JASON VICTOR SERINUS

dCS Rossini Apex DAC

D/A PROCESSOR

The text, from Gary Bruestle, a speaker-positioning wizard at Definitive Audio in Seattle, left my mouth watering: "Have you heard the Apex version of a Rossini or Vivaldi yet? It's stunningly good. Addictive, even. … I usually have a hard time relaxing and listening to music in the showroom, but the Rossini Apex DAC had me in its thrall for a few hours yesterday."

Soon thereafter, I heard from Peter McGrath, Wilson Audio's director of sales, that he was blown away by the sound of his dCS Vivaldi Apex DAC—the flagship DAC from Data Conversion Systems (dCS) of Cambridge, England. Nor was dCS exactly shy when it proclaimed, in its March 3, 2022, press release, that the Apex version of its Ring DAC was "taking the Ring DAC's world-leading performance to a new level."

When Gary told me, during the phone chat that followed his text, that he believed the Apex DAC raised the Rossini's bass response to that of the Vivaldi, I sat up in my seat. For the year the top-of-the-line Vivaldi DAC sang in my system, I reveled in its expansive soundstage, bigger, weightier, more lifelike images, and superior presentation of texture, overtones, and bass. It got me as close to the live-performance experience as I could get with medium-size floorstanders in a medium-size listening room. Might the Rossini Apex be capable of transporting me as close or closer?

Developing the new Apex Ring DAC hardware necessitated examining each component of the technology to see what could be improved.

My chance to find out came just a few months later, when a Rossini Apex DAC arrived for review. But before I began my audition, I sought to clarify what was going on inside the DAC's chassis.

The Ring DAC foundation

In a YouTube video titled *dCS—The New Ring DAC Apex*,[1] Chris Hales, dCS's director of product development, says, "With the Ring DAC, we're sitting somewhere in the sweet spot between absolute [voltage] precision and timing accuracy." The choice of filter—the Ring DAC includes six for PCM, four for DSD, and one for MQA—determines where you sit in that delicate balance. In a follow-up email, Hales noted, "Whilst the filter choice can affect the listening experience, it doesn't affect the operation of the

1 See youtu.be/tZEKEYniLTo. John Giolas and Rachael Steven conducted the interviews and collaborated on the story and editing.

Ring DAC itself, which remains extremely linear whichever filter is selected."

dCS's technical director, Andy McHarg, whose vision drove the Apex project, said that developing the new Apex Ring DAC hardware necessitated examining each component of the technology to see what could be improved. "Marginal gains mount up over time,"[2] he says in that video.

The Apex edition of dCS's Rossini and Vivaldi systems is based on a reconfigured Ring DAC circuit board with an all-new analog output stage. The challenge dCS faced as it developed the Ring DAC Apex, Hales said, was the inability of conventional test equipment to measure the Apex's performance values with sufficient accuracy. In an email, dCS VP of Sales and Marketing John Giolas wrote, "the linearity of our DACs is so [much higher than] the industry norm, we've had to create our own test equipment to measure it. Conventional test equipment is wholly inadequate to measure what our DACs are capable of.

"Audio measurement systems [can] introduce noise, or distor-

2 A similar sentiment was expressed by Nuno Vitorino, director of research and development at Innuos, who wrote in an email to me and Editor Jim Austin, "It's the sum of a very large number of small improvements on the source that end up providing a very audible benefit."

SPECIFICATIONS

Description Upsampling Network D/A processor with volume control and remote control. Roon Ready and compatible with AirPlay, Spotify Connect, and UPnP. Streaming from Tidal, Qobuz, Deezer, and internet radio. File playback of PCM, DSD, and MQA from NAS, external drive, or USB stick via dCS Mosaic Control app or other playback software. Automatic upsampling to DXD, DSD64, or DSD128. Filters: 6 for PCM, 4 for DSD, 1 for MQA. Digital inputs: Network (Ethernet RJ45) accepts up to PCM 24/384 and DSD128 in DFF or DSF format; USB-B 2.0 accepts up to 24/384 and DSD128 in DoP format; USB-A accepts up to 24/384 and DSD128 in DFF/DSF format; 2 × AES3 inputs on 3-pin female XLR connectors accept up to 24/192 PCM and DSD128 in DoP format; one Dual AES pair accepts from 24/88.2–384 and DSD128 in DoP format; 1 × S/PDIF (RCA) accepts up to 24/192 and DSD64 in DoP format; 1 × S/PDIF (BNC) accepts up to 24/192 and DSD64 in DoP format; 1 × S/PDIF optical (TosLink) accepts up to 24/96 PCM. Full decoding and rendering of MQA from network and USB2 ports. RS232 interface. Analog outputs: 1 pair balanced (XLR), 1 pair single-ended (RCA). Output levels: selectable 0.2V, 0.6V, 2V, 6V RMS. Output impedance, XLR: 3 ohms. Output impedance, RCA: 52 ohms. Minimum load: 600 ohms (10k–100k ohms recommended). Word Clock inputs: BNC, accepts standard Word Clock at 44.1, 48, 88.2, 96, 176.4, or 192kHz; data rate can be the same or an exact multiple. Word Clock output: BNC. Upsampling to DXD, DSD64, or DSD128. Residual noise for 24-bit data: Better than –113dB, 20Hz–20kHz unweighted at 6V output setting. L/R crosstalk: <–105db, 20Hz–20kHz. Power consumption: 23W (typical), 28W maximum.
Dimensions 17.5" (444mm) W × 5" (125mm) H × 17.2" (435mm) D. Weight: 34.3lb (15.6kg).
Finish Silver or Black.
Serial number of unit reviewed RSD59579. Manufactured in the UK.
Price $32,800. dCS-installed Apex upgrade: $9000. Approximate number of dealers: 24. Warranty: 3 years, parts & labor, for original owner, from date originally shipped from dCS.
Manufacturer dCS (Data Conversion Systems), Ltd., Unit 1, Buckingway Business Park, Anderson Rd., Swavesey, Cambridge CB24 4AE, England, UK.
US distributor:
Data Conversion Systems Americas, LLC,
PNC Bank Bldg.,
300 Delaware Ave., Suite 210,
Wilmington, DE 19801.
Tel: (302) 473-9050.
Web: dcsaudio.com.

tion, or limit the frequency response, just like the thing they're trying to measure, and there can come a point where, even if they're not dominating what you're measuring, these artefacts are affecting it one way or another."

