

Resonessence Labs Invicta (£3495)

The ESS Sabre DAC was key to many of 2012's most exciting digital products. Now the ex-design team has launched its own 'prosumer' flagship, expectations are very high
Review: **Keith Howard** Lab: **Paul Miller**

As we discussed in our review of the Bricasti M1 DAC [*HFN* June '11], it is rare for a high-end audio manufacturer to appear as if from nowhere with a product that challenges, in sound quality and price, established favourites from manufacturers who have built their reputations over decades of painstaking product development.

But anything they can do in New England they can do in Canada too, it seems, for here is another high quality DAC from an unfamiliar name, this time from the west coast (Resonessence is based in British Columbia) and north of the 49th parallel. What makes them different is that whereas Bricasti was at least active in the pro audio market before the M1 burst on the scene, Resonessence Labs is a start-up. Thus far it only has one product offering, the Invicta DAC on review here, but it has already made waves in North America, and is set to do the same on this side of the Atlantic now that it is being distributed in the UK by Unilet Sound and Vision.

SLOT FOR SD CARDS

Resonessence may be a new kid on the block but that's not to say it lacks a track record. Its president is Mark Mallinson, previously operations director at ESS Technology, whose Sabre DAC chips are deployed in the Invicta. If anyone knows how to extract the best from these high-spec DACs [see box-out], Mallinson should be the man.

To call the Invicta a 'DAC' is actually to sell it short, since it is half way to being a preamp too. Although it has no analogue inputs it does have a volume control, operating over the surely excessive range of 127.5dB, and – in a manner reminiscent

of Benchmark's DAC products – pays more than cursory attention to headphone users by incorporating two independent headphone amplifiers, each feeding a separate ¼in jack socket to the left of the fascia. Other noteworthy features on the front panel are an electrically quiet OLED display, indicators of input sampling rate from 44.1kHz to 192kHz (very useful for monitoring any downsampling by Windows or Mac operating systems or on DVD-A player S/PDIF outputs) and, perhaps uniquely, an SD card slot that can play AIFF or WAV files from SD or SDHD cards.

Round the back on the crowded rear panel there are balanced and unbalanced analogue outputs on XLRs and phonos, a balanced (AES/EBU) digital input on XLR and unbalanced (S/PDIF) inputs on BNC

(two inputs) and Toslink. There is also a USB input, a Toslink output (which carries data from the SD card slot or USB input), a clock input on BNC labelled 'Sync' and an HDMI output – although both the Sync and HDMI features are yet to be enabled pending a forthcoming software upgrade. These are applied by loading the upgrade file to an SD card, inserting it into the front panel slot and using the Invicta's menu system to locate and 'play' the file.

SO WHICH WAY TO GO?

A word or two about the USB input. As you'd expect of a modern DAC the Invicta (a) uses asynchronous mode data transfer, so that its master clock, not the computer's, is in control, and (b) is compatible with 24-bit audio data at



RIGHT: Powered by a low-noise linear supply (top right), the Invicta separates its digital processing (left) from the two parallel audio boards (lower right). Build quality is exceptional



sampling rates up to 192kHz. No driver disc is supplied, so the Invicta relies on suitable drivers already being installed on your computer. Both USB Audio 1.0 and USB Audio 2.0 drivers are supported, and you can force which of these is used via the Invicta's Settings menu.

A small plastic-bodied remote allows armchair control of power on/standby and volume level, enables access to the menu system and provides for navigation of SD cards. Fast forward, pause and rewind buttons operate on SD card and USB playback only.

As DACs like the Invicta offer users an ever wider range of operating modes, so they pose more questions for the reviewer to answer. In addition to the familiar question of whether the USB or S/PDIF interface provides the better sound quality, the Invicta also throws into the mix direct replay of files from SD card – is that better still? And any complete review must also

take into account the performance of the Invicta's headphone amplifiers, since in this respect it is self-contained: you don't have to connect it to an amp and speakers.

A FEW SURPRISES

My one reservation that I have about the Invicta was prompted when I moved from my initial sessions of headphone listening to using room speakers – connecting the DAC's unbalanced outputs to a Naim NAC252/ SuperCap/NAP250 and thence to my pair of Thiel CS1.6s (which I still find exceptional for their midrange openness

and vitality, and their ability to lay bare changes upstream). That lucid sound I so enjoyed via headphones was, arguably, a little diluted via the Invicta's line outputs. Through my Naim set-up, it was a close run thing against the more lively and assertive sound (using S/PDIF) of the Chordette QuteHD DAC [*HFN* Sep '12].

