USB/I²S DAC
Made by: Citech Co., Ltd, South Korea
Supplied by: Henley Audio Ltd, UK
Telephone: 01235 511166
Web: https://hifirose.com; www.henleyaudio.co.uk
Price: £4699

AUDIO FILE

hi-finews HIGHLY COMMENDED

HiFi Rose RD160

Designed to partner the RS130 network-attached streamer and RD180 integrated amp, the flagship RD160 DAC combines state-of-the-art silicon with a raft of custom DSP
Review: **Jamie Biesemans** Lab: **Paul Miller**

Sean Kim, the Marketing/Sales Executive Director at HiFi Rose, has stated that the brand wants to 'liven up the hi-fi market and have it embrace new technology faster'. That's quite an ambition, and, to be fair, the South Korean company has already proven itself to be a successful disruptor – a case in point being the buzz generated by its 'steampunk' RA180 amplifier [*HFN* Jul '22], and its network streamers sporting massive, customisable touchscreens [*HFN* Jun '21 and Mar '22].

So, here's the RD160, its first standalone DAC. Abandoning the ESS chipset used in its previous streamer/DAC models, it packs the new flagship Velvet Sound Verita solution from AKM [see PM's Welcome, *HFN* May '24]. Currently, this is the highest-level DAC that AKM offers, consisting of a two-chip bundle, with the AK4191 noise-shaper/upsampler/digital filter handing over to the AK4499EX for the actual D-to-A conversion. No fewer than two pairs are used in the RD160, one set per channel, in conjunction with HiFi Rose's own 'I²S alignment' regime running on a Cortex-A7 ARM-processor.

UNSEEN SCREEN

But before anyone gets to talking about what's happening underneath the RD160's hood, it will be this DAC's appearance that gets tongues wagging. Causing a stir is *de rigueur* for this brand, and the RD160 unveils yet another design aesthetic here.

When not in use, the DAC's ten small metal buttons on the left of its front panel flank a larger space that remains completely blank. But switch it on, and a display (actually two separate OLED panels) lights up, and because it's mounted behind translucent – rather than transparent – plastic, its white text and graphics have an unusual feel to them, almost reminiscent of e-paper. Off to the right, a larger dial is surrounded by a dimmable white LED ring shouting for your attention.

This fascia gives the RD160 its unique appearance, but look past it and you'll notice its other elements are 'typical HiFi Rose'. The thick top plate with the milled logo is one familiar aesthetic device, as are the cooling fins on the side of the chassis. I have no complaints about the build quality either, as the aluminium case has a gorgeous finish and, with black or silver colourways available, some partial matching of this DAC is possible with other HiFi Rose components.

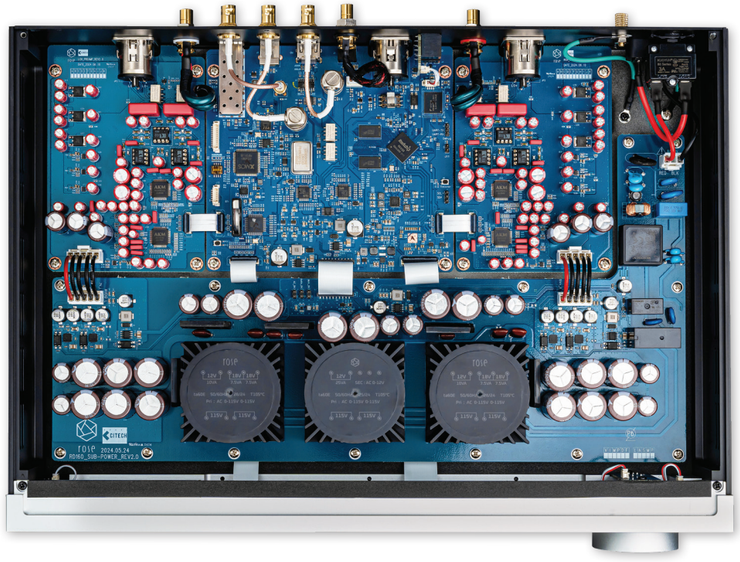
'Causing a stir is *de rigueur* for this brand'

CHARTING THE WAY

There's more to this device than a fancy industrial design, though. In keeping with its desire to be a force for change [see boxout, p69], the RD160 presents the D/A process in its own particular way. In default mode, you'll see a flowchart appear on the screen, highlighting the selected input, filter, upsampling and output – the route the signal takes through the RD160. If you love diagrams, the arc pattern that indicates volume – when used in variable output mode – will tickle your fancy even more. This 'schematic' display is bizarre, original... and I really enjoyed using it.