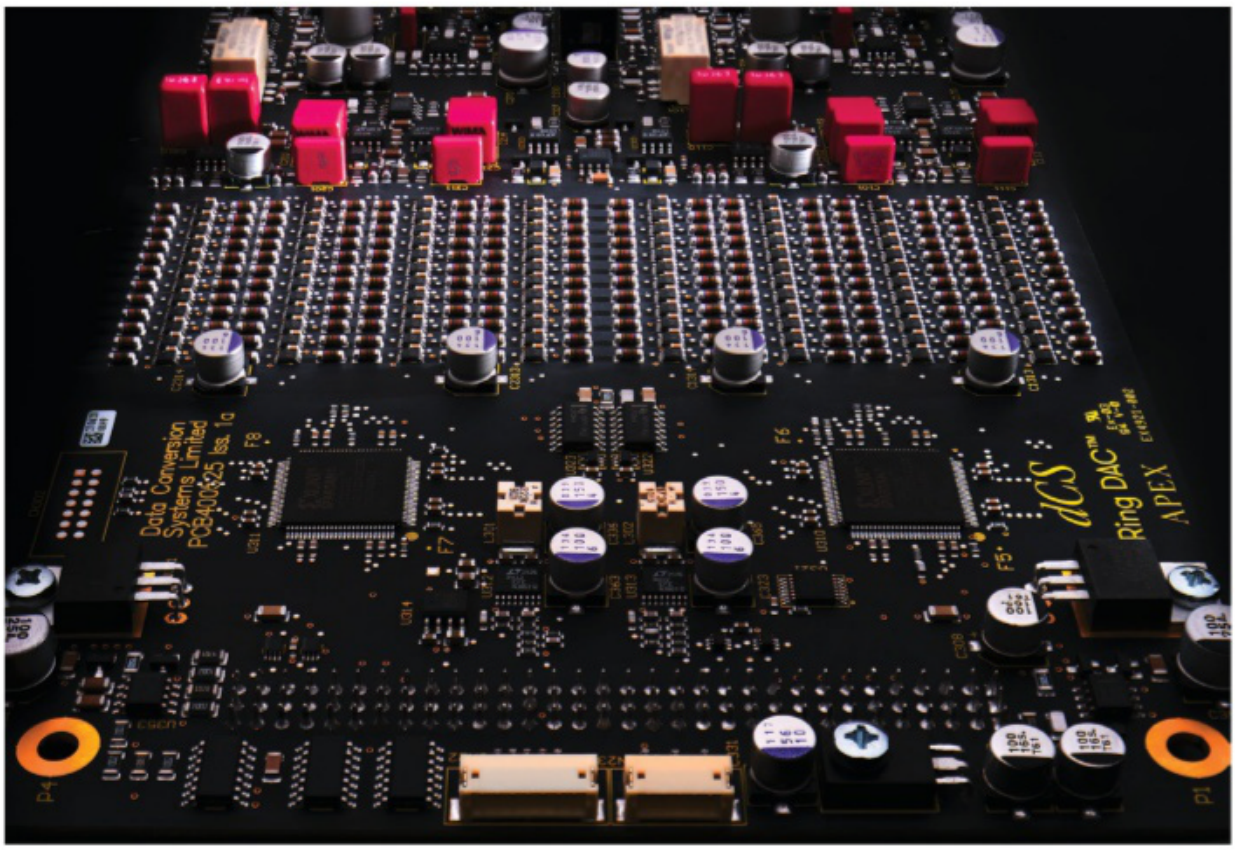
Hales explained, "A good example is when measuring harmonics, where the second harmonic inherent in the test equipment can cancel the one in the item you're trying to measure. This can result in a measurement that is much lower than [what] it should be, one which tends to behave unexpectedly as the performance of the item under test is adjusted."[3]

Giolas corrected a few misconceptions about the proprietary Ring DAC technology found inside all dCS products. dCS began to develop the Ring DAC more than three decades ago and was the first company to offer a digital-to-analog conversion system that could process audio signals at 24-bit resolution.

"It's not entirely intuitive to many audiophiles that the Ring DAC is an analogue device," Giolas wrote. "In all dCS DACs, the Ring DAC architecture is discrete and analogue. It consists of a resistor array, a voltage regulation bus, and a buffer/output gain stage that connects to the preamplifier or power amplifier (among several other things)."[4]

Hales elaborated in an email, "On the surface, the Ring DAC may look like a Ladder DAC. There is a latch and a resistor for each current source, and these current sources are fed to a summing bus. The key difference between the Ring DAC and Ladder DACs … is that the Ring DAC uses current sources of equal value. This is what is known as a 'unitary-weighted' or 'thermometer coded' DAC architecture.

"Additionally, *the Ring DAC does not use the same current source(s) for the same bit every time.*" (The emphasis is



I repeatedly switched back and forth between the Rossini Apex DAC and the original Rossini DAC. The differences were astonishing.

3 More detailed information about Apex technology can be found at dcsaudio.com/edit/apex-a-closer-look.

4 For more on the dCS Ring DAC, see dcsaudio.com/assets/dCS-Ring-DAC-Explained.pdf.

MEASUREMENTS

I measured the dCS Rossini Apex with my Audio Precision SYS2722 system,[1] repeating some measurements with the higher-performance APx500. I performed the testing with the serial data and USB inputs then repeated some of them with JVS's preferred Network input, using Roon.

The AES3 and coaxial S/PDIF inputs accepted data sampled at all rates up to 192kHz. TosLink was restricted to 96kHz data. I didn't test the Rossini's dual-AES3 input, but as with earlier dCS processors, it will accept data sampled at rates up to 384kHz. Apple's AudioMIDI utility revealed that the dCS Rossini Apex accepted 16- and 24-bit integer data via USB sampled at all rates from 44.1kHz to 384kHz. Apple's USB Prober app identified the Rossini Apex as "dCS Rossini DAC USB class 2" from "Data Conversion Systems Ltd" and confirmed that the USB port operated in the optimal isochronous asynchronous mode.

The dCS Rossini Apex's analog outputs preserved absolute polarity (ie, were non-inverting) from all the digital inputs. The maximum output can be set to "6V," "2V," "0.6V," and "0.2V." With full-scale 1kHz data and the volume control set to its maximum, I measured 5.95V, 2.014V, 594.7mV, and 201.3mV from the balanced outputs and very slightly lower voltages from the single-ended outputs. The balanced output impedance was an extraordinarily low 2 ohms from 20Hz to 20kHz. The single-ended output impedance was 51 ohms, again at all audio frequencies.

