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Krell Connect
Media streamer & DAC

Audioquest
DragonFly DAC reborn

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"Lennon was in his underpants"
Hamburg's Star-Club, p78

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AUDIO
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Krell Connect

As previewed at trade shows last year, Krell has entered the world of music streaming with its Connect network player. Would you like it with or without a DAC built-in?
Review: **John Bamford** Lab: **Paul Miller**

W e've said it before: while streaming music across a home network was once limited to lossily-compressed digital files and consequently only of relevance to 'convenience audio' installations, it is now a legitimate source for high-end hi-fi systems. Even Krell Industries of Connecticut, doyen of the high-end audio world, announced at CES in 2013 its intention to introduce a UPnP/DLNA-compliant network media player later in the year – the rather aptly named Connect, now available in the UK.

Tech-savvy observers might glibly murmur, 'Well about time too…', but like many companies designing audio components for demanding listeners, Krell has been wise to wait for network streaming technology to reach a satisfactory level of maturity. While simply 'pushing' data from a computer's USB socket to a hi-res-capable USB-equipped DAC has become reasonably seamless for audiophiles, 'pulling' audio across a network has been fraught with niggles, as we've noted when testing many (albeit modestly-priced) network media players during the last couple of years.

Would it play lossless CD-resolution files? Check. But what about FLAC compatibility? And is it 24/192-capable or does it max out at 24/96? Frustratingly, where many players ticked *most* boxes for audio enthusiasts, until recently they often failed to offer gapless playback, inserting annoying gaps of momentary silence between segued tracks – making the streaming proposition a non-starter for serious music lovers.

Last year several companies' models benefited from firmware updates. Network audio players from Pioneer and Cambridge Audio, for example, now offer gapless playback where they didn't when first

going on sale. So the feature sets of clients/renderers (the players) have been evolving.

Now that streaming functionality lacks for nothing other than *very* niche applications – such as compatibility with Direct Stream Digital DFF/DSF files and PCM resolutions *beyond* 24-bit/192kHz – high-end manufacturers like Krell Industries clearly feel satisfied they can design products worthy of their premium status and their discerning customers' high expectations. This follows a number of British firms like Linn Products and Naim Audio who, it must be said, have been leading the networked audio pack.

TWO OPTIONS

There are in fact two versions of Krell's Connect player. For hooking up to an existing DAC of choice (via RCA or Toslink

S/PDIF) there's a digital output-only model (£2500), while the one featured here has an optional built-in DAC with balanced (XLR) and single-ended (RCA) analogue outputs: it costs £3500. The £2500 'transport' version of the Connect – the one without on-board D-to-A conversion – makes a perfect complement to Krell's Foundation AV preamplifier with its suite of digital inputs, adding network connectivity and internet radio functionality to the multichannel processor. It matches cosmetically with the Foundation's fresh aesthetic too [see boxout], its moderately slim profile allowing placement in regular-sized equipment racks.

