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VINYL ICON REVIEW

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Simaudio Moon 750D *(£7950)*

From Canada comes an ambitious CD transport/DAC said to offer 32-bit processing of virtually any digital signal you care to feed it. Can it live up to the hype?
Review: **Keith Howard** Lab: **Paul Miller**

The man with 16-bit ears, Barry Fox, is going to love this one: 'the first true 32-bit fully asynchronous digital audio playback system', otherwise known as the Simaudio Moon 750D. More of this anon. For now it's enough to appreciate this flagship product encompasses both CD player and DAC, replete with digital outputs and inputs to service existing digital separates.

When you free the 750D from its packaging the first thing you notice is its reassuringly solid construction. In the established tradition of US high-end products it's built like the proverbial brick outhouse, using custom aluminium extrusions. It's unusual for a CD player/DAC to have heatsinks along either side but one of Simaudio's stated design objectives was to keep internal temperatures low in order to maximise reliability and longevity.

The extrusions look almost like aerofoil sections, framing a central portion of the front panel (available in either silver or black) that houses the thin plastic disc tray, red dot-matrix display beneath and, to either side, two arrays of push-buttons.

The six to the right control disc open/close and play and program functions, although these will more normally be accessed via the chunky, sculpted metal-bodied remote control – which, disappointingly, lacks a track number keypad. The seven to the left include a standby control at the top beneath which are other disc and display functions, plus a button that cycles through the 750D's four digital inputs when it is used as a DAC.

INS AND OUTS

Input D1 is AES/EBU via XLR, D2 is S/PDIF via phono, D3 is S/PDIF via Toslink and D4 is USB, for connection to a computer. Note that the last is not suitable for use with memory sticks. Two digital outputs are also provided: AES/EBU via XLR and S/PDIF via phono. Fixed-level analogue output is either balanced via XLRs or unbalanced via phonos and the back panel also houses an RS232 socket for installed system use, alongside remote control ins and outs.

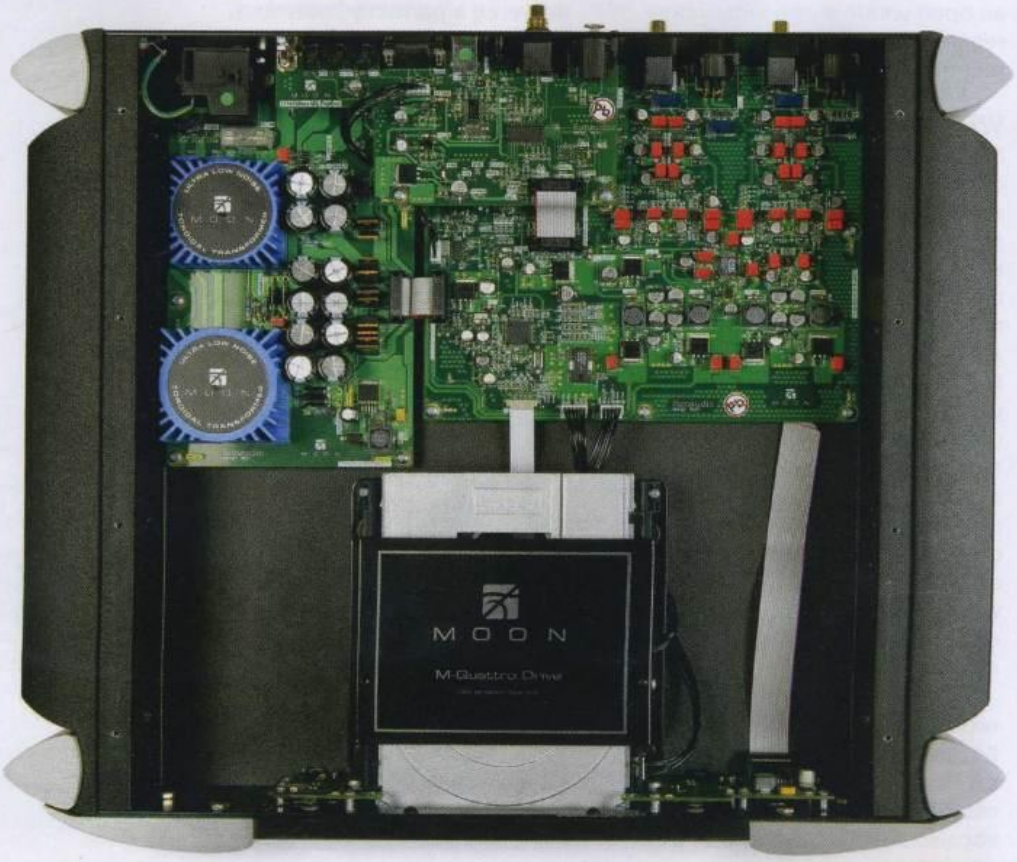
While the 750D is compatible with bit depths and sampling rates up to 24-bit and 192kHz, Simaudio – and it's not alone in this – is lax in specifying the sampling rate and resolution capabilities of each digital input. I was able to test the coax S/PDIF and USB inputs only. According to the 750D's display, which shows input sampling rate, the former supports single-wire 192kHz, and Simaudio has confirmed that the AES/EBU and Toslink inputs do too.

