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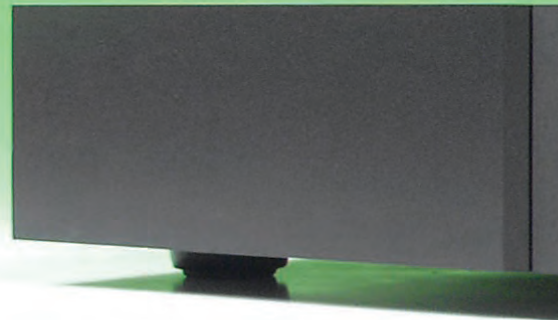
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Bit Prefect



After twenty years of protesting that they'd never do a digital-to-analogue convertor, Naim Audio have just launched one! David Price finds the new Naim DAC to be a cut above the crowd...

Naim Audio's view of life and how to live it is a sometimes controversial one. The vexed issue of DACs is a case in point; right through the eighties, nineties and noughties, Naim would patiently explain to anyone who'd listen that they "don't do DACs", because of all the imponderables and unknowns that any possible Naim digital-to-analogue convertor would have to work with. After all, they could hardly guarantee its sound if it found itself on the end of a Freeview box running 32kHz sampling frequencies, connected up digitally by one half of an old RCA phono lead bundled free with a Hitachi cassette deck circa 1983 now, could they?

Fair enough. But when they used to say this, there was always a slight doubt in my mind; possibly the reason they didn't do a great standalone DAC was that, just perhaps, they couldn't? Well, just to be really annoying, a close look at the brand new Naim DAC shows complete consistency with what the

layout, grounding and power supply issues, they've only gone and done a highly bespoke design from the ground up.

This doesn't happen very often because it's blooming difficult and very expensive. It bespeaks, on Naim Audio's part, a certain seriousness of intent. And so at last, the Salisbury company has come up with a no-holds-barred digital convertor, designed to work with just about anything that produces a stream of ones and noughts. Designed by Naim's Steve Sells and Hjalmar Nilsson, whose recent notable work surfaced in the DSP used in the Naim for the Bentley project, it sports a very fast and powerful SHARC digital signal processing 'brain' running Naim authored code. This has given Naim the freedom to get full control of the digital domain, rather than leaving it in the hands of third party manufacturers.

The traditional problem with a separate transport and DAC has always been the disconnect between the two; the DAC has to recover the clock from the S/PDIF signal,

in its own right, rather than just a waiting room for the data stream with its random flow in and out.

Interestingly, this 'digital transport' has, you could say, 'adaptive cruise control'; it can vary its own (clock) speed according to the rate of flow of the data coming into it. The SHARC DSP chip assesses the rate at which the data is coming in then nominates one of ten precisely set master clocks to send it through the DAC.

In this way, Naim say, the data entering the DAC chips is completely isolated from the incoming jitter. Only in rare cases will none of the Naim DAC's selectable master clocks be closely enough matched to the incoming data rate, in which case an asynchronous sample rate converter (ASRC) is used. Integer oversampling is used to as high a frequency as is possible given the source; for example, 44.1kHz CD is oversampled 16 times. The DAC chips themselves are two mono true multibit Burr-Brown PCM1704Ks, as used in all Naim high-end CD players including the CD555, and are capable of running with an input data clock of 25MHz, which allows sample rates of up to 768kHz.

As you'd expect, meticulous attention is paid to circuit board layout from an electrical point of view. Star earthing is used extensively, while the 210 VA toroidal transformer feeds 26 regulated low impedance supplies. When the external PSU upgrade option is used (XPS or 555 PS) with the Naim DAC, power supply separation is increased by the use of a dedicated supply for the master clock circuits. It also provides a bigger toroidal transformer and bigger reservoir capacitors, and the DSP remains

"Its clarity, insight and depth are far more than is expected at the price..."

company was always saying. This new product is designed specifically to deal with jitter issues (eliminating one great variable), but puts two fingers up to doubters like me on another front too. Instead of just doing a very well implemented proprietary design, adding those distinctive Naim qualities by meticulous attention to circuit board

which itself is very prone to timing errors. In the new Naim DAC, the data isn't recovered directly from the S/PDIF signal, but read in and stored in solid-state memory, then clocked back out to the DAC chips using a fixed-frequency local master clock. Essentially then, the DAC's master clock and memory structure becomes a kind of digital transport



powered from the Naim DAC transformer to give even more separation from the analogue section.

The circuitry has also been designed to reduce mechanical noise (i.e. vibration). The starting point is a rigid aluminium chassis with 3mm-thick panels, with the fibreglass printed circuit boards screwed to the chassis only at certain points, with other parts of the PCB resting on pillars to reduce energy transfer. To isolate vibrations associated with reservoir capacitor charging, the power supply PCB is separate from the main PCB. Analogue stage filter capacitors are mounted to minimise microphony.