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

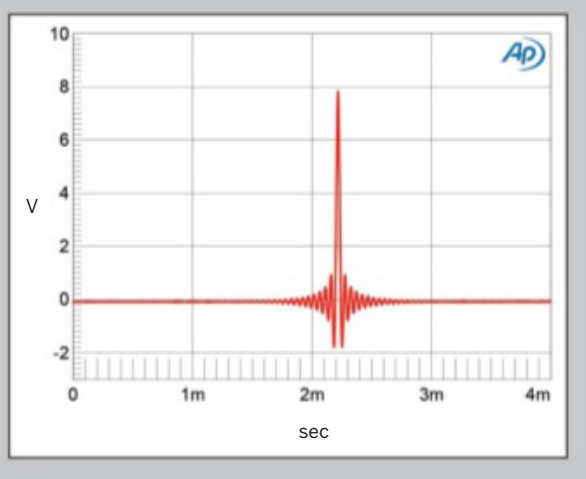


Fig.1 dCS Rossini Apex, F1, impulse response (one sample at 0dBFS, 44.1kHz sampling, 4ms time window).

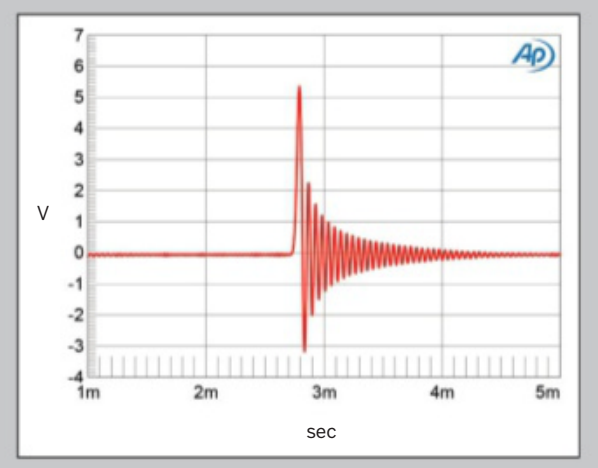


Fig.2 dCS Rossini Apex, F5, impulse response (one sample at 0dBFS, 44.1kHz sampling, 4ms time window).

Hales's.) There are 48 current sources within the Ring DAC, all of which produce an equal amount of current. The Field Programmable Gate Array (FPGA)–controlled nature of the Ring DAC allows the sources to be turned on and off in such a way that any component value errors are averaged out over time. Firing the same bit three times on the Ring DAC might give one output slightly high, the next slightly low, the next somewhere in the middle, as opposed to outputting the sample slightly high every time or slightly low every time (as seen in a Ladder DAC, for example).

"It takes a considerable amount of signal-processing power and know how to optimally operate a thermometer-coded DAC, but the benefit with this approach is that it almost entirely removes the linear distortion from the signal. (Bear in mind that the highly artificial distortion many DACs produce is very noticeable to humans and has a negative impact on perceived sound quality.)

"The Ring DAC process may be thought of as decorrelating errors. Background noise (an uncorrelated error, one which is not linked to the audio signal itself) is very prevalent in nature, whereas artificial distortion (a correlated error) is not. This results in the Ring DAC having class-leading distortion performance, particularly at lower signal levels. This means that more fine musical detail can be resolved and heard."

Giolas took it from there: "The dCS Digital Platform (DDP) instructs the Ring DAC which resistor 'latches' to turn off and on via a dCS-designed software system we call the 'mapper'. Its sophisticated quasi-randomization accomplishes this in such a way that any component value errors are averaged out, vastly improving linearity over ladder DACs and other conventional DACs." dCS had previously addressed and improved its mapper technology in 2017, when the Rossini 2.0 upgrade provided a choice of new or legacy mapping algorithms. David Steven, managing director of dCS, noted by email, "The mapping process is vital to the performance of the DAC and is performed in programmable logic (FPGA). As we improve it, we can upgrade the performance

measurements, continued

The Rossini Apex offers a choice of six reconstruction filters. All six filters are functional with data having a sample rate of 44.1, 48, 176.4, and 192kHz, but only the first four (F1–F4) operate with data sampled at 88.2 and 96kHz. (In this respect, the Rossini Apex is identical to the dCS Vivaldi D/A processor that Michael Fremer reviewed in January 2014.[2]) The behavior of these filters was the same as that of the Vivaldi's filters. Fig.1 shows the F1 filter's impulse response with 44.1kHz data. (F6's impulse response was identical.) It is typical of a linear-phase reconstruction filter, with equal amounts of ringing before and after the single sample at 0dBFS. Filters F2, F3, and F4 also had linear-phase impulse responses but with progressively smaller amounts of ringing. F5 was different. Its impulse response was a minimum-phase type, with all the ringing following the single full-scale sample (fig.2).

With 44.1kHz white-noise data,[3] F1, F5, and F6 rolled off rapidly above the audioband (fig.3, magenta and red traces), reaching full stop-band attenuation at 22.05kHz. They are therefore apodizing types. F2, F3, and F4 offered progressively slower ultrasonic rolloffs with 44.1kHz data, with F4 not reaching full stop-band attenuation until 30kHz (fig.3). With a 19.1kHz tone at –3dBFS (cyan, blue; with the tone at 0dBFS, many aliasing products were present in the audioband), the slow rolloff means that the aliased image at 25kHz is only suppressed by 12dB. The harmonics associated with the 19.1kHz tone were all extremely low in level, however. Figs.3 and 4 were taken with DXD upsampling. Changing to DSD upsampling gave a sharp upward slope in the ultrasonic noisefloor (fig.5). DSD2 upsampling also gave a rise in ultrasonic noise (fig.6), but with a less extreme upward slope.

The F1 filter's frequency response with data sampled at 44.1, 96, and 192kHz (not shown) was flat to just below half of each sample rate, with then a fast rolloff. The rolloffs were slower and started progressively earlier with F2, F3, and F4. F5, which I understood from JVS was his preferred filter for 44.1kHz data, gave a sharp rolloff at that sample rate (fig.7, green and gray

2 The Vivaldi's measured performance can be found at stereophile.com/content/dcs-vivaldi-digital-playback-system-measurements.

3 My thanks to Jürgen Reis of MBL for suggesting this means of displaying the performance of a DAC's reconstruction filter.

