Has Rossini reached its peak?

UK DIGITAL AUDIO SPECIALIST DCS HAS APPLIED THE LATEST APEX DAC UPGRADES TO ITS ROSSINI STREAMER/UPSAMPLING DAC. MARTIN COLLOMS SAYS IT'S A TRANSFORMATIONAL CHANGE, AND MAKES THIS RESPECTED PRODUCT EVEN BETTER

Having started out some 35 years ago making radar systems for military jets, before moving into the audio arena with professional A/D convertors for mastering – renowned tonmeister Tony Faulkner was an early adopter of its 900 series –, dCS has in more recent times concentrated exclusively on audiophile replay, where its skills in jitter suppression and high-order oversampling computation have proved a good fit for the audiophile market.

The company's most recent innovation is the introduction of its APEX technology, involving substantial and comprehensive improvement to the power supplies, enhancement of the analogue stages and some fine tuning of the proprietary 'Ring DAC', with revisions to the layout of its circuitboard. But the DAC itself is basically unchanged: it remains fundamentally a 1bit, high oversampled digital to audio converter, first seen in 1991 and involving some Bitstream technology.

The initial application of this technology is to the company's Vivaldi and Rossini products, including the Rossini APEX DAC upsampling streamer/DAC we have here, at £25,500, and the Rossini APEX Player CD/SACD player/streamer version, at an extra £2500. Existing Vivaldi and Rossini owners may have their products 'Apexed' for £6000, this upgrade requiring a return to the factory due to for the extensive nature of the rebuild required.

A chunky looking unit, the Rossini APEX DAC is dominated by a heavy duty and deeply machined alloy front panel, the whole unit being cased in heavy-duty anodised alloy plate in satin silver (or black), and supported on large and effective machined alloy feet with vibration absorbing inserts. There's a modest display to the left of the fascia, then a power button plus four more control buttons – for menu, input filter, choice of signal input and mute – acting in conjunction with layered menus, while to the right a smooth acting rotary encoder provides precision volume control of volume. In addition, the Rossini's menu system offers a large range of modes, upsampling filters and facilities, these being most readily addressed via the company's Mosaic app.

dCS DAC and Filter Options
dCS believes its DACs were the first to offer a choice of Nyquist filter image corrections back in the late

1990s. As we know, with a DAC an internal low-pass audio band filter is necessary to block unwanted 'images' that appear at frequencies greater than half the sample rate, these a consequence of the D-to-A conversion process. A similar filter is necessary for processing upsamplers) to remove related alias signals. Some DAC manufacturers have called some or all of these 'apodising' filters: dCS explains at base level that 'apodising' simply means 'changing a mathematical function'.

For a DAC, conventional low pass filters cut off steeply at the point where the signal frequency approaches one half of the sample rate. Thus for CD at 44.1kHz, the filter will necessarily cut-off just beyond 20kHz to delete the higher frequency 'image' of the music signal spectrum beyond 22.2kHz. A consequence of this is a rapidly changing phase response, which some say has an audible character: the filter process does result in multiple frequency components beyond the nominal band, possibly softening the subjective impact of music transients. Digital filters with more gradual cut-offs have a less abrupt phase response and shortened transients, and fortunately, there are good compromises available between these two extremes.

A choice of filters

When in PCM replay mode, dCS DACs generally offer a choice of four filters, with different trade-offs between the flatness of amplitude response and associated smoothness of phase response. These four filters (for CD 44.1kHz) are FIR (finite impulse response) types, with differing amounts of accompanying pre-ringing, again of debateable audibility. (see test results)

Two more filters are available for 176.4 or 192kHz, one being a Gaussian filter with a gentle roll-off, resulting in an excellent phase response, the other an asymmetrical IIR design which consequently has almost no pre-ringing. The choice is a personal one which may also depend on the type of music and associated recording practice, but these last two options are often favoured by dCS owners. Of course, CD data will have been sharply filtered during recording, so it can be argued that replay filter choices shouldn't matter as the sound is 'baked in' – but listening tests show that upsampling of CD data to 24/176.4 (for example), with a 'preferred' choice of upsampling filter, can sound 'better', or at least, preferable. High-res original material is another matter and is delivered to the listener raw via the DAC at maximum transparency.