GETTING CONNECTED

The Naim DAC isn't conventional on the outside either, coming as it does with a host of connectivity options, most interesting of which is the USB facility. Notably, it is the world's first Apple authenticated high-end DAC, offering full digital play out of iPods via their docking connector feeding the Naim's USB input. Put simply, hook your iPod up to the Naim via USB, and it plays the digital datastream bit-for-bit, bypassing all its analogue playback circuitry (iPod charging is switchable for best sound quality; not charging sounds better). As you can use the iPhone and iPod Touch as uPnP streaming clients, then these will give you high quality streamed music (or internet radio), off your home network, via the Naim DAC. There are even 'transport' controls for the iPod, front mounted on the DAC, and it also works via the Apple Remote.

Additionally, the DAC will also play out USB memory files, with audio of up to 768kHz sample rates, via the two type A USB inputs (one

on the front panel, the other at the rear). It will not play USB music direct from computers however; Naim say this is too noisy for serious sound, and suggest using an optical digital feed from a USB soundcard. For those of a more conventional bent there are eight S/PDIF inputs (two 75Ω BNC, two RCA and four TOSLINK optical).

For the purposes of this review, DAC was fed variously with digits from a Naim CDX2 (new type), Sony CDP-R1 CD transport and Sony DTC-59ES DAT player, although I also tried a memory stick with some hi res 24/96 files too. Unusually, the new Naim DAC is ground-switchable, via a small two-way toggle switch on the back. Naim don't recommend either position as such, leaving the user to decide. In my system, the standard setting worked best.

SOUND QUALITY

Having heard the new Naim DAC at the factory launch in September for several hours, I was intrigued to see if it sounded similar in my own reference system. My initial findings in Salisbury were of a digital source of quite exceptional clarity and resolution, and my own listening tests subsequently confirmed this. It's a very modern, contemporary sounding device, devoid of any romance, mystery or euphony; rather the Naim DAC cuts to what's going on in the recording like a hot knife through butter. Even via ye olde sixteen bit Compact Disc sources, it gives astonishing insight into the music. But here's a thing; in some ways I don't think it sounds like a Naim!

Let me elucidate. The company has always had a 'house sound'; traditionally of course this was bracing, bright, fast and forward. In

recent years the company's electronics have moved to a deeper, darker and more velvety place, but still with the accent on (the Holy Trinity of) pace, rhythm, and timing. Whilst not radically different, I still think the new DAC edges towards a more crystalline, super-neutral sound than we've heard from this marque...

For example, cue up Sonar Kollektiv Orchestra's cover of 4hero's 'Universal Love', and there's a glassy clarity to it that's completely at odds with the Naim CDX2 CD player. Whereas the latter delivers, you might say, a somewhat editorialised rendition of the music, making things a little warmer, fuller in the bass and fluffier in the treble, as well as adding a louche but rather seductive rhythmic swagger, going to the Naim DAC is like switching from a well kept pair of Hush Puppies to the world's lightest running shoe. Things are tighter, firmer and more connected with the road - or music, if you get my drift?

Tonally, the Naim DAC isn't a million miles from any modern Naim digital product; it's dry and neutral like the CDS3, for example, with dark silences and a light, shimmering upper midband when it's called for. But it has an icy clarity; everything is picked out in a cool, unromantic way and just read straight off the disc (or memory stick). This doesn't mean it's in any way cold or uninvolved; it's just that the way the Naim DAC goes about its business isn't clouded by the need to charm or beguile the listener. It's brutally matter of fact, but in the best possible way.

Prefab Sprout's 'Bonny' showed what a remarkable sounding digital product this is. This is a complex, polished pop production courtesy



of Thomas Dolby, and yet the Naim DAC unpicked it like a car thief screwdriving an eighties car door lock. Everything in the mix fell instantly and immediately into its rightful place, whereupon it sat with tremendous poise. The song starts with simple vocals and guitar, adds drums and bass, then gets ever more complex as more and more layers are added. Few DACs I've heard have ever given such a detailed picture of how this process works, and fewer still have done it with such apparent ease. Yet it's not simply a deconstructive process, where everything is laid bare, as the new Naim strings everything together in such a musically coherent way. In short, it does very 'hi-fi things', but not it an obviously 'hi-fi way'.

One thing that impressed me particularly strongly was how the DAC handled vocals. Obviously, we humans are totally attuned to our own voices, so their correct rendition means more to us than a particularly dextrous handling of the sound of a china boy cymbal, bass guitar or suchlike. With the Prefab Sprout track, singer Paddy McAloon's vocal strains were exceptionally clean and natural sounding. The Naim carried his highly distinctive phrasing particularly well, and spotlight his dynamic subtleties. Likewise, when I moved to Kate Bush's 'Running Up That Hill', so this new DAC unpicked the dense, slightly murky mix of this classic eighties song and revealed the singer's voice in all its sullen, chilly glory. Once again, the track was rendered with superlative clarity, yet the Naim carried its emotional force in its entirety.