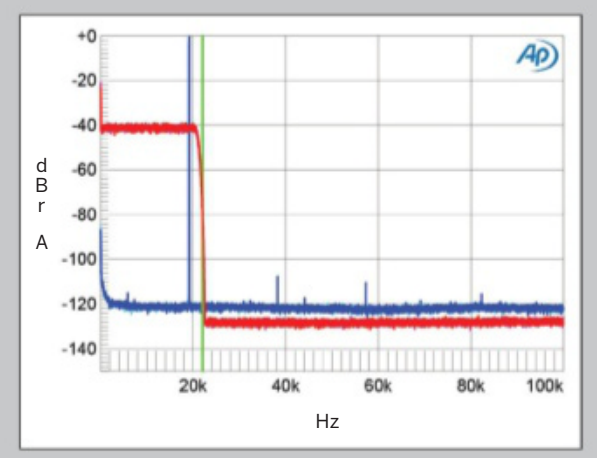


Fig.3 dCS Rossini Apex, F1 & DXD upsampling, wideband spectrum of white noise at –4dBFS (left channel red, right magenta) and 19.1kHz tone at 0dBFS (left blue, right cyan) into 100k ohms with data sampled at 44.1kHz (20dB/vertical div.).

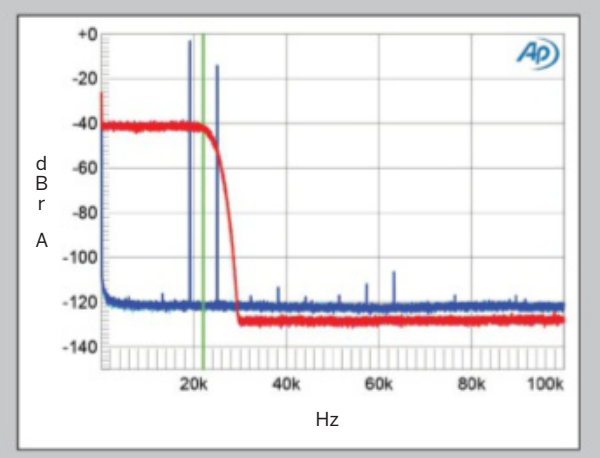


Fig.4 dCS Rossini Apex, F4 & DXD upsampling, wideband spectrum of white noise at –4dBFS (left channel red, right magenta) and 19.1kHz tone at –3dBFS (left blue, right cyan) into 100k ohms with data sampled at 44.1kHz (20dB/vertical div.).

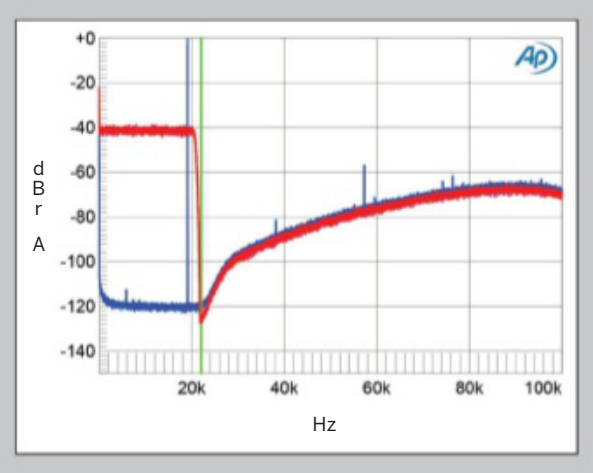


Fig.5 dCS Rossini Apex, F6 & DSD upsampling, wideband spectrum of white noise at –4dBFS (left channel red, right magenta) and 19.1kHz tone at 0dBFS (left blue, right cyan) into 100k ohms with data sampled at 44.1kHz (20dB/vertical div.).

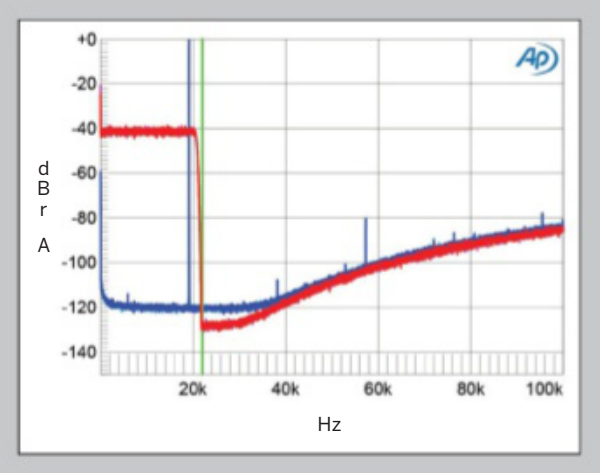


Fig.6 dCS Rossini Apex, F6 & DSD2 upsampling, wideband spectrum of white noise at –4dBFS (left channel red, right magenta) and 19.1kHz tone at 0dBFS (left blue, right cyan) into 100k ohms with data sampled at 44.1kHz (20dB/vertical div.).

of units in the field (e.g., most recently with Bartók 2.0). The Apex hardware changes take full advantage of and build upon the high-speed mappers that were installed during the 2.0 software update to the Ring DAC."

"The new Ring DAC Apex hardware features several modifications," Giolas continued. "The reference supply that feeds the Ring DAC circuit board was one of the first areas that dCS engineers looked at during the research and development phase. Their investigation led them to make some significant adjustments and enhancements. The engineers also thoroughly modified and improved all subsequent stages of the Ring DAC, including the summing and filter stages. The Ring DAC output stage responsible for buffering the analogue signals generated by the Ring DAC was redesigned.[5] Other changes to the Ring DAC's hardware included replacing individual transistors on the Ring DAC circuit board with a compound pair, thereby improving symmetry and linearity, and adjusting the layout of components on the Ring DAC circuit board. The result of these various adaptations is a new, enhanced analogue board that is quieter than previous iterations and over 12dB more linear in the second harmonic."

Setup

I placed the Rossini Apex DAC on a shelf under my reference Rossini DAC, both DACs resting on Wilson Audio Pedestals. A Stromtank S 1000 battery power source supplied power via Nordost Odin 2 cables. A Rossini Grade 1 master clock ($10,200), which I consider essential for optimal playback, paced both DACs. Settings on both units were identical: mappers (Map 1), filters (F5 for Red Book, F3 for 24/88.2 up to 24/192, F6 for higher PCM resolutions, F1DSD for DSD, and M1 for MQA), voltage output (2V),[6] and upsampling format (DXD). I soon discovered that my

5 According to Hales, "The purpose of the output stage is primarily to interface us to what is unknown territory once we leave the dCS realm. We really don't have much control over what cables people are going to connect, what external equipment people are going to connect, and these can have very different input characteristics, so it's important to have an output stage which is capable of driving lots of current, that's not sensitive to stability problems that these may cause. … The solution, then, is to isolate the summing stage from the outside world so that we can optimize the performance of the summing stage and drive the enormously uncertain loads that cable and amplifier combinations can present."