The other change since last I reviewed a dCS product is the arrival of the Mosaic Control app control interface, for Apple iPads and the like on the same network to which the Rossini is connected using an Ethernet cable – there's no Wi-Fi option here. This makes a wealth of settings and controls for processing options immediately accessible to the user, avoiding the more complex layered menu chasing via the optional remote, or obtaining access to deep menus via multiple button presses to the front panel control array, working in conjunction with that fairly small display. Playback includes TIDAL, Qobuz, Deezer and Internet radio, as well as UPnP – Mosaic prefers your server to be running MinimServer –, AirPlay and Spotify Connect, and the Rossini is also Roon-ready.

Digital inputs

The unit also has two USB inputs – Type A for storage devices, and Type B for connection to a computer –, plus AES, Dual AES and S/PDIF inputs, and can accept encrypted SACD data from a dCS Transport via dual AES connections. Its employs multi-stage DXD oversampling, with optional DSD upsampling, with those user-selectable filters, and auto-clocking to improve ease of use and minimise jitter. Dual low-noise toroidal mains transformers work with multi-stage regulation to isolate analogue, digital and clock circuits. Firmware-upgradeable for future functionality and performance upgrades, it also features a full MQA decoder.

The well-designed digital volume control covers a very wide range in fine 0.5dB steps, and is smooth acting and noiseless, and from the start I took care to certify the volume control, as some earlier models showed a small but perceptible loss in quality when invoked, even for the first step – i.e., just 0.5dB of reduction. In this latest Rossini, volume processing was essentially blameless, even when the network connection was removed to judge its relatively small effect on sound quality. And it's worth having that network connection, and not just for streaming: for example, Roon has a good quality local DSP volume control which is normally invoked, but with the DCS app operational you get the whole 0.5dB control step precision of the Rossini's more powerful volume processor. You can hear the difference: it really is more transparent than the Roon app's volume adjustment, and remains so right across the range

Class-leading potential

The Rossini Apex DAC undoubtedly has a class leading performance potential when fully system-connected, but there's also a 'hair shirt' mode, using it as a pure DAC with external sources. Using the dCS with a CD player connected via its coaxial digital input, the sound quality was now a little higher than when streaming from my server, even on raw 44.1 CD material, and not unexpectedly it's better still with the network cable unplugged. Though this was the best 'CD' replay I have experienced, the server-connected sound was very, very good indeed.

The System

Townshend Allegri Reference control units; Naim NAP250DR power amplifier, D'Agostino Progression integrated, Naim SuperLine-SuperCap DR phono pre with Linn LP12 player with Keel chassis, Karousel main bearing and Radikal motor control, Naim ARO arm, Lyra Delos cartridge, Naim UnitiCore network server and S/PDIF source, Roon Nucleus Plus server control with Qobuz; Linn Klimax DSM streamer-DAC, Naim ND555 Streamer-DAC, 555 PS x2 (DR), Wilson Audio Sabrina X, Magico S-5II, FinkTeam KIM, Quad ESL63, BBC LS3/5a (15ohm), loudspeakers Naim FRAIM racks; Transparent XL MM2, Naim NAC A5 speaker cables, Naim Super Lumina, Transparent MM2 and Van den Hul Carbon TFU interconnect cables

Audio output is available on both RCA and XLR balanced connections, with a choice of fixed output levels, plus variable level controlled via the volume control for direct connection to a power amplifier or active speakers. Both sets of outputs can be used simultaneously. In addition, the unit has 'main' and 'loop' network connections, and finally a trio of gold-plated BNC sockets, for connection to an optional Word Clock unit.

Sound Quality

The well-run-in Rossini Apex DAC review sample was certainly memorable: in a world of upgrades, some mild and some not so mild, the APEX has an impact on sound quality, and the news is all good.

I listened in DSD at many sample rates, and in PCM at rates up to 96kHz, the filter settings creating greater differences than expected for these options, and some clear favourites emerged (see Filter Settings), while for a straight CD input (via wired SPDIF) with no further processing, the sound quality was considered excellent right away, up with some of the best DACs auditioned. Minimal jitter artefacts were audible, and the Apex DAC sounded 'fast', upbeat, and musically engaging, being superbly revealing of detail, but also dynamic and expressive. This firm foundation made the later comparison of those various upsampling and filter options so easy, while the digital volume control was audibly transparent.