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ABOVE: A beautifully crisp and clear OLED display is far 'quieter' than standard fluorescent types. The menu navigation may not be entirely intuitive but the SD card reader is a real bonus

In fact I had begun my listening using headphones because I had the Lehmann Black Cube Linear still powered up following completion of the Bryston BHA-1 review [see p48]. I also turned to the wonderfully transparent, tonally neutral Sony MDR-MA900 to decide the issue of whether the Invicta's headphone circuits could match or even exceed the sound quality of a fine standalone headphone amp: a distinct possibility when extra cables and connectors are inevitably involved with any external device.

I used an S/PDIF feed to one of the Invicta's BNC sockets for this comparison, sourced – as ever – from a TC Electronic Digital Konnekt x32 FireWire interface fed by a Mac mini running Windows XP and JRiver Media Center v17. When using the Lehmann I turned the Invicta's volume control up full to 0dB and controlled playback level via the Black Cube's volume control – when using the Invicta's headphone output, of course, level was adjusted by its own volume control.

For music tracks over headphones I had chosen three very different but treasured 16/44.1 files to start with: the opening Prologue from the original cast recording of Bernstein's *West Side Story* (large soundstage, wide dynamic range); Peggy Lee's incomparable 'Fever' (a high level of tape noise but such stylish performances from the whole band); and the last movement of Mozart's clarinet quintet featuring Antony Michaelson (a shining example of how to capture small musical forces performing in a natural acoustic by recording engineer Tony Faulkner). My conclusion was (hold on to your hats) ☺

SABRE RATTLING

ESS Technology Inc of California manufactures three high-spec SABRE32 digital-to-analogue converter chips, the eight-channel ES9016 Ultra DAC which claims a dynamic range of 128dB in two-channel mode, and the ES9012 and ES9018 Reference DACs (two-channel and eight-channel respectively) which increase that figure by 5dB. All use ESS's patented 32-bit Hyperstream DAC architecture, which is claimed to offer vanishingly low distortion alongside these exceptional dynamic range figures. All also offer on-board volume control and allow the use, if desired, of user-specified digital filters, and all three support double-quad-rate sampling frequencies (352.8kHz and 384kHz), raising the possibility that products equipped with them may support these higher rates in future if they don't already. Indeed, all three chips offer DSD compatibility, suggesting they also facilitate native replay of DSD files via the DoP (DSD over PCM) USB interface. The Invicta uses both a 9018 and a 9016 in a '4:1 mode' (eight DACs for two channels) which Resonance claims extracts maximum performance, although no further details of this are provided online or in the Invicta literature.

OUTBOARD DAC

LAB REPORT

RESONESSENCE LABS INVICTA (£3.5k)



ABOVE: Balanced (XLR) and single-ended (RCA) analogue outs are joined by AES/EBU (XLR), Toslink optical, S/PDIF (coaxial on BNC) and USB digital inputs. The 'Exp' HDMI connection is destined to be enabled by a future firmware update

that the Lehmann has been eclipsed in my affections at last. The Invicta's headphone output did it for transparency every time. Via the Invicta the sound was simply more like that I'm used to hearing from a good pair of speakers – and that, for me, remains the ultimate accolade for headphone reproduction of conventional stereo source material.

ACE UP THE SLEEVE

As I got such fine results via the headphones I donned them for the next comparison: S/PDIF versus USB input versus – and I was *really* interested to hear the outcome of this option – replay of the same file via SD card. If you, like me, hear a difference between computer replay of a file via hard disk or USB flash drive, it seems reasonable to hope that replaying a file within the DAC itself might be better still.

For these comparisons I chose three hi-res files freshly copied to the Invicta's SD card: Tor Espen Aspaas playing the *Maestoso* from Beethoven's Piano Sonata No 32 (a 24/96 download from 2L that embodies a magical combination of subtlety and power); the 24/96 download of the title track from Paul McCartney and Wings' *Band On The Run* (no great shakes as a recording but one that can still surprise through the best replay equipment); and the first movement of Mozart's Wind Serenade K388 (a 24/88.2 file from the Naim Label that is another Tony Faulkner recording but distinctly less transparent and which demands top-notch detail retrieval if it isn't to sound murky).

As I was itching to know how replay from the SD card would fare, my first comparison was between

this and its S/PDIF input. It would be hyperbole to say I couldn't believe my ears at the result because I was primed for the possibility that the former would be superior, nevertheless I was surprised at just how effortlessly better it was.