6 Listening tests conducted years ago revealed that, to my ears, Rossini's 6V output delivers the most colorful and engaging sound. But since some preamps and integrated amplifiers that arrived for review couldn't handle 6V, I reluctantly switched to 2V. Then, while preparing the specs for this review, I noticed that specified residual noise levels are lowest at the 6V output. With this confirmation for my 6V preference, it's now back to 6V.

measurements, continued

traces) but a slower rolloff with 192kHz data (blue, red) that reached –6dB at 40kHz. F6 behaved identically to F5 in this respect.

Channel separation (not shown) was superb, at >125dB in both directions below 1kHz decreasing to a still excellent 113dB at the top of the audioband. The low-frequency noisefloor (fig.8) was free from any power supply–related spuriae, with a very low level of random noise.

The red trace in fig.9 plots the error in the analog output level as a 24-bit, 1kHz digital tone steps down from 0dBFS to –140dBFS. (The Rossini Apex was set to Map 1, its output level to 6V, and the volume control set to its maximum for this and the next three measurements.) The amplitude error is negligible until the signal lies below –135dBFS, which implies very high resolution. Repeating the test with Map 2 and Map 3 gave virtually identical results. An increase from 16 bits to 24 bits with dithered data representing a 1kHz tone at –90dBFS (fig.10) dropped the dCS Rossini Apex's noisefloor by 26dB, which implies a very high resolution of between 20 and 21 bits. When I played undithered data representing a tone at exactly –90.31dBFS, the waveform was symmetrical, with the three DC voltage levels described by the data cleanly resolved (not shown). Repeating the measurement with undithered 24-bit data gave a well-formed sinewave (also not shown).

JVS told me that he preferred the Ring DAC's Map 1 with network data. I repeated the low-level resolution tests with data sourced over my network from Roon and with Maps 2 and 3, but I didn't find any significant differences.

The dCS Rossini Apex produced very low levels of distortion—so low, in fact, that it challenged the SYS2722's resolution. I therefore used the higher-resolution APx500 analyzer to examine the harmonic distortion. With a full-scale 1kHz tone and the Rossini set to output its highest level of 6V, the THD+noise measured just 0.00026%! The second harmonic was the highest in level, at a vanishingly low –124dB (fig.11), and though some higher-order harmonics were visible in this graph, they all lie at or below –130dB. This spectrum was taken with TosLink data and a load

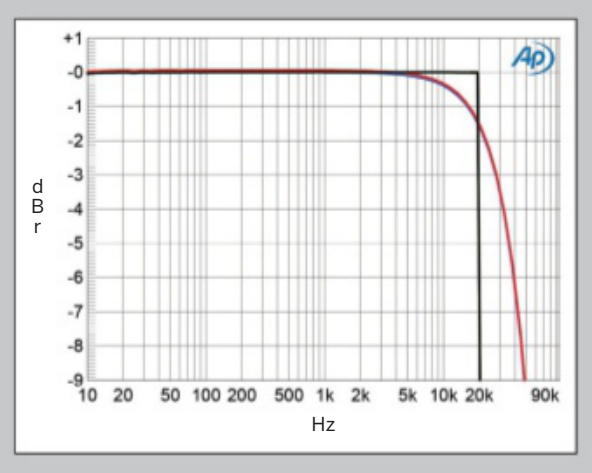


Fig.7 dCS Rossini Apex, F5, frequency response at –12dBFS into 100k ohms with data sampled at: 44.1kHz (left channel green, right gray) and 192kHz (left blue, right red) (1dB/vertical div.).

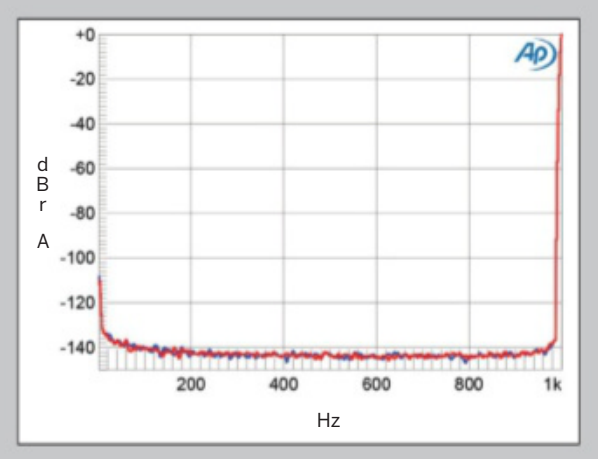


Fig.8 dCS Rossini Apex, balanced output, spectrum with noise and spuriae of dithered 1kHz tone at 0dBFS with 24-bit TosLink data (left channel blue, right red) (20dB/vertical div.).

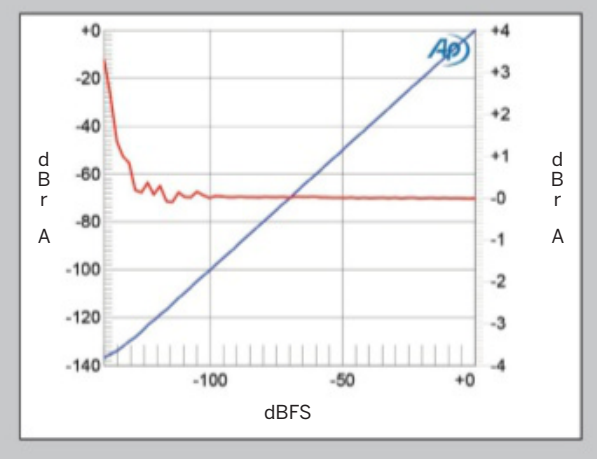


Fig.9 dCS Rossini Apex, Map 1, left channel, 1kHz output level vs 24-bit data level in dBFS (blue, 20dB/vertical div.); linearity error (red, 1dB/small vertical div.).

