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DAC to the Future

Andrew Harrison finds more than just battleship build quality to like in Audio Research's new DAC7 - it's a crossover digital-to-analogue convertor that looks like a valve preamp but has more in common with the iPod generation...

There's something strangely comforting about a hi-fi product with grab handles on the front. But in truth, the Audio Research DAC7's aren't terribly useful, as it only weighs 5.2kg - this is no retro amplifier, but rather a modern day solid-state digital to analogue converter built for the PC age. The company has focused first on getting the best from its USB digital audio input - and then added the more familiar digital interfaces like RCA and Toslink S/PDIF to widen the unit's scope. And it's as well that it did, since those S/PDIF inputs do work so very well!

In the centre of the trademark thick aluminium fascia is a black-backed window containing various LEDs to show which of five inputs is active. We're spoilt for choice here, with each of the principal industry-standard connectors represented: RCA phono, BNC, XLR and Toslink optical – plus the less typical USB port. Four lights illuminate to show power on, polarity inversion, digital lock and mute. In the smaller dark window below are push buttons labelled Power, Invert, Mute, and Input; the latter cycling between aforementioned available inputs.

Only lacking here is some kind of indication of the incoming digital audio sample frequency. When playing from a computer in particular, it's useful to have ready reference to the incoming datastream format, in order to ensure that a Mac or Windows PC isn't inadvertently doing any on-the-fly sample-rate conversion. When playing CD-ripped music, for example, it's sometimes easy for the computer to get reset to 48kHz sample-frequency output, with subtle but debilitating results on audio quality. A front panel indicator could prevent the error by explicitly showing data frequency.

On the rear panel are all the necessary connectors, chassis mounted with enough space between them to allow for chunky cables. In the case of the USB input, it uses a Type B port, as found on most PC printers.

Look inside the DAC7 and you find two small frame transformers – one each for digital and analogue sections – used in the power supply on one side, with a large part of the circuit board dedicated to smoothing and voltage regulation on the other. A bank of six high-temperature specification electrolytics on top are supplemented with lower-value Rel Cap bypass capacitors on the PCB's underside. The circuit board itself is a real heavyweight type with thick conductive tracks, itself supported from the chassis baseplate on sturdy support pillars. In one corner, just behind the various digital input socketry, is the unit's digital section. This features some surface-mount components such as the converter's core DAC chip, a Burr-Brown PCM1792. This hybrid chip - using multibit and delta-sigma conversion techniques - is a 24bit, 192kHz-capable converter utilising eight-times oversampling and an integrated digital filter.

The rest of the large circuit board, however, more closely resembles a valve amplifier, with circuit tracks so wide and so well-spaced from each other, it could almost be using point-to-point wiring on a tag strip. Solder joints alone betray the hand-crafted nature of construction, with generous amounts of shiny metal showing at every junction of component with circuit board. The centre of the board is dominated by a large and mostly discrete solid-state output stage. This is laid out in an almost mirror-like symmetrical fashion for the stereo left and right channels, and provides passive I/V (current-to-voltage) conversion. This recovers the required analogue voltage output that will ultimately drive a connected pre- or integrated amplifier. The notable addition to the fully discrete output stage is a pair of low-noise J-FET opamps right at the end of each channel, allowing a direct-coupled output through the unit's balanced XLR and unbalanced RCA phono connectors.

You can switch between inputs from the comfort of your armchair with a supplied infrared remote control, as well as invert polarity of the output, mute the sound, or put the DAC7 into standby. So far, so conventional for any hi-fi DAC that offers remote control. But more surprising are the triangular buttons arranged in the compass ordinal points and marked skip left and right, play/pause and stop. When playing music through the USB input from a computer, these buttons actually control playback from a program on the PC. So with music playing from iTunes, for example, those navigation controls allow you to start play, pause and skip using Audio Research's own remote handset. And if you're watching a video from Apple QuickTime, it will likewise give control over playback.

SOUND QUALITY

Smooth and sonorous are just two words that leap to mind upon hearing the DAC7 in action. Audio Research has engineered a free-flowing, natural sound using the more established technology of an oversampling converter chip. It's not an instant razzle-dazzle sound that pulls you in, but a stable, confident portrayal of music that can seduce the ear. The key here is the manner in which the DAC7 simply lets the music reveal its

VERDICT £

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FOR
- natural 'undigital' sound
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- rock-solid stereo imaging
- great build

AGAINST
- no sample freq. display
- 16/48 via USB only

natural pace.

