonic noise, accompanied by sharply defined nulls at 44.1kHz and 88.2kHz (not shown). With the Low Dispersion Short Delay filter, the c|AQWO's initial rolloff was quick (fig.6) and the aliased image at 25kHz of the high-frequency tone was suppressed by 46dB.

With the two Slow Roll-off filters and 44.1kHz data, the c|AQWO's frequency response was flat up to 10kHz, but down by almost 5dB at 20kHz (fig.7, green and gray traces). The output extended a little higher with data at 96 and 192kHz (cyan, magenta, blue, and red traces), lying at –0.75dB at 20kHz. The response with the Sharp Roll-Off filters followed the same basic shape at all three sample rates (fig.8), but with a sharp rolloff above half of each sample rate. JVS had commented that with the tubes in circuit, there was "a modest diminution of bass slam and less response in the lower octaves." Fig.9 shows the response with 44.1kHz data with the tubed output. (Note the expanded vertical scale compared with figs.7 and 8.) There is indeed a small shelving down of the low frequencies, and the excellent channel matching with the solid-state output has been slightly compromised.

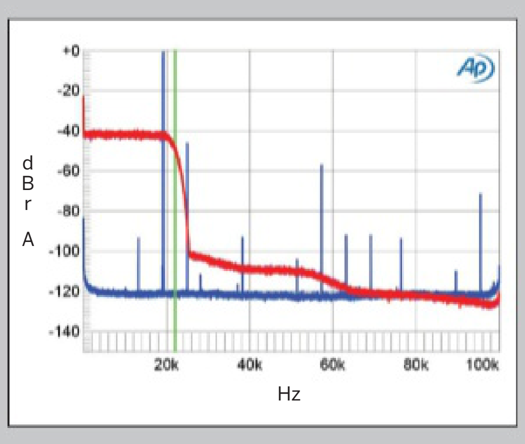

Fig.6 Métronome c|AQWO, Low Dispersion Short Delay filter, wideband spectrum of white noise at –4dBFS (left channel red, right magenta) and 19.1kHz tone at 0dBFS (left blue, right cyan) into 100k ohms with data sampled at 44.1kHz (20dB/vertical div.).

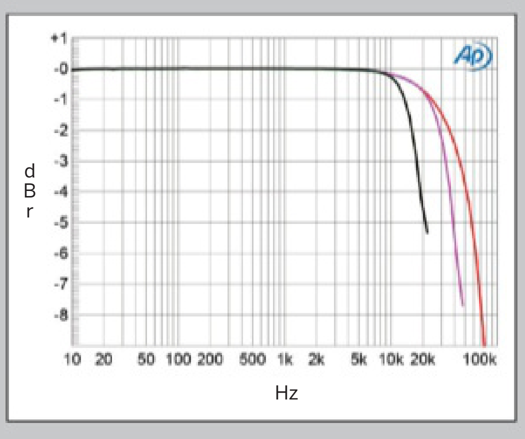

Fig.7 Métronome c|AQWO, Slow Roll-Off filter, frequency response at –12dBFS into 100k ohms with data sampled at: 44.1kHz (left channel green, right gray), 96kHz (left channel cyan, right magenta), 192kHz (left blue, right red) (1dB/vertical div.).

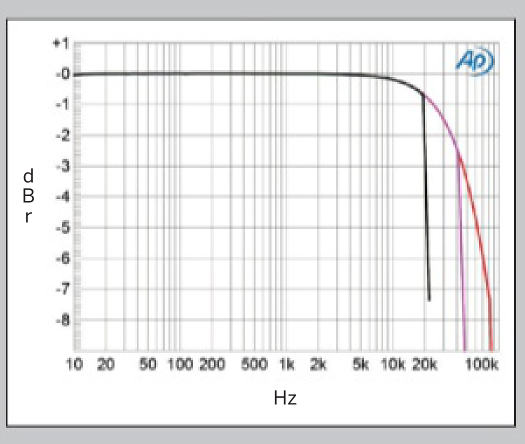

Fig.8 Métronome c|AQWO, Sharp Roll-Off filter, frequency response at –12dBFS into 100k ohms with data sampled at: 44.1kHz (left channel green, right gray), 96kHz (left channel cyan, right magenta), 192kHz (left blue, right red) (1dB/vertical div.).