While legibility isn't great from a distance of three metres or so, it's definitely more fun than boring text or a small LED telling you which filter you've selected. Also, compared to the button- and LED-infested Musical Fidelity M6x DAC [*HFN* Jul '22] I occasionally use for testing, I found the RD160's display more informative when exploring everything the DAC offers.

A pure (large) text display is available if you prefer, and once music playback gets underway, all is replaced by two waveforms. These appear sluggishly and lack sharp focus due to the slightly frosted ➪



RIGHT: Three linear PSUs [bottom] feed the digital and analogue sections of both left and right channels. The former utilises an RK3128 Quad core Cortex-A7 CPU [centre right], the latter with AK4191EQ/AK4499EXEQ upsampler/DAC chips and J-FET outputs [top left and right]

'The "schematic" display is bizarre, original... and I really enjoyed using it'

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display, but this lends them an oddly 'analogue' feel – again, fun!

Generally, the remotes that accompany HiFi Rose's separates are minimalistic in the extreme. That's not the case here [see p71], as the RD160's remote is packed with buttons, making this one of the company's few products you can completely control while sitting on the sofa. I found this handset to be much more intuitive to use than the buttons on the unit itself.

FLOWER POWER

Setting the RD160 apart from a slew of entry-level AK4191/AK4499EX-based DACs from challengers including SMSL, Topping and Eversolo, HiFi Rose has added more to the mix to justify the price. Three custom linear toroidal power supplies lay the foundation, powering the digital stage and the left and right analogue output stages independently. A lot of effort has been put into keeping the core digital and analogue stages apart [see inside picture, p66], the designers describing this architecture as 'Rose CIM' (Completely Isolated Modules).

The DAC and balanced analogue output stages, the latter employing low-noise J-FET op-amps, are separated onto two mono PCBs for the left and right channels.

All the digital processing, including the various PCM/DSD formatting, digital filter and upsampling options, as well as its channelling to I²S, is accomplished on the central PCB. The OCXO clock is based here too (this is the large-ish metal can in the centre), though HiFi Rose does offer the facility for an external clock to be attached.

FLEXIBLE FRIEND

The feature set and connections of the RD160 allow for plenty of choice when fitting it into a wider system, including pre-out levels ranging from 1V to 9V, which can be adjusted on the fly using the large dial on its front panel. This would be handy if you were to connect the RD160 directly into a power amplifier, but I opted to use it with an integrated amp: HiFi Rose's EISA Award-winning RA280 [*HFN* Apr '24]. In this set-up, the RD160 seemed to add little in terms of colouration and appeared quite transparent. It resolved lots of detail, especially through the analytically minded Focal Sopra N°2 floorstanders [*HFN* Sep '15] I used, but traces of harshness or artificiality were absent.

> 'It very neatly exposed the twangs of the stringed *saz*'

Playing the Akademie für Alte Musik Berlin's *Bach Brandenburg Concerto* recordings [B0991J76PS; Harmonia Mundi; 192kHz/24-bit], via Roon and an Eversolo DMP-A8 [*HFN* May '24], drafted into digital streamer duties over I²S, 'II.Adagio' from Concerto No.1 in F Major was presented in a pleasantly flowing manner. The oboe leading the way sounded very natural, segueing into finely portrayed baroque strings, and the scale of the recording was appropriately conveyed. With eyes closed, I was almost convinced I was listening to the live performance at the Jesus-Christus-Kirche in the German capital.

ABOVE: The huge AMOLED display is both configured and navigated by a matrix of buttons on the left – there is no network/app control – with an illuminated volume dial on the right

OPEN WIDE

That said, when 'zooming' in on individual instruments I missed being able to place them with confidence on the stage. Of course, this is never easy with orchestral pieces recorded in great halls, but when I have listened to this album in the past via the same loudspeakers and a T+A DAC200 [*HFN* May '22], there was a heightened sense of accuracy. But I wouldn't want to overstate this: the performance certainly didn't come across as being smeared, rather a more spread-out image in general, and this didn't make the listening experience unrewarding. HiFi Rose's debut standalone DAC hit the spot on multiple fronts and delivered convincing immersion when 'IV. Menuet – Trio I – Polonaise – Trio II' came around.