So how would this redoubtable new digital device cope with that most analogue of experiences, jazz? Interestingly, it worked very well - underlining my findings that, whilst it may have massive insight and analysis, it's not a slave to this. Lou Donaldson's 'Alligator Bogaloo', a classic late sixties Blue Note recording, was a joy. The Naim set up a powerful double bass sound, silky treble and a fat, funky Hammond organ groove. Bass notes stop and start on a sixpence, so to speak, with this digital to analogue convertor; it's very fast and tuneful, yet things still sounded decently sumptuous, reflecting the original flavour of the

recording. The midband was majestic, the Naim accurately reconstructing the soundstage (so crisply captured by that original crossed pair of cardioid microphones) in all its three dimensional glory. Saxophones rasped, yet retained a beautifully realistic 'patina' to them that's so rare via sixteen bit CD, and snares shuffled along beautifully. The DAC caught the dynamic contrasts of the brass instruments with ease, giving a captivating performance. Meanwhile, treble was unexpectedly atmospheric (for CD), and the ride cymbals had a smooth yet tactile quality.

Wonderful stuff, but upping the ante - digitally speaking, you understand - produced an even finer sound from the Naim DAC. 24/96 PCM from Naim's own Naim Label website, and from others, showed the new convertor off as an even more subtle and detailed performer than before. The superior depth was palpable; the soundstage hung behind the speakers rather than around them, giving a more natural listening experience. Many people who've never heard hi res expect sonic fireworks the first time they set ears on 24/96, or suchlike, and are often disappointed because instead of sounding 'higher fi' than CD, it 'just' sounds more natural and 'less hi-fi'. The Naim DAC illustrates this, becoming less showy as it effectively does a disappearing act...

The quality it squeezed out of my Apple iPod Touch was impressive. We are not, as some had hoped, at the point where an iPod via the Naim's direct digital link is as good as a CD player, as the iPod has all sorts of internal issues that don't predispose it to being a brilliant digital transport, but it certainly wasn't bad. An uncompressed rip of The Verve's 'Lucky Man' came over with

a good deal of delicacy and was very listenable, even if it did sound fractionally 'out of focus' compared to the CD-based original.

CONCLUSION

Having spent a lot of time with some very high end digital sources this year, I can only say I am very impressed with this in its standard (i.e. non-power supply upgraded form). No, it's not going to upset a £10,000 dCS Paganini, but it's closer to this than its price suggests. Its clarity, insight, depth, space and natural musicality is far more than would be expected at the price, and better than the great majority of DACs currently on sale. And the fact that it brings a slightly more detailed and finessed sound to the Naim brand, whilst retaining all of those trademark rhythmic and dynamic qualities, means that it's one of the few Naim products that can easily go out and reach a new audience. The new Naim DAC doesn't just make sense in the context of an all-Naim system, but is truly able to go forth and mix with just about any other high quality ancillaries, with convincing impressive results. Another cracking product from Naim then; one that's destined to be a great success.



VERDICT 
Innovatively designed, superb sounding DAC with exceptional connectivity and excellent feature set.

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- FOR**
- superb sonics
 - flexibility, connectivity
 - direct digital iPod play out
 - value
- AGAINST**
- nothing at the price

MEASURED PERFORMANCE

Frequency response of the Naim DAC was flat from 2Hz to 21.1kHz, with the usual small roll down at high frequencies that Naim prefer, imposed by the anti-alias filtering used. This ensures an absence of obviously bright or spitty treble, always useful with CD.

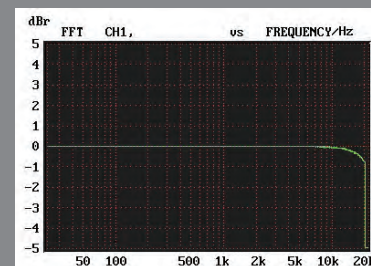
Distortion levels were low at higher music levels but rose above the expected value of 0.22% at -60dB, measuring a high 0.53% with a 16bit signal. With a 24bit signal this figure should drop to below 0.1% or lower, but with the DAC it remained a stubbornly high 0.38%, so the DAC isn't especially linear in itself.

Output was a normal 2.3V and EIAJ dynamic range a modest 106dB due to the mediocre performance at -60dB. The Naim DAC should sound smooth enough. It isn't a low distortion design however and is unimpressive here. NK

Frequency response (-1dB)
CD 2Hz-20.1kHz

Distortion (%)	
0dB	0.001
-6dB	0.001
-60dB	0.52
-80dB	4.6
Separation (1kHz)	122dB
Noise (IEC A)	-110dB
Dynamic range	106dB
Output	2.3V

FREQUENCY RESPONSE



DISTORTION