porting DSD needs either USB, HDMI or more complex solutions like dual AES[2]. We thought HDMI would be very efficient, robust, and simple. We know that audiophiles aren't very fond of HDMI, but our object was to make a transport and DAC that would fit together without adding a proprietary link between them because we want people to be able to use our transport with another converter. If our customers require that we adapt [because their DACs don't have HDMI ports], we will. If we have to do double AES, we will. But we'll see what happens. For me, HDMI/ I²S is the simple and efficient way to transport multi-information signals, and robust enough to transport the highest hires files like DSD. I also chose I²S to keep the signal native as much as possible on its way to the DAC, since I²S is the output format of the SACD mechanism."

The top-loading t|AQWO transport offers optional upsampling, but the c|AQWO is, in Clauzel's words, a "pure" DAC with no upsampling features. Because the DAC's two Japanese-sourced AKM AK4497 chips (one per channel) are capable of upsampling, and can decode up to PCM 32/768 or DSD512 (8×DSD), I asked Clauzel why he nixed upsampling in the DAC.

"We could have easily put an [upsampling] module in the c|AQWO as well as the t|AQWO," he acknowledged by email. "It's my personal choice to implement the function only in the transport, and to limit data in the D/A converter to the format in which it enters. My way of thinking is that in the DAC box, nothing should happen other than signal conversion from digital to analog."

The c|AQWO offers the option to process its signal through two Philips NOS JAN 6922 tubes for those desiring what Clauzel described as a "quite neutral" tube-like effect. "I like tubes when their effects are nice and delicate," he said. "I've kept the difference between the two outputs slight because I don't want to have a cathedral effect or something that strong. If customers want a stronger tube effect, they are of course allowed to change the tubes." To engage the tube output stage, users depress a small tube icon on the lower left of the DAC's touch-screen display.

The c|AQWO lacks streaming features, is not a Roon endpoint, and does not decode or render MQA. About MQA, Clauzel said, "I think MQA is mostly important for streaming and network playing. Our streamers do it, but for a top-of-the-range converter, the quality is so high that I ask, 'Why MQA? Why should we use a codec that creates smaller files when our processors can easily handle the large files?' Maybe I'm wrong, but this is my way of thinking. I don't think MQA would make very much difference on our top-of-the-line products."

In addition to HDMI I²S, the c|AQWO has USB, AES/EBU, S/PDIF, and optical inputs. There's no Ethernet port, but that seems to be the case with many DACs, includ-

2 dCS DACs and some Aurender servers use dual AES for high-resolution data transmission.

measurements, continued

Returning to the solid-state behavior, the Métronome processor's channel separation was superbly high, at >115dB in both directions below 10kHz. The low-frequency noise floor was also very low, and the only supply-related spuriae present were 120Hz at –120dB and 880Hz (1000–120) at –110dB (fig.10, blue and red traces). However, switching the tubes into circuit (fig.10, cyan and magenta traces) increased the level of the random noise by up to 20dB and the 120Hz component now lay at –70dB. Other even-order harmonics of the 60Hz power-line frequency are also now visible.

When I switched off the tubes and increased the bit depth from 16 to 24 with a dithered 1kHz tone at –90dBFS (fig.11), the random noise floor dropped by 26dB, meaning that the c|AQWO offers at least 20 bits' worth of resolution. With undithered data representing a tone at exactly –90.31dBFS, the three DC voltage levels described by the data were perfectly resolved (not shown).