The USB input is limited to 48kHz although it will replay 96kHz and 192kHz source files; Simaudio has confirmed that it is only 16-bit capable, on the basis that: 'Anyone using the USB input will be connecting to a computer and these days virtually every decent sound card has S/PDIF and/or Toslink connectivity; furthermore, most of the newer computer motherboards that have an onboard soundcard will have S/PDIF and/or Toslink.' If you want to play hi-res files, then the USB input is no-go.

Using a Mac mini running Windows XP and the Foobar audio player, I found that the 750D would also not support kernel streaming via USB so – for users who are concerned about this – the Windows kernel mixer cannot be bypassed. Furthermore, via USB the display sometimes proved reluctant to acknowledge the change to a 44.1kHz file when the display was already reading 48kHz.

GRIPPING THE BITS

Let's unpick just what the 32-bit tag means here. There are two elements to



RIGHT: Uncluttered internal layout and the substantial casework help keep operating temperatures low to the benefit of reliability. An optional outboard power supply is on its way

ABOVE: Push-buttons either side of the disc drawer and large-character display operate the usual standby, disc and programming controls, and select between inputs in DAC mode

it, both wrapped up in Moon's M-AJiC32 circuit topology – a new incarnation of the Asynchronous Jitter Control circuit from the CD3.3 CD player. First, this incorporates – as the name suggests – an asynchronous sample rate converter to decouple the 750D from jitter in the incoming data. This outputs 32-bit data whether the audio input stream is 16-bit or 24-bit.

Part two is a 32-bit differential DAC stage, comprising eight DACs per channel, which is clocked using Moon's proprietary Alpha Clocking System. This is claimed to have very low inherent jitter of less than 10picoseconds RMS – although that shouldn't be taken to mean that such a low figure is necessarily achieved in the analogue output since DAC jitter mechanisms can potentially add to this.

The DAC chips themselves are ESS Technology ES9018s, one per channel, each containing eight DAC stages in a configuration ESS calls 32-bit Hyperstream. Two groups of four DACs operate differentially thereby providing averaging and cancellation of individual DAC errors to improve performance, which is claimed to be 'up to' 135dB dynamic range and THD+N (total harmonic distortion plus noise) of –120dB, equivalent to 0.0001% [see Lab Report, p54]. Also within the ES9018 is an oversampling filter offering either fast or slow roll-offs – Simaudio implements the fast option – and a jitter reduction circuit that ESS calls the Time Domain Jitter Eliminator.

Note that while the ES9018 is a 32-bit DAC, it doesn't offer 32-bit analogue performance because that's utterly unobtainable. [See the box-out below for more detail.] Nor, of course, are 32-bit audio sources generally available, or the 750D fitted with interfaces that can stream 32-bit signals. So does this make the 32-bit tag a bit of marketing hyperbole? Yes and no. The technology is 32-bit but the performance is not – a criticism you can just as well make of 24-bit digital audio. (And which Barry did indeed direct at Deutsche Grammophon's 4D recording technology many years ago.)

What really matters, I'd suggest, is how the 750D acquits itself on the bench and the listening room – and on the first count the lab report shows it to be state of the art.

CD FIRST...

I began by listening to the 750D as a CD player, using its own disc mechanism, with the marginally costlier Naim CDX2/DAC/XPS combination (£8380) to hand as a point of reference. Any notion that these two excellent performers on the test bench might sound indistinguishable was scotched immediately I played the first track on both, one after the other and then back again: The Beatles' 'Come Together', from the remixed *Love* album [Parlophone 0946 3 80789 2 0] produced by George Martin for Cirque Soleil. Via the 750D the sound was a little smoother, a little less rough-edged (appropriately or otherwise) and there seemed to be greater bass extension. Against which the Naim assembly may have sounded less suave but had the advantage in sheer musical drive, the pulse of this track appearing to beat a little faster and harder.

> 'The Moon was smooth as silk with Bremnes' voice on CD'

Searching for something of a very different genre that also places a premium on rhythmic ability my eye fell on *British Classics VI* [Decca 440 321-2], a collection of Benjamin Britten pieces conducted by the composer. The headline work on the disc is *The Young Person's Guide To The Orchestra* but what I wanted was the magnificent *Variations On A Theme of Frank Bridge*, which positively bristles with youthful invention and bravado. Recorded in 1967 this isn't the least glare-free classical recording you'll ever hear but I've yet to encounter an alternative which so brilliantly evokes the variety and vitality of these nuggets of creative energy.