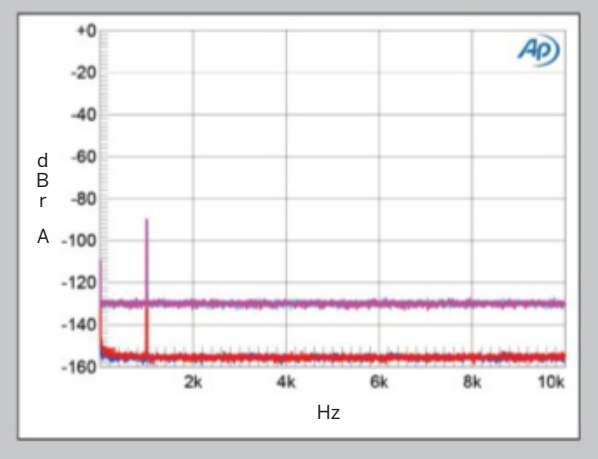


Fig.10 dCS Rossini Apex, spectrum with noise and spuriae of dithered 1kHz tone at –90dBFS with: 16-bit TosLink data (left channel cyan, right magenta), 24-bit TosLink data (left blue, right red) (20dB/vertical div.).

preference for the Map 1 mapper remains unchanged with the Rossini Apex DAC; I find it richest in color saturation and contrast.

Since I ran out of power cables for additional components, I left the Rossini upsampling SACD/CD/Transport ($26,5000) disconnected. Instead, I used a Roon Nucleus+ music server (powered by a Nordost QSource linear power supply) for file playback from a USB stick, Tidal, and Qobuz. Discs, files, and streams rely on the same Ring DAC and clocking technology for sound; I expected similar results.

For comparison, I chose the EMM Labs Reference DV2 Integrated DAC ($30,000), which I'd reviewed previously.[7] When I compared the DV2 to a dCS Vivaldi DAC I then had on loan, I felt that their bass, image size, and soundstaging seemed equivalent. If the Rossini Apex DAC now equaled or bettered the DV2 in bass, image size, and soundstaging, then it succeeded in elevating the sound of the Rossini DAC's bass to the lofty performance level of the Vivaldi DAC.

This led to two other tests, which intrigued my friend Scott Campbell so much that he asked me to repeat them with him present. Because the Rossini Apex DAC can process its highest resolutions of PCM and DSD by either Ethernet or USB,[8] I tested which of these inputs produced better sound. (The DV2 lacks an Ethernet input, but the company claims to have optimized the DV2 USB input.)

With the Rossini Apex DAC's Ethernet input, colors were a mite more differentiated and saturated, highs smoother and less aggressive, and bass foundation firmer than through USB. Ethernet also conveyed brass and winds with more warmth and richness and the soundstage with more realism. I next compared the sound of the two DACs with and without a preamplifier (D'Agostino Momentum HD) in the chain. This test, discussed below, revealed any qualitative differences between the two DACs' internal volume controls.

Revelation time

Several aspects of the Rossini Apex DAC's sound stood out: depiction of instrumental texture, silence, nuance, perceived distance from and space around instruments, and bass response were signifi-

7 See the discussion on the DV2 at stereophile.com/content/meitner-ma3-integrated-da-processor.

8 While the Rossini Apex can, through its Ethernet input, fully decode and render MQA, its USB input functions as a renderer only and depends upon playback software such as Roon to do the decoding. See the Specifications sidebar for more information.

measurements, continued

of 100k ohms; the levels of the harmonics were the same with network data and didn't increase by any significant amount when I reduced the load impedance to 600 ohms. Intermodulation distortion with an equal mix of 19 and 20kHz tones with a peak level of 0dBFS was vanishingly low in level (fig.12). This graph was taken with DXD upsampling and the fast-rolloff F6 reconstruction filter. Aliased images of the primary tones appeared above the audioband with the slowest-rolloff F4 filter, but actual intermodulation products were still as low as they had been with F6.

Fig.13 shows the spectrum of the Rossini Apex's output when it was fed high-level, optical, undithered, 16-bit J-Test data. The odd-order harmonics of the undithered low-frequency, LSB-level squarewave lie at the correct levels, indicated by the sloping green line, and the noisefloor between the sidebands is extremely low in level. Repeating the test with 24-bit J-Test data (not shown) gave a similarly superb result.

Overall, the dCS Rossini Apex's measured performance was beyond reproach.

—John Atkinson

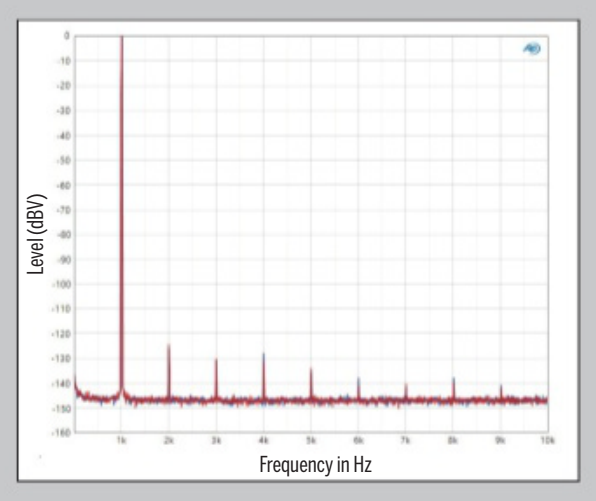


Fig.11 dCS Rossini Apex, balanced output, 24-bit TosLink data, spectrum of 1kHz sinewave, DC–1kHz, at 0dBFS into 100k ohms (left channel blue, right red; linear frequency scale).

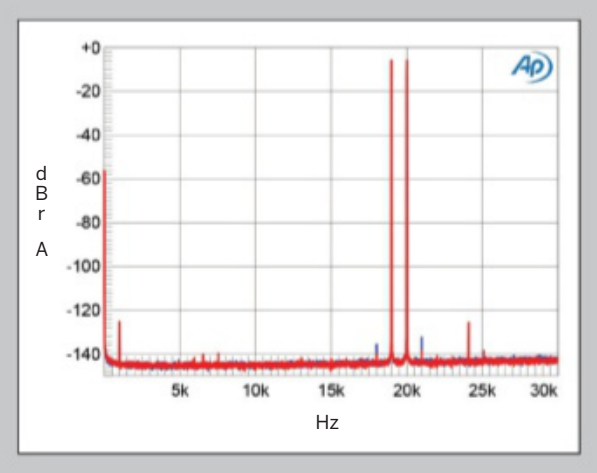


Fig.12 dCS Rossini Apex, balanced output, F6, 24-bit TosLink data, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 0dBFS into 100k ohms, 44.1kHz data (left channel blue, right red; linear frequency scale).