The Métronome processor offered very low levels of harmonic distortion. With a full-scale 50Hz tone, the second, third, and fifth harmonics all lay below –90dB or 0.003% (fig.12). The levels of these harmonics didn't rise by any significant amount when I replaced the 100k ohms load with 600 ohms, and while a lot of higher-order harmonics made an appearance under this condition, they all lay below 100dB. The c|AQWO's solid-state output stage is of high quality. However, the same can't be said for the tubed output stage. With the 50Hz, 0dBFS tone, the balanced output (still set at 3V) now had the third harmonic present at just –30dB (3%) and the second at –44dB (0.6%, not shown). Setting the output level to 2.5V reduced the level of the third harmonic to –40dB (1%), and setting it to 1.4V gave a further reduction

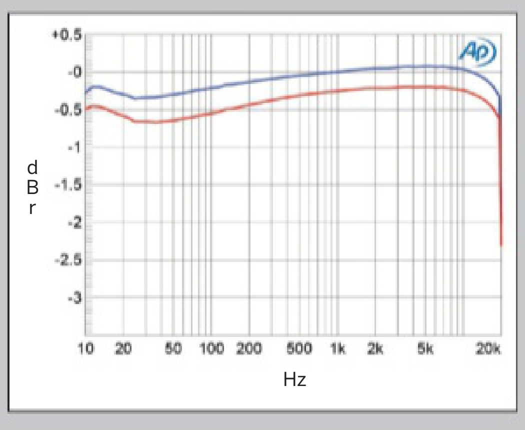

Fig.9 Métronome c|AQWO, tube output, Sharp Roll-Off filter, frequency response at –12dBFS into 100k ohms with data sampled at 44.1kHz (left channel blue, right red) (0.5dB/vertical div.).

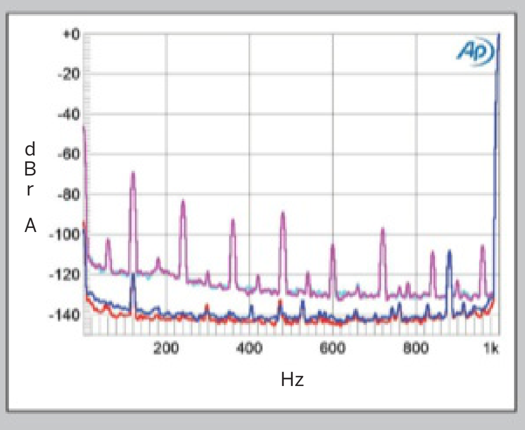

Fig.10 Métronome c|AQWO, spectrum of 1kHz sinewave, DC–1kHz, at 0dBFS into 100k ohms with solid-state output (left channel blue, right red) and tube output (left cyan, right magenta) (linear frequency scale).

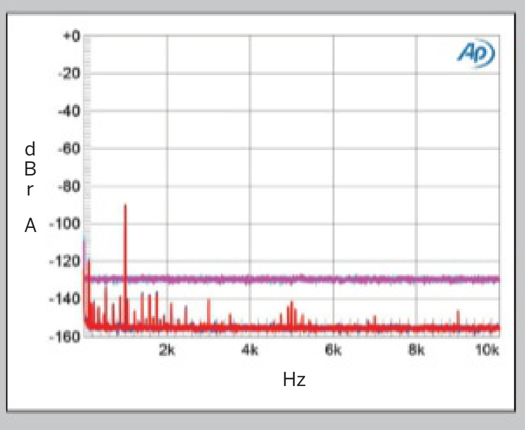

Fig.11 Métronome c|AQWO, spectrum with noise and spuriae of dithered 1kHz tone at –90dBFS with: 16-bit data (left channel cyan, right magenta), 24-bit data (left blue, right red) (20dB/vertical div.).

ing the EMM Labs DV2, that were not designed to serve as streamers. Only the c|AQWO's USB and HDMI ports can process PCM sampling rates above 192kHz or DSD. I try to avoid using computers in my reviews because they are so sonically compromised, and the only music server/streamer I own is the Roon Nucleus+. So, when streaming, I sent signal via Ethernet from the Nucleus+ to the dCS Network Bridge ($4750), which is a Roon endpoint and MQA decoder. From there, I used AES/EBU to send it to the c|AQWO. I tried both AES/EBU and S/PDIF, heard virtually no difference, and stuck with AES/EBU because it may be quieter.

The AQWO units' large touchscreen displays, which dominate their front panels, offer a choice of 11 different display colors in either "light" or "dark" theme. In addition to all the PCM and DSD upsampling options in the transport, there's a choice of six digital filters in the DAC. None of these features is accessible by the simple remote, which even lacks a program feature for the transport. Thankfully, the displays are far easier to discern from a distance than the art in the great museums of Paris, which is frequently blocked by gawking tourists who seem to think that selfies, rather than art and music, are the end-all/be-all of human existence. The displays are also far more responsive to input, which means that you won't be tempted to pick them up and throw them across the room.