While less imposing than many a Krell component, needless to say it is still vastly overbuilt compared with most music streamers. At its core lies a
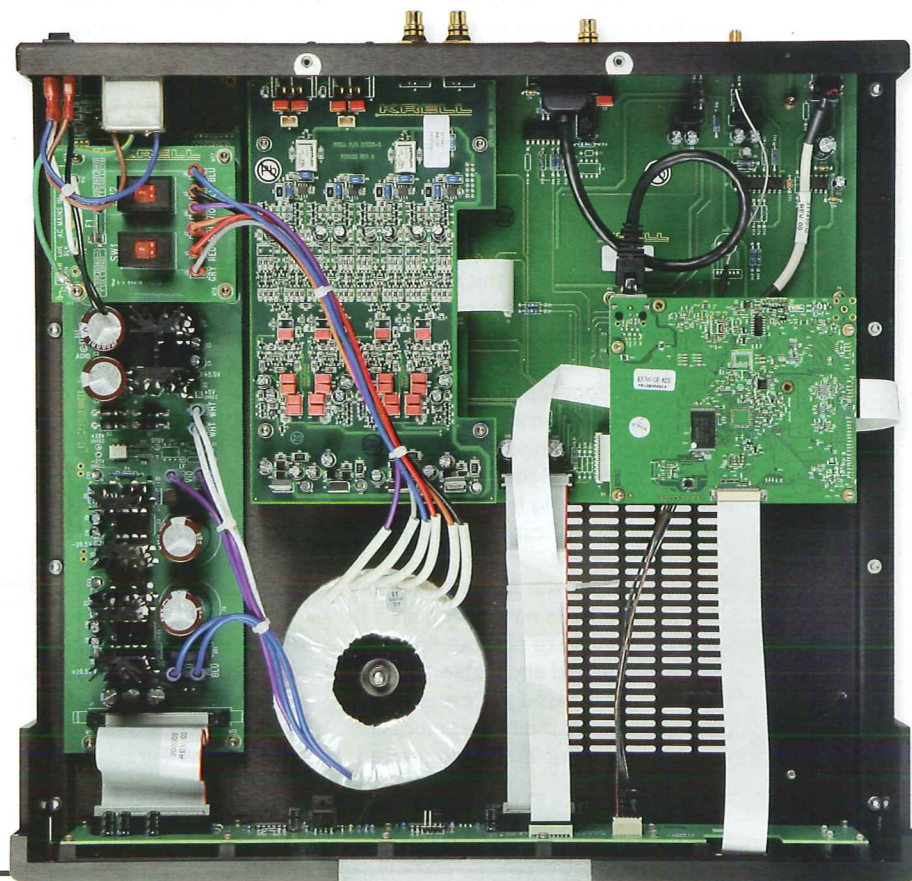
RIGHT: At the core of the Connect player is a hard-wired StreamUnlimited network audio board [right of picture]. A 32-bit ESS Sabre DAC and Krell's own Current Mode analogue stage drive the 4V balanced outputs

familiar BridgeCo-based StreamUnlimited platform including vTuner internet radio functionality – also seen in many much less elaborate network audio players. But massive power supplies have always been the cornerstone of Krell product designs, the Connect featuring an over-specified linear power supply with a 94VA toroidal transformer large enough to power a modest amplifier.

WITHOUT DIGITAL INPUTS

Meanwhile, the optional on-board D-to-A converter section uses ESS Technology's flagship ES9018 Sabre 32-bit DAC chipset and has a fully discrete balanced analogue output stage employing Krell's Current Mode topology. Again, this is a highly-specified DAC, so it's a shame that Krell hasn't fitted it with digital inputs so that it can be used with additional sources. At the rear are three mini-jack sockets. Two are 12V triggers, the third is for an external IR receiver should the Connect be positioned out of line of sight of your listening seat. There is also a solitary A-Type USB input for direct playback of files from 'local storage' such as a USB hard drive or memory stick.

These must be formatted for the FAT32 file system, not NTFS.

The Connect's minimalist fascia sports no controls other than a standby on/ off button on the left, the unit coming with a chunky aluminium IR system controller handset [shown on p53] that provides navigation and transport keys for playing/pausing/skipping selected music files. Naturally there's also the option of operating everything via a tablet or smartphone using Krell's (or anyone else's open-source) control app.

On the right is a 3.5in QVGA (320x240 pixel) colour LCD screen. Menu settings include a choice of four colour/design 'themes' and timeout settings for the display which can also be dimmed or turned off from the handset. Getting the player up and running, either hooked up with an Ethernet cable to your home's modem/router or communicating with the network via Wi-Fi, takes barely five minutes. It's that easy.

Of course, your computer or NAS drive requires server software running in the background in order for a network player to access music files. Krell suggests using Twonky Server, which costs €14.95 and is

'The Connect delivers really meaty, deeply extended bass'

ABOVE: New styling matches Krell's Foundation AV preamp/processor. File navigation is via a 3.5in LCD screen and the Connect's IR handset, or via tablet/smartphone control

available for Windows and Mac OS X – but there are myriad others one can use. The Connect will render WAV and FLAC files up to 24-bit/192kHz along with WMA, Apple Lossless, MP4A and MP3 file formats. (Macintosh computer owners should note that it doesn't currently support AIFF files.)

Krell's free-of-charge iOS app functioned perfectly well enough on my iPhone. There's an Android version too but, unless you've only a couple of hundred or so albums, you're probably going to want a tablet for more comfortable browsing of a large music collection. When you've a thousand or more albums, scrolling through them using the small screen on the Connect's fascia, or on a miniature telephone screen, really *is* a chore.