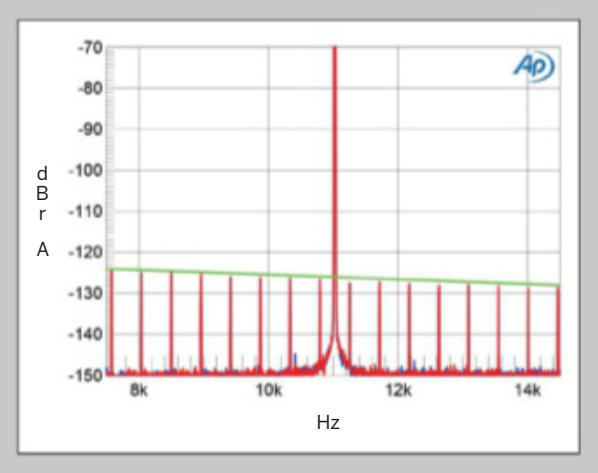


Fig.13 dCS Rossini Apex, high-resolution jitter spectrum of analog output signal, 11.025kHz at –6dBFS, sampled at 44.1kHz with LSB toggled at 229Hz: 16-bit TosLink data (left channel blue, right red). Center frequency of trace, 11.025kHz; frequency range, ±3.5kHz.

cantly improved. At the start of Debussy's colorful Sonata for Flute, Viola, and Harp, from *Debussy: Sonates & Trio* (24/96 MQA, Erato/Tidal), I heard more sound from the viola's bow than before. More of the overtones and harmonics that distinguish the viola from the violin emerged, and the complex character of instruments was easier to discern. Subtle changes in dynamics and shading were also more noticeable and impactful.

Music of the great French composers of the late 19th and early 20th century, in particular—Debussy, Ravel, Fauré, and others—abounds in color, texture, and romance. I'm especially fond of pianist Cédric Tiberghien's performance of Ravel's piano concertos on *Maurice Ravel: Concertos Pour Piano / Mélodies* with Francois-Xavier Roth and Les Siècles, his marvelous period-instrument orchestra (24/96 WAV, from files provided by Harmonia Mundi). With the Rossini Apex DAC, I immediately noted a deeper silence between notes, a greater sense of grace, flow, and warmth from string instruments, and a beautiful finish to the sound that epitomized fin de siècle elegance.

As I repeatedly switched between the two Rossini DACs, the differences were astonishing. They were especially noticeable in *Also Sprach Zarathustra*, from our Recording of the Month seven-CD box set *Strauss* (24/96 MQA, DG/Tidal),[9] with the Gewandhausorchester Leipzig under Andris Nelsons. The bass with the earlier Rossini DAC was less gripping and not as fleshed out as with the Rossini Apex DAC—even when I increased the volume to give it a fighting chance. Highs were noisier, drum rolls noisier and muddier, colors less intense, and distinctions between timbres of very different instruments less palpable. As the big bang at the start of Strauss's tone poem cedes to a glorious sunrise—one which Nelsons reveals with a slow, perfectly paced crescendo that progressively bathes the listener with light—I heard more grace, beauty, and detail from the Apex.

At Scott's request, I played "April in Paris" from *The Magnificent Thad Jones (Remastered)* (16/44.1 FLAC, Blue Note Records/Qobuz). With the Rossini Apex DAC, brushes on snare drums were more involving, the sound of the trumpet and double bass fuller and richer. Instruments the recording artificially spread out across a wide soundstage seemed more connected and sounded smoother. These were not small differences; we were bowled over by their cumulative impact.

I suggested we return to Talk Talk, whose music I enjoyed so much in our last listening session. We chose "April 5th" from *The Colour of Spring* (24/96 FLAC, Parlophone/Qobuz). The earlier Rossini DAC sounded thinner than the Apex, with less substance. Everything seemed diminished and less involving. There was less there. Scott felt that while both DAC presentations were well-sorted, the Apex DAC's presentation was more liquid and had more integrity.

We then moved on to Les Siècles' new recording of Mahler's Symphony No.4. Without question, the Rossini Apex DAC supplied a more substantial bass foundation and granted all instruments fuller and rounder tone. The balance between lower-pitched instruments and those playing many octaves above seemed more appropriate to the music. The contrasting textures of the period-instrument woodwinds were riveting.

One of the biggest revelations came at the start of *Metacosmos*, Anna Thorvaldsdóttir's orchestral tour de force, performed by the Iceland Symphony Orchestra on *Concurrence* (24/352.8 WAV, Sono Luminus DSL-92237). *Metacosmos* begins with a minute-long low-pitch, multi-octave drone, which is interrupted by a sudden, disturbingly sharp crack that sounds like the universe cleaving in two. With the earlier Rossini DAC, quiet entrances of lower instruments were barely discernible; with the Apex, they took on real significance.

ASSOCIATED EQUIPMENT

Digital sources dCS Rossini DAC 2.0, Clock and Transport; EMM Labs DV2 Integrated DAC; Synology 5-bay 1019+ NAS, Uptone Audio EtherRegen with AfterDark Giesemann Emperor Double Crown Master Clock, Small Green Computer Sonore Deluxe opticalModule, Linksys mesh router and Arris modem, all powered by HDPlex 300 linear power supplies; Roon Nucleus+ music server and Nordost QNET Ethernet Switch, both powered by Nordost QSource linear power supply; Apple 2017 iPad Pro and 2017 MacBook Pro laptop with 2.8GHz Intel i7, SSD, 16GB RAM.
Preamplifier Dan D'Agostino Momentum HD.
Power amplifiers Dan D'Agostino Progression M550 monoblocks.
Loudspeakers Wilson Audio Specialties Alexia 2 with Acoustic Diode supports.
Cables Digital: Nordost Odin 1, Odin 2, and Valhalla 2 (USB and Ethernet); Frey 2 (USB adapter); Wireworld Platinum Starlight Cat8 (Ethernet), OM1 62.5/125 multimode duplex (fiberoptic). Interconnect: Nordost Odin 2. Speaker: Nordost Odin 2. AC: Nordost Odin 2, Valhalla 2; AudioQuest Dragon and Dragon HC. Umbilical cords: Ghent Audio Canare for HDPlex LPSs and NAS; QSource Premium DC cables with Lemo terminations for QSource.
Accessories Grand Prix Monza 8-shelf double rack and amp stands, 1.5" Formula platform; Symposium Ultra Platform; Nordost QB8, QX4 (2), QK1, and QV2 AC power accessories, QKore 1, 3, and 6 with QKore Wires, Titanium and Bronze Sort Kones, Sort Lifts; Stromtank S 1000 power generator; AudioQuest Niagara 7000 and 5000 power conditioners, NRG Edison outlets, JitterBugs; Tweek Geek Dark Matter Stealth power conditioner with High Fidelity and Furutech options; Wilson Audio Pedestals; A/V RoomService Polyflex Diffusers; Resolution Acoustics room treatment; Stillpoints Clouds (8) and Aperture 1 (2) and 2 (2) acoustic treatments; HRS DPX-14545 Damping Plates; Stein Music Blue Suns, Blue Diamonds, and Quantum Organizer; Bybee Neutralizers; Absolare Stabilians; Marigo Aida CD mat.
Room Dedicated listening room 20' L × 16' W × 9'4" H.
—Jason Victor Serinus