Both the t|AQWO and c|AQWO are fed by their own versions of Métronome's Elektra outboard power supplies, which connect via long umbilical cords (included). The two power supplies may weigh and look the same, but their internals are different. The t|AQWO's contains three toroidal transformers with Schaffner filters and seven independent regulation lines, while the c|AQWO's supply holds four toroidal transformers with 11 independent regulation lines. Because their umbilical cords are identical, I took care to never mix them up.

Listening choices, conundrums, and joys

Because the manuals for the t|AQWO and c|AQWO were pretty rudimentary, and the products were so new that little else was available online, Wong visited to help with installation. With only two free shelves on my Grand Prix Monza eight-shelf double rack, stacking the transport and DAC atop their respective power supplies was unavoidable. As much as I wished to decouple units, power supplies and shelves, using Grand Prix Apex isolation/dissipation footers with the t|AQWO and/or its power supply would not have left enough room to access the transport's top-loading mechanism. I could easily fit three footers between the c|AQWO and its power supply, but I initially thought that placing a second set between power supply and shelf would have raised the DAC so close to the shelf above that its tubes would have lacked sufficient space for ventilation. So, where I had hoped to use four sets of footers, I made do with only one. It was only after I began enough listening tests to drive many an audiophile batty—even before Clauzel emailed to say that if stacking components was unavoidable, he advised that one "put decoupling equipment under and in between

measurements, continued

to –44dB, with the second now lying at 54dB (0.2%, fig.13). As the c|AQWO's single-ended outputs are 6dB lower in level than the balanced outputs, I repeated all these distortion tests using those outputs and all three output settings, but there was no difference in behavior.

As expected, the Métronome's intermodulation distortion varied with the digital reconstruction filter chosen. With the Low Dispersion Short Delay filter, the second-order difference product produced by equal-level tones at 19 and 20kHz with the combined waveform peaking at –6dBFS lay just below –94dB (0.002%, fig.14). However, a large number of higher-order intermodulation products are present in this graph, with the highest in level, at18kHz and 21kHz, lying at –64dB (0.03%). The aliased images of the two tones with this filter can also be seen and the levels of these images varied with the Slow Roll-Off filters, or disappeared altogether with the two Sharp Roll-Off filters. When I increased or reduced the signal level by 6dB, the intermodulation products rose or dropped by the same 6dB. However, when I switched the tubes into circuit, most of the higher-order products disappeared, even with a signal peaking at 0dBFS (fig.15), though the second-order difference product now rose to –54dB (0.2%).

When I tested the Métronome processor for its rejection of word-clock jitter with 16-bit USB data, other than the two closest to the high-level 11.025kHz tone, all the odd-order harmonics of the LSB-level, low-frequency

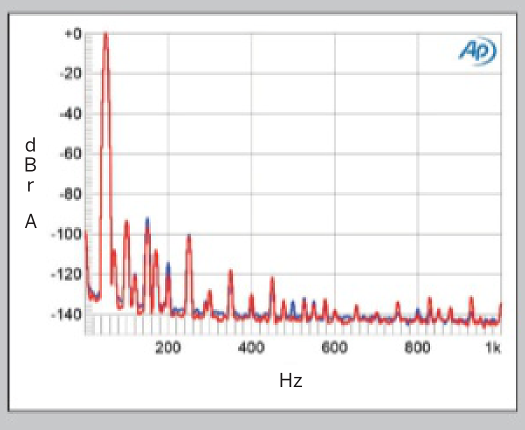

Fig.12 Métronome c|AQWO, solid-state output, 3V output level, spectrum of 50Hz sinewave, DC–1kHz, at 0dBFS into 100k ohms (left channel blue, right red; linear frequency scale).