Somehow this DAC gave the impression that a significant piece of the replay chain had been bypassed, sounding better-focused, more immediate, detailed and musical. dCS has attained a new higher performance level with this design iteration: lightning fast, forceful, expressive, almost hyper-dynamic, and gripping. Without any thought I put on 'It's High Time' from Jan Garbarek's *Rites* and was rewarded with an enveloping soundstage, deep and richly detailed with excellent timing, and beautiful

percussion, timbales, wood block and the like. The track had to be run to its conclusion: it would be an insult to the musicians to curtail the piece.

Moby's *We Are All Made of Stars* (here sourced from a USB HDD via Roon) sounded remastered: this skilful if heavy mix, was surprisingly punchy, fresh and immediate, demanding attention. The sound quality difference between on-line streaming and a local HDD on Roon was very small indeed, inspiring confidence in the Apex DAC's data capture. This was high resolution with a velvet glove – but if you wish for the ultimate on this track, fire up a CD transport and enjoy a fraction more grip, definition and image depth.

Garbarek's *Saga* reveals superbly crisp, defined drumming combining with powerfully natural timbres, and no false exaggeration of transients. The recreation of space and ambience from this CD was highly satisfying, if only just edging the Roon server replay into second place here in streaming mode. You'd likely never know that it could be a little better unless you had the silver disc, while Garbarek's 'Evenly They Danced' was close to spellbinding in atmosphere and natural spaciousness. Yes, it's a 'studio' production, but was very convincing nonetheless.

Dave Brubeck's 'Take Five', streamed from Qobuz, was also very good with that finely-textured sax shockingly realistic and the connected, well-timed ensemble playing so well. Fresh-sounding and belying its 1959 recording date, it was another compelling listen: the distinctive 5/4 beat was challenging, even for the band never mind the public, but it caught on. The dCS captures the track's vitality well – and the contemporaneous mono version is worth hearing too and is a fascinating alternative experience.

Rossini refreshed

Overall, the Rossini sounds refreshed, exceptionally detailed and natural, yet strongly dynamic and expressive. Loud passages showed no strain or false hardness while quieter sections were transparent and airy with unsuspected subtlety and expression. The bass extended deeply with clear definition and a fine sense of power, while complex music was explicitly resolved and with expansive well focused stereo images.

New to me, Beethoven's Piano Concerto No 1, performed by Krystian Zimmerman on his own personally voiced Steinway piano, was exemplary. Voiced and tuned more like a period piano than. say, one set up for Rachmaninov, this excellent performance sounded authentic and vibrant: the acoustic was beautifully balanced, natural and convincing, with rich vibrant cellos in the LSO under Simon Rattle.

Playing Sting's *Mercury Falling* from CD, the bass was really good, melded so well in the music replay that it was just right, never sounding obvious or forced, just finely integrated. It is only when you focus on it that you appreciate just how good it is. Similarly with a favourite master organist of mine, Jean Gilleau, playing the Mozart *Fantasy in F minor, K. 608* at St Eustache, Paris, Rossini Apex DAC brought us nearer the heart of his performance, also with a deep sense of immersion in the lovely acoustic. It was a spellbinding effect.

Conclusions

Nothing in audio can be taken for granted, and here experience with the previous unit, if now upgraded, was little help in informing opinion, so radical was the transformation. You really must experience the Rossini Apex DAC package for yourself to hear how much it offers. Allied to the well-designed Mosaic control interface, this is now a winning combination for dCS, and comfortably wins a HIFICRITIC Audio Excellence Award.

Sound quality appendix: Volume Control and Filters

Volume Control: Audibly transparent throughout the range, the listening results revealed only a tiny difference in output level between the DSD and Linear modes for full modulation 1kHz, here also with super accurate channel balance. Thus linear 24/96 kHz at full level read 1.998/1.998V L/R and for DSD 2.022/2.022V, an inaudible level difference of just 0.024V and showed perfect channel balance. Auditioning the multitude of replay mode/filter settings was made easier with such precision, these results to be found below.

Auditioning the Filter Settings

If ever you wanted a reference test bed to audition digital filters, sources, formats and sampling rates, this was it, and it could take days to investigate these options reasonably thoroughly, and it did. Care is always needed in such comparisons and at first a slight, compressive loss of quality was noted when the output was set to 6V output rather than 2V. After a little consideration, and a bench test, it was discovered that my trusty Townsend Allegri Reference auto transformer control was compressing almost imperceptibly at inputs over 4V, perhaps not unexpectedly, but it had taken the super clean 6V drive from this dCS Streamer DAC to show up this very subtle shift.