Krell's Connect app affords switching between 'servers' seen on your home network, access to the world's many thousands of podcasts and internet radio stations via your router/modem, and selection of the unit's rear panel USB input. It also displays a file's data rate and provides a volume control.

♪ MAKING A CONNECTION

The Connect is an extremely supple and expressive digital player. With good recordings it delivers really meaty and deeply extended bass, and refined high frequencies that lack any sense of hardness or fatiguing glare.

My first experiment was to see if there was any detectable difference between sound quality using a wired Ethernet hook-up or wireless connectivity. There wasn't much in it, but I noticed the sound did lose a smidgen of detail and focus when using Wi-Fi, the music appearing subtly less vital and immediate. Listening to a familiar recording of mostly acoustic jazz, *Quiet Winter Night* by the Hoff Ensemble (a sample track can be downloaded from *www.2l.no*) revealed that via wireless ⤷

RINGING THE CHANGES

The form factor of the Connect mirrors that of Krell's Foundation multichannel AV preamp/processor (£6500), a component which ran off with a coveted EISA Award in the high-end home theatre category last autumn. It heralded a new 'look' for the marque's high-end separates: uncharacteristically slim compared with Krell products' typically colossal chassis, yet still exuding a machined-from-solid feel to their build quality. At the centre of the black fascia is a silver-coloured sculpted aluminium block with dominant Krell logo at its base, the section concealing a subtle backlight that glows red when the unit is in standby and changes to blue when operational. Do these latest components indicate the beginning a new series from Krell? Can we expect similarly-styled amps and CD/SACD players in the future? Says Krell Industries' Peter Mackay: 'The new industrial design of the Foundation and Connect will be included with all new Krell product offerings. Going forward, each of our components will have a specific name – simply Krell Connect, Krell Foundation, and so on – and will no longer be part of a 'series' within our product portfolio, such as KAV or S-Series.

NETWORK AUDIO PLAYER

ABOVE: Single-ended and balanced (XLR) analogue outputs are provided, along with RCA and Toslink digital outputs. USB socket allows direct playback from a flash drive

connection the Connect delivered a marginally softer-focused image of the musicians in the church venue. And in a manner not dissimilar to the effect I've observed when comparing hi-res PCM with DSD playback, when listening to some of the latest appropriately-equipped DACs, a faint blunting of transients lent the performance a lazier feel.

The Connect's wireless receiver appears pretty robust, since my listening den is in the basement of my house and the DSL modem/ wireless router lives on the ground floor. Playback was seamless and 100% glitch-free with music files up to 24-bit/96kHz, but did suffer intermittent dropouts with 24/192 files. You're always best advised to make an Ethernet cable connection whenever a network player is for use as a primary source for enjoying better-than-CD digital audio.

MOVING INTO OVERDRIVE

Then I listened to a selection of tracks played from a flash drive, using the Connect's USB input. Sound quality moved into overdrive, with gains in dynamic shading and an improved sense of 'being there'. The Connect already sounded great when streaming files via the network, but now the performance was even better, both spatially and tonally, with soundstage cues more apparent and tonal hues more fleshed out.

Hearing a naturally lifelike recording by sound engineering veteran Barry Diament, proprietor of Soundkeeper Recordings, who likes to capture musicians playing live and record them directly to stereo at 24/192 (he calls this 'recording without a net'), showed just how capable the Connect's DAC is at

delivering the *feel* of a performance, preserving both the musical balance and dynamics.

Playing 'Dragon Boats' from Work Of Art's *Lift* album [*www. soundkeeperrecordings.com*] highlighted the Connect's delightful midrange purity and outstanding bass extension, with no bloat or overhang. Image scale and focus were exceptional, the musicians presented as a seamless spread of images across the soundstage. It sounded magical at 16/44.1 but simply fabulous at 24/192, with improved image depth and more finely-described harmonic textures.

As a 'transport-only' music streamer the Connect might be considered a sledgehammer to crack a nut. But with its optional DAC on board it certainly makes for an audiophile-quality network audio player that's a perfectly legitimate source for high-end systems.