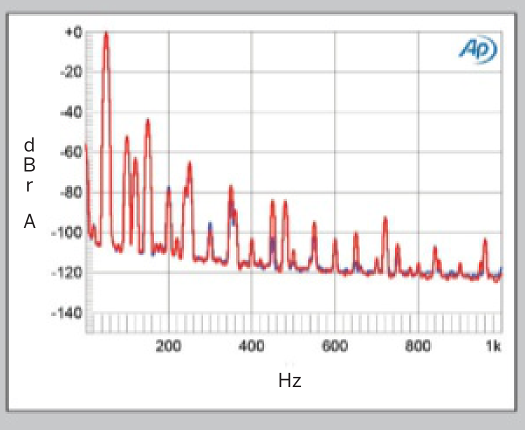

Fig.13 Métronome c|AQWO, tube output, 1.4V output level, spectrum of 50Hz sinewave, DC–1kHz, at 0dBFS into 100k ohms (left channel blue, right red; linear frequency scale).

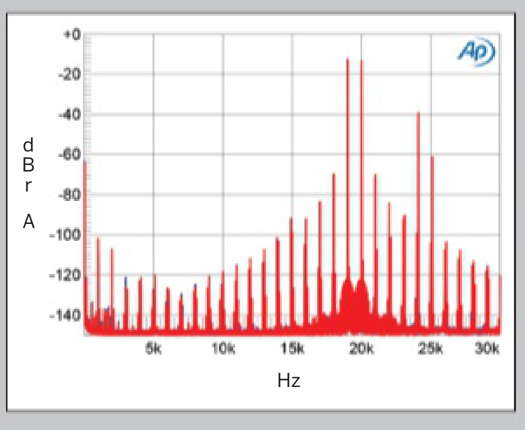

Fig.14 Métronome c|AQWO, solid-state output, Low Dispersion Short Delay filter, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 0dBFS into 100k ohms, 44.1kHz data (left channel blue, right red; linear frequency scale).

the boxes"—that I squeezed a second set of footers under the DAC's power supply.

The c|AQWO offers a choice of three analog output levels: 1.4V RMS, 2.5V and 3V RMS. In my system, 2.5 and 3V were the best match for the output levels of the dCS Rossini and EMM Labs DV2 DACs, facilitating the easiest comparisons.

Both the c|AQWO and Rossini DACs offer a choice of up to six PCM digital filters; the DV2 makes matters simple by choosing filters automatically. To my ears, the c|AQWO's "Slow Roll-off" and "Super Slow Roll-off" filters sounded most like the F2 and F3 filters that I customarily use on the Rossini for 24/96 PCM file playback. "Super Slow Roll-Off" was the sharpest-edged of the bunch, and perfect for recordings that otherwise sounded a bit flat. I loved the extra sense of space that the "Low Dispersion Short Delay" filter brought to Finnish composer Kaija Saariaho's *Ciel d'hiver* (*Winter Sky*), from her collection *True Fire • Ciel d'hiver • Trans* (ODE1309, 24/48 Flac). With this filter, the c|AQWO produced such an extraordinary sense of air, depth, and spaciness that I felt suspended in a vast multi-dimensional alternate reality. But as cool as the filter sounded on Saariaho's uniquely celestial and radiant music, it ultimately felt artificial on more grounded music by a guy named Beethoven.

Since only HDMI I^{2}S allowed me to send the DSD layer from the hi-rez layer of an SACD to the c|AQWO, I used that cable exclusively for disc playback. Upsampling decisions in the t|AQWO were less clear-cut. To maintain consistency during comparison with the Rossini transport, which upsamples PCM to either DXD, DSD, or DSD×2 (DSD128), I stuck with my preference for the Rossini, which is PCM upsampling to DXD (24/352.8). Since the Rossini leaves the DSD layer of an SACD alone, I didn't mess with DSD in the t|AQWO, either.

I spent quite some time evaluating the c|AQWO with and without its 6922 tubes in the signal path. Deciding which I preferred was tough. Using solid-state to play the "Chicago, 2012" movement from Mason Bates's *Alternative Energy*, as performed by the San Francisco Symphony and Michael Tilson Thomas on the Jack Vad-engineered hybrid SACD, *Mason Bates: Works for Orchestra* (SFS Media 0065), bass was excellent, midrange superb, air and atmosphere quite good, and the soundstage maximally wall-to-wall. Layered sounds of FermiLab's particle collider zooming back and forth beyond my speakers were quite exciting, the low grunts just what some demented doctor ordered, and the dance music as rhythmically engaging as it was musically absurd.