With more than enough system gain available, the dCS was reset to 2V output and then enjoyed a clear run. I allocated a good half day to assess the filter and processing options, of which there are many – too many, in fact!
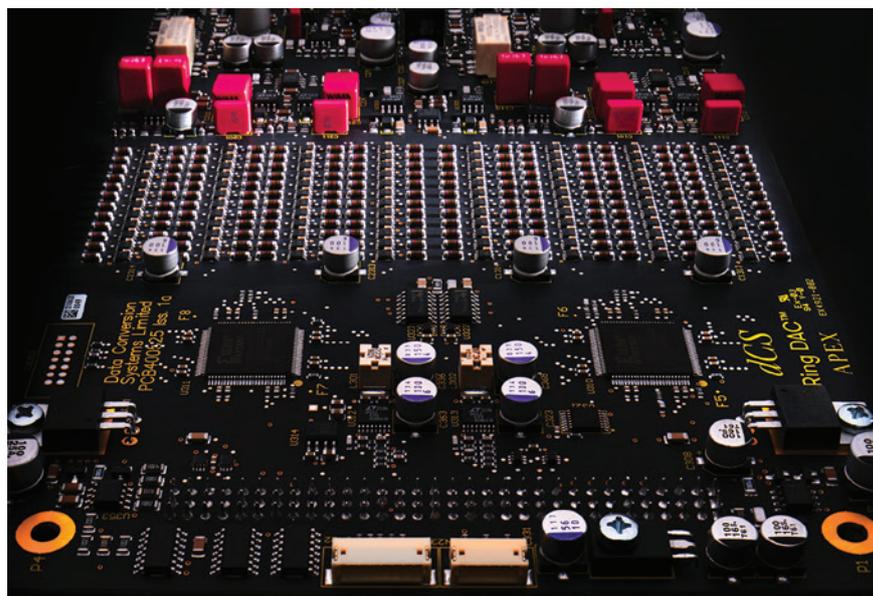
A. The Sound of a Baseline CD reference with various Mapping/Filter options. (Ratings are relative only) Reference is **CD** source, unprocessed**:**
1. **Straight CD 16/44.1**: 'word clock' set to 'auto' as standard, and which reference baseline replay actually sounded really good. We then progressed through the many options for upsampling and filtering, and the various filter maps. Some of these setting combinations and options had quite strong audible effects and were not always for the better. I suspect that some industry critics have favoured some options just because they could 'hear' a difference. For example, with '100%' as reference for plain **CD**, invoking **Map 1** was now marked down at 90%, **Map 2** at 65 % with noticeably poorer rhythm, and **Map 3** at 70 % but little else of consequence to remark.
2. **DSD F1** - **Upsampling**; with **Map 3**, for two rates, Normal and Double: Doubling the DSD sample rate was worse, here sounding dry and truncated, with poorer musical timing scoring 60% overall for sound quality.
3. **DXD Upsampling Filters**: **F1** with **Map3** was marginally better on image depth than the reference but was also unconvincing musically, lacking listener engagement. Returning to **Map 3**, **DSD,** again with **F1** and normal rate, was a relief with listeners reporting better sound quality than with **DXD**.
4. **DSD Processing** on **Map3**: Filter options 1-6. After some respite I now assessed some of the digital filter options comprising **F1-6**, with **F1** set as the reference or control. I'd previously cleared **F1** as a strong performer and now compared it to **F2**. **F2** Interestingly by comparison this filter added a mild nasal coloration combined with weaker musical timing, and sounded less connected to the

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Specifications

dCS Rossini APEX DAC

Type	Upsampling Network DAC
Price	£25,500
Networking	Ethernet
Digital inputs	USB Type A and B, 2 AES/EBU, two coax, one optical
Analogue outputs	RCA and XLR, adjustable to fixed 0.2V, 0.6V, 2V, 6V rms; or variable output
Other connections	Word Clock
Finishes	Silver or Black
Dimensions (WxHxD)	44.4x12.5x45.5cm
Weight	15.6kg

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musical flow. *Red Beret* by Prince on CD playback was revealing here.

F3 was preferred to **F2** showing better flow and listener involvement, but also with a slight loss of ambience and transparency.

F4 was a shockingly different option and despite an almost exaggerated level of detail combined with fine image depth, the subjective increase in glare or brightness let it down. It sounded more coloured and artificial.