In the Beethoven piano recording the big chords were even more powerfully rendered but just as impressive was the way that notes tailed away into the reverberation with sustained clarity. The stereo image was wider in 'Band On The Run', instruments were more clearly separated and Macca's voice was warmer and fuller. Soundstage expansion was evident in the Mozart too but the key factor here was the superior delineation of instrumental timbres that made it easier to hear who was playing what and how. In fact the improvement in transparency was evident from the musicians' collective intake of breath before they even began to play.

For the S/PDIF versus USB comparison I used the same files and slightly preferred the result via USB, although it was again bettered by replay from SD card. I'd begun by thinking the SD slot might be just a curiosity: by now I needed no persuasion of its significance. ☺

HI-FI NEWS VERDICT

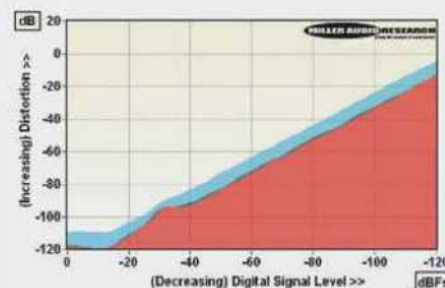
The Invicta is a remarkable product in many ways, the more so for being Resonance Labs' first. Its headphone amplifiers are state of the art and its SD card slot is more than a mere whim, providing superior sound quality to the S/PDIF or USB interfaces. It's clearly a technical reference among sub-£5k DACs but if I were going to listen *exclusively* via headphones, I'd covet the Invicta and consider it a bargain.

Sound Quality: 84%

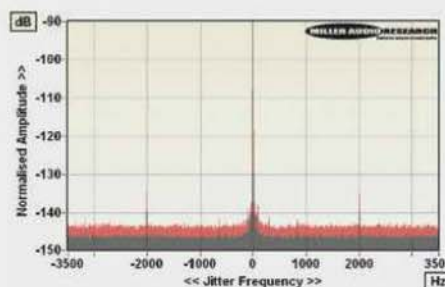


Most manufacturers make do with a half page of specifications in the user manual, but the Invicta comes with a separate 56 page PDF to illustrate its technical prowess. *HFN* is not short of experience in this field, so readers might care to compare this PDF (available from RL's website) with the comprehensive QC Suite test reports available via the red 'download' button at www.hifinews.co.uk. Otherwise, I can save you the trouble by declaring that not only does the Invicta out-perform Audiolab's M-DAC [*HFN* Sep '12] and Oppo's superb BDP-95EU player [*HFN* May '12] – both utilising ESS Sabre DACs – but it also bests RL's own specification in some areas. With analogue stages the equal of its two ES9018S DACs, distortion is a mere 0.00008% through the midrange at its peak 4.4V output, falling still further to ~0.00003% at -10dBfs [see Graph 1, below] and settling at just 0.00025%-0.0003% from 20kHz to 40kHz. The A-wtd S/N is a huge 116dB via S/PDIF and USB 1.0/2.0 inputs while low-level resolution is good to within ±0.1dB over a 100dB range and ±0.5dB over a 120dB range.

The frequency response and time domain behaviour depends on the choice of fast or slow digital filters, the former offering 83dB stopband rejection with equal pre/post event ringing and a -0.23dB/20kHz or -1.1dB/45kHz (96kFs) roll-off. The slow filter benefits from minimal pre/post ringing but offers almost no rejection of aliasing images (-5.7dB) and a response that rolls away more obviously to -3.2dB/20kHz and -4.4dB/45kHz. Channel separation is >135dB and channel balance 0.00dB (!) while jitter is within 10psec at all sample rates, through all inputs [see Graph 2]. When it comes to the numbers, the Invicta is clearly *the* benchmark DAC of 2012. PM



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



ABOVE: High resolution jitter spectra comparing 24-bit/48kHz data over S/PDIF (black) with USB (red)

HI-FI NEWS SPECIFICATIONS

Maximum output level (Balanced)	4.43Vrms at 76ohm
A-wtd S/N ratio (S/PDIF / USB)	116.2dB / 116.2dB
Distortion (1kHz, 0dBfs/-30dBfs)	0.00008% / 0.0017%
Dist. & Noise (20kHz, 0dBfs/-30dBfs)	0.00025% / 0.0025%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0dB to -0.2dB/-1.1dB/-3.2dB
Digital jitter (48kHz/96kHz/USB)	10psec / 11psec / 10psec
Resolution @ -100dB	±0.1dB
Power consumption	22W (9W standby)
Dimensions (WHD)	220x50x280mm