An easy way to illustrate the DAC's mastery of musical structure is with some challenging grand piano recital. Mitsuko Uchida plays Debussy's Études with accomplished grace, despite the technical challenge of sequencer-like staccato runs. In 'Pour les Huit Doigts', there's a shocking and seemingly unrelenting run of notes right from the start to the end of the brief composition. Playing from CD on a dCS Verdi via an AES balanced line, the DAC7 made sense of the rippling finger storm, highlighting the lower resonances of the instrument in a brief left-hand stretch toward the bass notes. As a brief point of comparison, the Chord DAC64 is similarly adept, perhaps bringing out more gravitas at the low end, at the expense of reduced upper smoothness.

The Audio Research could stand its ground against costlier designs too, losing out on the ineffable silkiness of the dCS Delius – but likewise making good sense of a complex north African acoustic mêlée lead by Rabih Abou-Khalil on the stringed oud. From his remarkable 1992 album Tarab and the stand-out track 'Bushmen in the Desert', the Lebanese oud player sits centre back while hand percussion builds up at front left and right stereo positions. The rhythms are complex, defying normal Western counting, but a section in what approaches 5/4 time proves a challenging trial for good hi-fi reproduction, but the DAC7 sailed through the piece, keeping the smoke-tinged tension and atmosphere all the way.

In tonal terms, the Audio Research DAC7 has a somewhat mellow tone, smooth at the top, splendidly open right through the midband, and controlled down to the bass. It loses out on the final word of bass extension, subjectively speaking, missing out on some low-frequency effect highlights on some tests discs; yet it gets most of everything else so tangibly right, it almost feels rude to point it out. And compared to DACs that process the digits with upsampling, the stereo representation is a tad more constrained in its width.

From 'Pictures at an Exhibition' with Riccardo Muti at the helm of the Philadelphia Orchestra, there's a more mono-focused rendering with strings sited centre-left and woodwinds centre-right. Dynamics are truly first class, hinting at the range of an in-the-room orchestra, and instrumental positioning is beautifully stable. To return to the term 'sonorous', it's the colouring of the piece's all-important brass and horns that truly impressed. Close harmonies between these instruments are played with such believable realism, they make many playings of this work appear like detuned raspberries!

Music played through the USB input, on the whole, kept the faith too. The stereo precision was there, where many a USB DAC gets a little nebulous and vague, although the top end could sometimes lose out on the treble grace as found through AES balanced, for instance. Audio Research has excelled itself in getting the USB working so very well.

CONCLUSION

More than just an accomplished hi-fi digital converter: the superb new Audio Research DAC7 bridges the gap between PC and music system by allowing high end sound reproduction from both traditional and computer-based sources.

MEASURED PERFORMANCE

Our high resolution frequency response sweep with the digital generator of our Rohde & Schwarz UPV analyser clearly shows that high frequency output rolls down slightly above 10kHz, a popular way of ensuring CD doesn't sound bright or glassy. The trace readout shows the upper -1dB point is 21kHz all the same, much like other players. At the other end of the spectrum the DAC7 reached down to 4Hz.

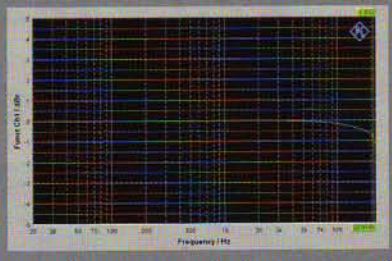
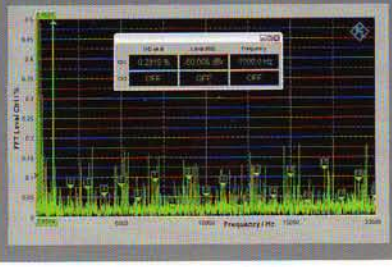
Linearity was up with the best, although peak level of 0dB distortion was a little high at 0.02%. More consequential are lower level figures, from -6dB down to -60dB and over this range the DAC7 measured well, our -60dB analysis showing the usual sea of quantisation noise with harmonics picked out by markers, and which measured 0.23% in all. The noise is intrinsic to digital quantisation on the Philips test disc by the way, not generated by DAC7. The UPV gives a dramatic visual presentation of the phenomenon.

EIAJ Dynamic range was a high 112dB, as expected from the excellent linearity figure, and output high too, measuring 2.7V.

The DAC7 measures well all round. It should give an easy sound. NK

Frequency response (-1dB)	
CD	4Hz - 21kHz
Distortion (%)	
0dB	0.02
-6dB	0.005
-60dB	0.23
-80dB	4.2
Separation (1kHz)	109dB
Noise (IEC A)	-100dB
Dynamic range	112dB
Output	2.7V

FREQUENCY RESPONSE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