F5 Adds some upper range noise shaping (ultrasonic band), with fairly good image depth, but quite poor musical involvement: the musicians seemed to suffer impaired timing, and it was less satisfying overall.

5. DSD Upsampling: *Filters 1-5*

Filter 1 We then assessed the 44.1kHz/16bit CD material processed to DSD on **Map3**, here auditioning another five filter settings with **F1** as the local refence or control.

Filter 2 Poorer timing, less involving and considered a touch bright-sounding.

Filter 3 Sweeter, perhaps, superficially 'nicer' but less interesting and with surprisingly poor timing, impairing listener involvement. However, there are further sub menu settings associated with user choices for sample rate which weren't tried.

Filter 4 The sharp roll-off sounded unremarkable in practice, neutral but without overall sound quality improvement for this source mode.

Filter 5 (Not shown on the display menu) Sounded spacious and detailed but was strangely 'altered', also with confused timing cues. For what it is worth this setting also invokes second stage oversampling.

How other audio signals, quality, formats, and sample rates will fare with such processing is impossible to predict, and must be down to the user to find out. Beware of being overimpressed on first hearing a *difference*, it is not always found to be to the good when allocated more listening time.

Lab Report

Key tests were successfully made to establish that the dCS was working to specification ,and representative. Advanced digital test signals were provided, including a flat-out pure sinewave at a high 'audio' 100kHz frequency, for a 352.8kHz sampling rate, and also for the eight specified DSD rates ranging from 44.1 to 384kHz. A few usefully representative results follow:

A 1kHz tone encoded at a very low -110dB level (WAV) was recovered at high accuracy, with an analysed distortion and noise floor which was 30dB lower still when measured up to 20kHz. The tone itself was near perfect with no harmonics or noise evident above the -140dB noise baseline, measured from 20Hz to 20kHz.

For two-tone intermodulation, 0dB, 19/20kHz at 176kHz sampling, an exceptional difference tone figure of -114dB was found, this a truly miniscule 0.00002% , very much at my analyser limit. Such high-quality results were consistent, pretty well regardless of whether it was in linear 44.1kHz, or even 384kHz sampling in DSD. In DSD mode, and when driven to full level at 20kHz, there were no significant noise signals beyond 25kHz, while the analysed in-band noise floor was well down at -125dB, showing no spuriae at all above this level – another excellent result.

The frequency responses were also excellent on all tests, asserting confidence in the neutrality of timbre for the arduous and extended auditioning. Taken overall the results we obtained were of text-book accuracy, such that it would serve well as a precision signal generating instrument. Technically its recovery of 'audio' signals from digital audio streams was exemplary in all modes of operation that we checked.

dCS Rossini 20kHz 0dB z dsd
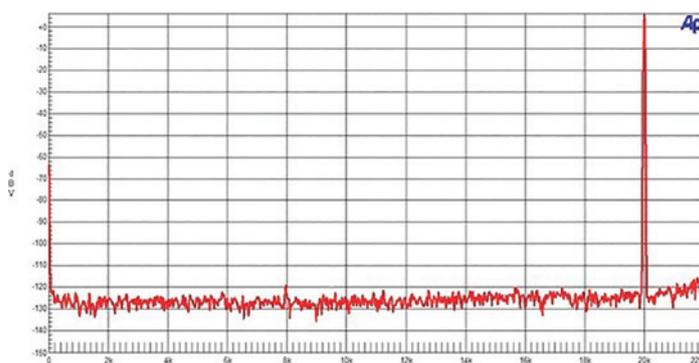
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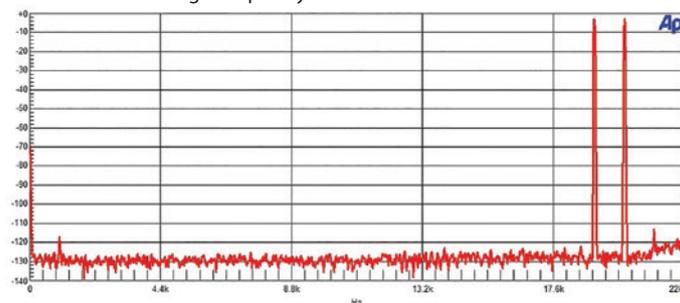
dCS Rossini 1kHz-110dB 176kHz WAV