Comparison time

How did the Rossini Apex DAC/Clock combo compare to the DV2 integrated DAC?[10] They were close enough that it was essential to match output levels, which I accomplished using a Fluke multimeter to measure the output at the loudspeaker terminals with a 1kHz warble tone from *Stereophile*'s Editor's Choice CD; I matched levels to within 0.03V at a level of about 1.5V.

My critical listening session opened with a superbly recorded freeform jazz take on Gesualdo's madrigal "Moro, lasso, al mio duolo," from a forthcoming album of improvisations on medieval melodies from Europe and the British Isles titled (tentatively) *From One Dark Age to Another*. This album features percussionist Garth Powell (who is also AudioQuest's director of engineering, and who passed the track along to me). Engineered by Michael C. Ross and produced by Joe Harley, the album was recorded directly to ¼" 30ips tape at Studio A of Hollywood's Capitol Studios. The piano was the 7' Steinway B that Nat King Cole preferred.

Next, I listened to the second movement from Shostakovich's

9 See stereophile.com/content/recording-june-2022-richard-strauss-orchestral-works.

10 EMM Labs founder Ed Meitner does not believe in external clocks, and the DV2 therefore offers no option to add one. Instead, Meitner strives to optimize the internal clocks in his DACs.

Symphony No.11 from the fabulously recorded album *Shostakovich: Symphonies Nos.4 & 11 "The Year 1905,"* with Andris Nelsons conducting the Boston Symphony Orchestra (24/96 FLAC, DG/Qobuz). Its concluding section, which intensifies from a quiet foreboding to a thunderous barrage of brass and percussion, ends in a smoking stillness that gets me every time.

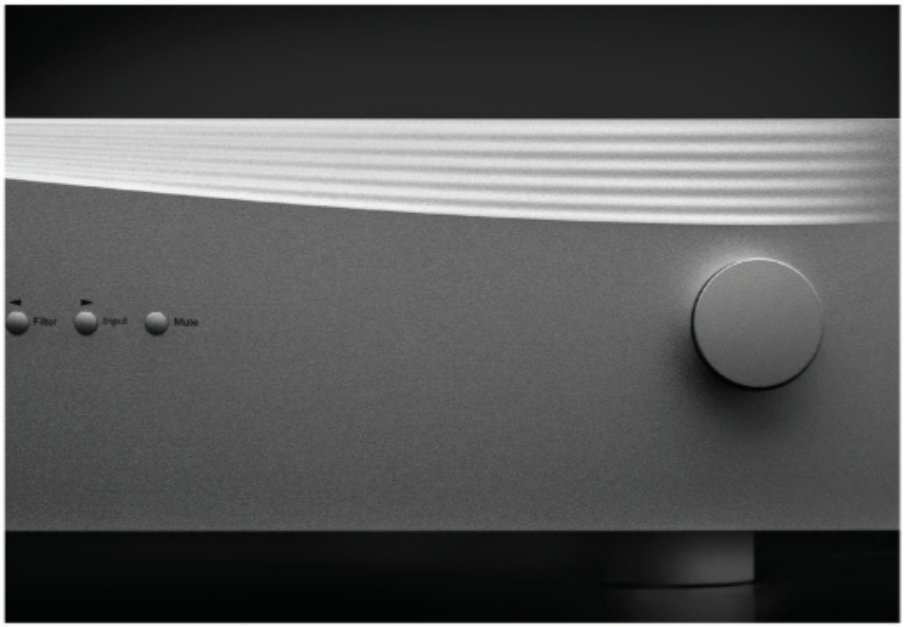
The Rossini Apex DAC and Clock sounded more colorful than the DV2 and blacker between notes. Deep bass-drum thwacks were a little tighter, and the soundstage was more open. When I removed the D'Agostino Momentum HD preamplifier and used the DACs' internal level controls instead, the DV2's color and bass remained less impactful. On the Shostakovich, chilling silence was less profound; on the Gesualdo, colors of soprano saxophone were less intense.

The Momentum HD preamplifier elicited more color, contrast, transparency, and weight from both DACs. Capitol Studios' famed piano, which sounded somewhat faint in the Gesualdo premix, came alive with the D'Agostino Momentum HD preamplifier.

In our next listening session, Scott and I played Fleetwood Mac's "Gold Dust Woman" from *Rumours* (24/96 MQA, Warner Bros./Tidal). The Rossini Apex DAC/Clock combo sounded cleaner and fuller and seemed to have a lower noisefloor than the plainer-sounding DV2. The Apex also made it easier to discriminate among several female vocals on "Gold Dust Woman." It was clear that the Rossini Apex DAC's bass is at least equal to the DV2.[11]

Incomparable

The Rossini Apex DAC is more than another upgrade; it's a major advance in digital sound reproduction, one that elevates an already excellent DAC to a much higher level. With dramatic improvements in bass, color saturation, detail, texture, and coherence, its presentation is more realistic and refined than that of the original Rossini DAC. In many respects, the Rossini Apex DAC now performs on a level previously exclusive to the Vivaldi DAC.



Should existing Rossini owners consider the upgrade? Unless the $9000 upgrade price is prohibitive, without question. The Rossini Apex DAC is a must-hear for anyone who cares about cutting-edge sound reproduction. The improvements are impossible to miss. Once you hear them, there's no going back. But be aware that because the Rossini Apex DAC sounds so natural and unforced, you may not realize how good it is until you compare it with other top-tier DACs. ■

11 Once the DV2 V2 is available, this comparison will merit revisiting.