And not every recording features a big, live sound. There was a beautifully spacious feel to the RD160's portrayal of 'Yok Haddi Yok Hesabi', an 11-minute track from Turkish psychedelic rock band BaBa ZuLa [*Istanbul Sokakaları*, Glitterbeat GBCD163; 48kHz/24-bit], particularly in its handling of the varied scattered percussion, which includes the tinkle of falling coins. The HiFi Rose DAC was in its element with this layered, focused piece, maintaining the feeling of its hypnotic build-up while still neatly exposing the characteristic twangs of the stringed *saz* – a Turkish/Middle Eastern instrument the band amplifies to ⇨

STYLE ICONS

In contrast with brands aiming for a clear and readily identifiable 'image', HiFi Rose is playing up to its disruptor reputation by invoking multiple and distinct industrial design languages. With the amps and streamers all having their own 'look', this makes for an eclectic set-up when several HiFi Rose components are arranged in one system. There's no denying that a stack of – say – the HiFi Rose RS130, RD160 and RA180 is the stylistic opposite of a family of McIntosh or Esoteric units. With the latter two brands, you often need to look very closely before working out which model you're dealing with. But as Sean Kim explains, the divergent HiFi Rose designs are intentional, and meant to convey the respective functionality and underlying architecture. 'A streamer, like the RS130, is a digital device, which is why it presents as a big screen', he says, 'while our amps are completely analogue, and their designs with the buttons and dials express this fact. The RD160 is a bridge between these two extremes, and the new design ties analogue and digital together'. Perhaps the stacked trifecta is meant to illustrate the flow from digital to analogue? 'Exactly', Sean confirms.

ABOVE: Digital inputs span optical (192kHz/DSD64 DoP), two coaxial and AES/EBU (384kHz/DSD128 DoP), HDMI/I²S (768kHz/DSD512), USB-B and SFP (768kHz/DSD512). Two clock ins are included, plus balanced (XLR) and single-ended (RCA) analogue outs

get a sound that sits somewhere in between folk and metal.

Switching to a Pro-Ject CD Box RS2 T CD transport [*HFN* Sep '19], connected via AES/EBU, I spun Gustav Mahler's Symphony No.1 and the unfinished Symphony No.10, found on Disc 1 of the *Leonard Bernstein Conducts Mahler* box set [Sony Classical; 19439708562]. The change of source didn't yield a change in the RD160's demeanour – the grand orchestral dynamics on 'II. Kräftig Bewegt' found the space to express themselves, at the same time as softer passages offered subtle, light detailing that invited me to 'lean into' the recording. Again, the impression was that of listening to a concert performance in its totality, which isn't a downside when dealing with Mahler.

STRIKING A BALANCE

The virtuoso playing of Anne-Sophie Mutter during John Williams' Violin Concerto No.2 [Deutsche Grammophon 00289 480 2012 8; 96kHz/24-bit] was on the cusp of being not quite pronounced enough, yet this will depend a bit on personal taste – if you prefer individual instruments to be accentuated, above getting a more integrated view of an arrangement, the RD160 might not tickle your fancy. On the other hand, I did often enjoy the balance struck, which HiFi Rose's Sean Kim states informed the selection of this DAC's dual-chip AKM package.

LEFT: The RD160 has a 'dedicated remote control' offering access to input, mute, volume, sampling and filter modes, display appearance and menu navigation

An element of the appeal of this flagship unit is the convenient way in which you can play around with its digital filters and upsampling. Yes, most DACs offer similar capabilities, but the interesting thing about the RD160 is that you know exactly what you're doing, thanks to its OLED display. You'll be enticed to experiment, even if that's not your nature.

SEASON TO TASTE

During testing, I felt the greatest positive impact on performance was achieved by instigating the unit's PCM upsampling to the maximum rate (768kHz or 705.6kHz, depending on source). As often with AKM chipsets, conversion to DSD brought with it a hint of a smoothing effect – a lesser sense of resolution but a more fluid sound – as evidenced when listening to Feist's *Multitudes* album [Polydor 4873183; 88.2kHz/24-bit], but you do need to take into account the drop in level during comparison to PCM modes. Furthermore, as it's easy to experiment with, I assume RD160 owners will go out and discover what they prefer. For some, playing around with these variables will be an end unto itself.