When I switched the c|AQWO from solid-state to tube, there was a difference. Tonal balance didn't change significantly, but the tubes' gentle kiss of warmth and roundness seemed accompanied by a modest diminution of bass slam and less response in the lower octaves. Even with music devoid of deep bass, such as Murray Perahia's performance, on piano, of Handel's Harpsichord Suite in E, HWV 430 from *Murray Perahia Plays Handel and Scarlatti* (CD, Sony Classical 62785), I felt the choice was between extra bloom and fullness in the lower octaves. Personally, I love strong but not overblown "tell it like it is" bass, but I fully understand why others will love the tube option.

As I continued to listen and go back and forth between the c|AQWO and my reference DACs, I began to get a sense of the Métronome DAC's unique sound. On "Singing Winds, Crying Beasts" from the MoFi Ultradisc UHR hybrid SACD remastering of Santana's *Abraxas* (UDSACD2152), the DAC's huge soundstage and wall-to-wall three-dimensionality were positively thrilling. When multiple instruments got going at once, I also discovered that the Métronome gear prioritizes warmth and smoothness over the extraction of every last detail on a disc or in a digital file.

Sticking with file playback allowed me to easily compare

measurements, continued

squarewave were at the correct levels (fig.16, sloping green line). A pair of supply-related sidebands at ±120Hz is present, but the noise floor is otherwise very low. Repeating the jitter test by playing a test CD with the t|AQWO transport and connecting it to the c|AQWO with an HDMI cable gave a similar result. However, when I examined the Métronome's rejection of jitter with AES/EBU and TosLink connections, the result was a large number of sidebands spaced at 120Hz (fig.17).

Other than that disappointing result, the Métronome c|AQWO did well on the test bench, at least as far as its solid-state output is concerned. The tubed output, however, suffered from what I feel are excessively high levels of noise and harmonic distortion. YMMV.—**John Atkinson**

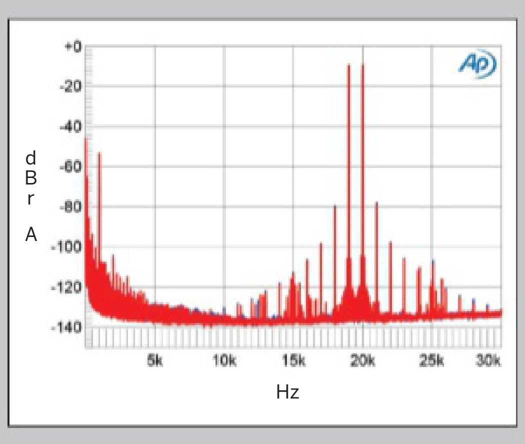

Fig.15 Métronome c|AQWO, tube output, Sharp Roll-Off filter, HF intermodulation spectrum, DC–30kHz, 19+20kHz at –6dBFS into 100k ohms, 44.1kHz data (left channel blue, right red; linear frequency scale).

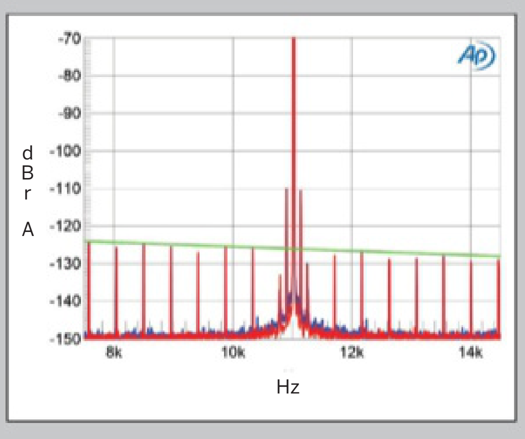

Fig.16 Métronome c|AQWO, high-resolution jitter spectrum of analog output signal, 11.025kHz at –6dBFS, sampled at 44.1kHz with LSB toggled at 229Hz: 16-bit USB data (left channel blue, right red). Center frequency of trace, 11.025kHz; frequency range, ±3.5kHz.