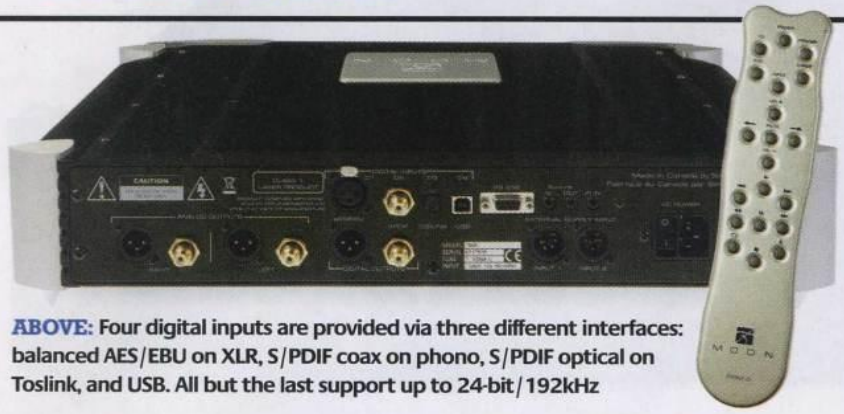
The track I selected was the third, 'March', which is propelled forward by the frenetic bowing of the double basses before the violins catch the mood. It's insistent, spiky and restless.

At least, it was via the Naim line-up which reproduced this difficult but magical recording with more rhythmical conviction than I've ever heard before. Beside this the 750D sounded smoother and a little more spatially expansive but the overall result was a little too refined.

Sensing that the 750D does its best work in other areas, I turned next to Kari Bremnes' 'Byssan Lull' from *Svarta Bjørn* [Kirkelig Kulturverksted FXCD 200]. Bremnes is Norwegian and this is a ⇨

32-BIT CONVERSION

A true 32-bit DAC – one capable of 32-bit performance in its analogue output – is way beyond today's technology to deliver. A 16-bit system encompasses 65,536 (2^{16}) amplitude levels and, as a result, delivers a theoretical signal-to-noise ratio (for a full-scale sine wave input) of 98dB. A 24-bit system has sufficient binary code for 16,777,216 (2^{24}) amplitude levels, giving a theoretical signal-to-noise ratio of 146dB. Thermal noise within circuit components makes this impossible to achieve at everyday temperatures, the best 24-bit DAC chips typically returning about 118dB. So 32-bit performance (theoretical S/N ratio of 194dB) is even more unobtainable. Not that this is anything to worry about since the real-world performance of modern 24-bit DACs is already good enough to keep noise below audibility in normal usage.



ABOVE: Four digital inputs are provided via three different interfaces: balanced AES/EBU on XLR, S/PDIF coax on phono, S/PDIF optical on Toslink, and USB. All but the last support up to 24-bit/192kHz

well-known Swedish children's song written by Evert Tauber. I have only a vague idea of what the lyrics mean (probably a good thing as there's a religious theme) but I don't want to hear it in English because I far prefer Bremnes' hauntingly lyrical voice singing in Scandinavian. The track opens with repeated bass taps – signifying knocking on a door, perhaps, or a heartbeat? – which the 750D didn't pitch as confidently as the Naim but it was smooth as silk on Bremnes' voice and projected a large, airy soundstage.

DAC MAGIC?

Time to try the 750D as an outboard DAC, which I did by feeding it S/PDIF signals on coax from the Mac mini via an RME Fireface 800 FireWire interface, and via USB directly.

It's often the case that USB DAC interfaces disappoint, even within their sampling rate and bit-depth limitations – the one notable exception I've experienced being dCS's asynchronous mode link in the Scarlatti Upsampler. Comparing the 750D's USB link to coax S/PDIF using an EAC rip of the Volodos Schubert I've been raving about recently [Sony SICC 70, Japanese import], I preferred the S/PDIF sound but only marginally once a ~3dB difference in analogue output level had been corrected. The USB sound had weightier bass but the S/PDIF won out for having more pizzazz.

Next I compared the rip, played via S/PDIF, to the disc played in the 750D. Again there was a level disparity to correct, after which I preferred the sound of the rip. The differences were not large but, as is often the case, the sound from CD was a little less well resolved, a little rougher at the edges than the sound from hard disk.

And so to hi-res material from hard disk and more comparisons with the Naim DAC/XPS, beginning with 'I Had the Craziest Dream' from Jimmy Cobb's *In The Key Of Blue* [Chesky Records, HDtracks 24/96 download]. This piece of meticulous crafted, easy-going, immaculately recorded jazz is like a comfortable sofa – something to sink gratefully into after a hard day. The 750D did well on this: it captured the music's infectious swing and the airy acoustic in which it was recorded, but there was a mild clouding of detail compared to the Naim which, for instance, rasped out the trumpet with more conviction.