HI-FI NEWS VERDICT

With the promise inspired by the implementation of a pair of AKM's flagship DAC solutions, the RD160 is clearly no run-of-the-mill product. In practice it delivers the goods, offering a smooth, detailed sound albeit favouring broad soundstaging over pin-sharp positioning. Otherwise, the unique design not only attracts visually, but also adds an element of fun and exploration in use. And there's nothing wrong with that!

Sound Quality: 82%

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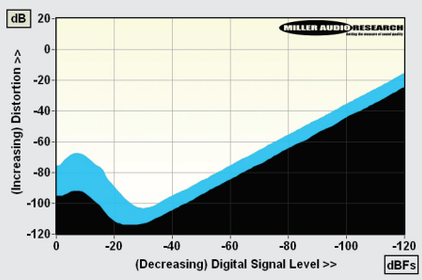
LAB REPORT

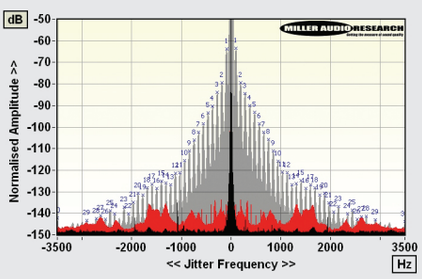
HIFI ROSE RD160

We have tested other implementations of the superb two-chip AK4191EQ upsampling/noise-shaper and AK4499EXEQ DAC [*HFN* May '24] so a baseline has already been established. In practice, however, there are key aspects of the RD160's performance that are determined by both the DPC (Digital Processing Core) and its balanced analogue output stage. The latter will deliver a maximum 8.8V from a 110ohm source impedance, rising to 258ohm/20Hz – HiFi Rose claims the RD160 has a particularly extended LF response but, in practice, there are a host of DACs flat to 2Hz. The A-wtd S/N is a spectacularly wide 120dB but distortion is *analogue* over the top 20-30dB of its range, from 0.0025-0.023% at 0dBFs down to 0.00015-0.0006% at –30dBFs [all 20Hz-20kHz, see Graph 1]. The real bugbear takes the form of a low-rate ±3Hz jitter amounting to ~50,000psec but that might be missed with cursory spectral analysis [see Graph 2 – grey spectrum = black spectrum magnified x35 on the X scale].

Otherwise, response and stopband rejection are determined by the choice of six digital filters, including two linear-phase (Sharp and Slow) and two minimum phase types (Short Sharp and Slow), though these are only enabled in 'Bypass' and 'To PCM' modes, *not* in 'To DSD' or in 'Upsampling' modes. The two sharp filters have the same –0.3dB/20kHz, –1.6dB/45kHz and –4.2dB/90kHz response with 48kHz, 96kHz and 192kHz media, respectively, with a similar 104dB stopband rejection. By contrast, the slow-roll off types trade a limited 8.5dB stopband rejection and –8.5dB/20kHz, –10.7dB/45kHz and –13.4dB/90kHz response for minimal ringing/time domain distortion. The 'Low Short' filter is a hybrid type that shows in-band ripples. **PM**



ABOVE: Distortion vs. 48kHz/24-bit digital signal level over a 120dB dynamic range (black, 1kHz; blue, 20kHz)



ABOVE: High resolution 48kHz/24-bit jitter spectrum comparing Bypass (black) with Upsampling (red). Zoom spectrum with mkrs (grey, x35, ±100Hz span)

HI-FI NEWS SPECIFICATIONS

Maximum output level / Impedance	8.83Vrms / 258-110ohm (XLR)
A-wtd S/N ratio (S/PDIF / USB)	120.3dB / 120.4dB
Distortion (1kHz, 0dBFs/–30dBFs)	0.0025% / 0.00015%
Distortion & Noise (20kHz, 0dBFs/–30dBFs)	0.023% / 0.00063%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0 to –0.3dB/–1.6dB/–4.2dB
Digital jitter (48kHz / 96kHz / 192kHz)	~50,000psec all sample rates
Resolution (1kHz @ –100dBFs/–110dBFs)	±0.1dB / ±0.1dB
Power consumption	15W (1W standby)
Dimensions (WHD) / **Weight**	430x88x330mm / 10kg