I revisited several tracks from the CD version of Carlos Franzetti's *The Jazz Kamerata* [Chesky Records JD283] ripped to my digital library. Chesky's beautiful recording, with so much space you feel you could walk up to the jazz ensemble and shake hands with the musicians in turn, sounded exquisite. ☺

HI-FI NEWS VERDICT

Given that it's only a network media player the Connect is not inexpensive – but it *is* a Krell, and built in a commensurately luxurious enclosure. The version with in-built DAC sounds bold and confident with CD-resolution files and it certainly delivers the high-end goods when rendering hi-resolution recordings. What a pity that such a great-sounding DAC doesn't have inputs for other sources as well.

Sound Quality: 82%
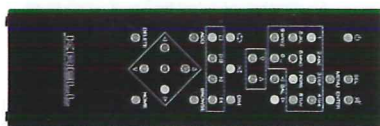
Krell's choice of a BridgeCo-based StreamUnlimited network audio platform stands the Connect in good stead, for the player will render 24-bit WAV and FLAC files up to 192kHz while also handling 32-bit floating-point files in the WAV format. The technical performance of all format types was glitchless and identical, even with the jitter test which yielded 100psec (48kHz), 65psec (96kHz) and 105psec (192kHz) across the board. The nature of the jitter, a low-rate (5Hz) pattern from 5Hz-80Hz, was also consistent regardless of file type or sample rate [see Graph 2, below]. These figures are very low but, if they were eliminated completely, might add that extra percent of stereo focus and sharpness in the most revealing of systems.

Our sample was equipped with the 'optional' 32-bit ESS Sabre DAC with Krell's fully discrete and balanced Current Mode analogue output (rather pointless reviewing the Connect without the onboard DAC, in my view). In practice it's the latter that determines the player's distortion, noise, response (etc) rather than the former. Indeed we know the ESS Sabre DAC can deliver far lower levels of distortion than the 0.002-0.0025% witnessed here (20Hz-20kHz at 0dBFs) even if this is perfectly low enough. The lowest distortion is realised at –10dBFs for a figure of 0.00016% [see Graph 1, below]. The A-wtd S/N ratio is rather better than Krell's 96dB specification at 110.8dB and the response(s) are very flat: out to –0.1dB/20kHz (48kHz media), –0.9dB/45kHz (96kHz) and –2.2dB/90kHz (192kHz files).

Readers are invited to view a comprehensive QC Suite test report for the network audio performance of Krell's Connect (with onboard DAC) by navigating to *www.hifinews.co.uk* and clicking on the red 'download' button. **PM**
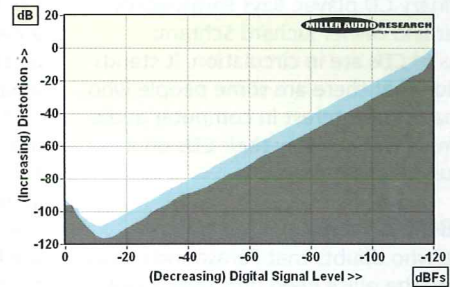
ABOVE: Distortion versus 24-bit/48kHz digital signal level over a 120dB dynamic range via Ethernet connection (1kHz, black; 20kHz, blue)
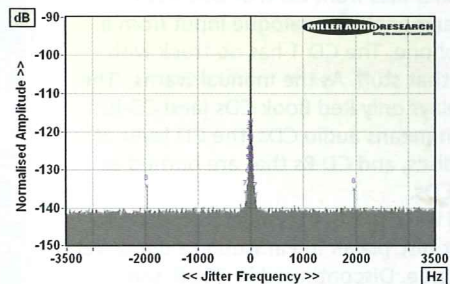
ABOVE: High resolution jitter spectrum from 24-bit/48kHz data over wired Ethernet connection

HI-FI NEWS SPECIFICATIONS

Maximum output level (Balanced)	4.03Vrms at 164ohm
A-wtd S/N ratio	110.8dB
Distortion (1kHz, 0dBFs/–30dBFs)	0.0020% / 0.0012%
Dist. & Noise (20kHz, 0dBFs/–30dBFs)	0.0025% / 0.0028%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0dB to –0.14dB/–0.9dB/–2.2dB
Digital jitter (48kHz/96kHz/192kHz)	100psec / 65psec / 105psec
Resolution @ –100dB	±0.5dB
Power consumption	25W (4W standby)
Dimensions (WHD) / **Weight**	433x88x428mm / 8.2kg