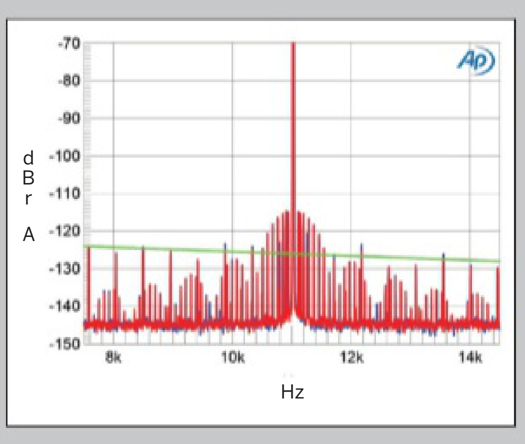

Fig.17 Métronome c|AQWO, high-resolution jitter spectrum of analog output signal, 11.025kHz at –6dBFS, sampled at 44.1kHz with LSB toggled at 229Hz: 16-bit TosLink data (left channel blue, right red). Center frequency of trace, 11.025kHz; frequency range, ±3.5kHz.

all three DACs. I began with the "Ninth of January" movement from Shostakovich's devastating Symphony No.11, "The Year 1905," as performed live by Andris Nelsons and the Boston Symphony Orchestra (24-bit/96kHz download, Deutsche Grammophon 002859502). The Roon software that I regularly use on my Nucleus+ server/streamer gives this recording a very high dynamic-range rating of 24, which is unmissable when the music shockingly shifts from depicting a heavily percussive *fff* total assault of gunfire to a near-silent landscape littered with dead bodies. Using the c|AQWO to play both this movement and the title track of Genesis's *The Lamb Lies Down on Broadway* (Tidal 16/44.1, 2007 stereo mix)—one of Clauzel's favorite albums—what impressed most were not individual details, but rather the collective impact of multiple instruments and musicians playing full out.

Guided by Clauzel's love of Queen, I turned to the title track of Freddie Mercury's over-the-top collaboration with soprano Montserrat Caballé, *Barcelona* (Tidal 24/48 MQA, 2011 remaster). I know this fabulously campy recording quite well and was drawn most to the warmth the c|AQWO brought to Caballé's voice. The newly upgraded EMM Labs DV2, on the other hand, was far less concerned with tonal glow than delivering the most nuanced, layered, and impactful bass of all three DACs in my system. On the Shostakovich, Genesis, and Freddie Mercury tracks, as well as the first movement from the San Francisco Symphony's digital-only release of Alban Berg's *Three Pieces for Orchestra* (24/192 WAV, SFS Media SFS0070), the DV2 was the low-end champ.

As I continued to audition the Métronome AQWO front end with a wide range of music—from Rickie Lee Jones's positively weird, crackly-voiced cover of the Rolling Stones' "Sympathy for the Devil" (Tidal, 16/44.1 FLAC), from her album *The Devil You Know*, to music that addressed far more celestial concerns, such as soprano Elly Ameling's rendition of Schubert's "Die Sterne" (The Stars), from the anthology *The Art of Elly Ameling* (4 CDs, Philips 473 451-2), the c|AQWO's unique strengths and tonal balance became increasingly clear. It was definitely the most "impressionistic" of the DACs I had in my system, with a nonfatiguing, easy-on-the-ears sound that some would consider analog-like and others would liken to a farther-from-the-stage experience. Emphasizing smoothness and roundness above all, its beauty and musicality were unmissable.

Conclusion

"My target is always to make people forget that they're listening to digital files," Clauzel told me the morning after the units were installed. "Some digital equipment is so detailed and so cold; it's not warm enough and not musical enough. We want a very different product, even if it has imperfections. … I prefer something that may have imperfections, but that excels in quality, musicality, and an analog feel."

Without question, Métronome's top-of-the-line t|AQWO upsampling/resampling transport and c|AQWO DAC achieve the company's goals. If you're looking for an excellent transport and DAC, by all means make the effort to spend some time with the AQWO front end. With optimal setup, they may very well deliver the sound you long for. ■