The movement 'Rasch' from Anton Webern's *Five Pieces for Violin And Piano* [2L Records, 24/96 download] could hardly strike a more vivid contrast musically, its Second Viennese School angst not being something you're intended to relax to at all. But the 750D remained true to character, sounding mildly softened compared to the Naim. With such challenging music that's something you might welcome but it was the Naim, just, that better conveyed the urgency of the piece and Webern's intention to shock bourgeois ears.

HI-FI NEWS VERDICT

This is a well built and engineered product that shines on the test bench and has been well reviewed elsewhere. That said, its music making won't quite satisfy all. It will appeal most to those who prefer a slightly distanced view of musical performance, where sweetness of sound is embraced at the cost of some insight. Only if you crave being hard-wired to the music, may it seem just a tad reticent.

Sound Quality: 80%

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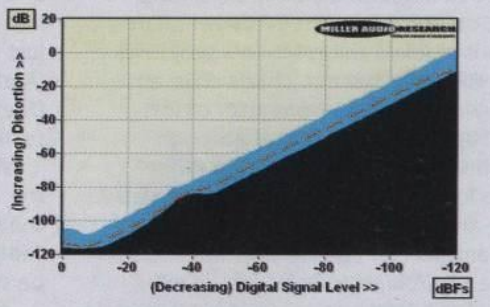
LAB REPORT

SIMAUDIO MOON 750D *(£7950)*

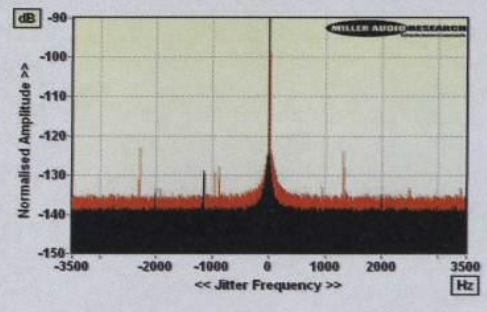
In almost every respect (bar one oddity that I'll come to later), the 750D resides in state-of-the-art dCS territory when it comes to measured performance. Distortion is an order of magnitude lower than Moon thinks it is – not 0.0003% at 1kHz/0dBFs but an incredible 0.00005% at its 2V (balanced) output. Even at 20kHz, distortion is just 0.0005% [see Graph 1, below], rising to a mere 0.0009% at 40kHz with 24-bit/96kHz and 192kHz digital inputs. The brickwall digital filtering is very steep indeed, offering at rejection of alias images >126dB at 22kHz with CD and 86dB at 24kHz with 48kHz digital inputs. The frequency response is flat to –0.16dB/20kHz with CD and with 48kHz digital inputs, reaching out to –0.8dB/45kHz with 96kHz and –4.4dB/90kHz with 192kHz digital inputs.

Jitter, as promised by Moon, is squeezed down to the limits of measurement [see Graph 2, below], reaching the 120psec data pattern limit with 16-bit CD and settling at just 5psec/15psec with 48kHz/96kHz 24-bit digital inputs. The novel DAC architecture also delivers extremely low levels of ultrasonic noise which bodes well for compatibility with different amps. And the 'oddity' I spoke of? Distortion – not through mid or treble – but through low bass where it climbs to 0.001%/100Hz and 0.003%/20Hz. This is still very low but sufficiently *different* from its mid/treble performance for it to flag my attention and, perhaps, Keith's during his auditioning.

Readers are invited to view comprehensive QC Suite test reports for the Simaudio Moon 750D CD player and integral DAC by navigating to *www.hifinews.co.uk* and clicking on the red 'download' button. **PM**



ABOVE: Distortion vs. digital signal level over a 120dB dynamic range using 24-bit data at 1kHz (black) and 20kHz (blue); CD/1kHz data (red dash)



ABOVE: High resolution jitter plot, 48kHz/24-bit data (black spectrum) and 96kHz/24-bit data (red)

HI-FI NEWS SPECIFICATIONS

Maximum Output Level (Balanced)	1.98Vrms / 97ohm
A-wtd S/N Ratio	109.0dB
Distortion (1kHz, 0dBFs/–30dBFs)	0.00005% / 0.0014%
Distortion & Noise (20kHz, 0dBFs)	0.0005%
Frequency resp. (20Hz-20kHz)	+0.0dB to –0.16dB
Digital jitter (CD/24-bit digital in)	120psec / <5psec
Resolution @ –100dB	±0.1dB
Power consumption	25W
Dimensions (WHD)	476x102x427mm