

# Canor Precision Tube DAC 2.10

This Slovakian-built DAC retains the brand's signature triode-tube analogue stage from the companion CD 2.10 disc player, but its digital engine beats to a very different tune  
 Review: **Jamie Biesemans** Lab: **Paul Miller**

Many manufacturers building tube-based products seem to prefer retro-nostalgic designs but Slovakia's Canor is one of the few that favours a more modern, progressive aesthetic. It not only produces tube amplifiers but also integrates line-level tube stages into source products, such as the CD 2.10 CD player [HFN Apr '21]. The partnering DAC 2.10 also marries an output stage containing four Electro-Harmonix 6922EH triode tubes with a digital mainboard, the latter equipped with a pair of ESS9038Q2M DACs. Otherwise this is a dyed-in-the wool 'legacy' DAC with no network or wireless functions and a fixed rather than variable output. So that large rotary is not a volume control...

As PM notes in his boxout [see p59] this digital stage is reminiscent of that employed in the EISA Award-winning Musical Fidelity M6x DAC [HFN Jul '22], and although they are not the same device they both offer a selection of seven digital filters to season the listening experience. And since PM tested the Precision Tube DAC 2.10, Canor has added yet another filter – Optimal Transient – that was developed by John Westlake and used in Pro-Ject's Pre Box S2 Digital [HFN Aug '17].

## IT PAYS TO PLAY

The combination of these filters with Canor's reclocking and oversample bypass modes offers up the potential for a lot of 'tweaking' possibilities, particularly by audiophiles who like to play around searching for the most pleasing sound. As some of these filters deliver better results with high sample-rate material, rather than CD/48kHz files, you probably won't

**RIGHT:** Large linear PSU with screened/potted transformer [top right] has separate regulation for the XMOS USB, Altera Max II processor and pairs of ESS9038Q2M DACs [centre of main PCB], in addition to the triode tube output [lower left]

quickly settle on one selection and leave it at that. At least, that was my experience, in part because Canor made it easy to switch between the different options, with dedicated filter buttons and more on the remote. Experimenting is encouraged!

As you would expect from a DAC in this price class, it is ready for all types of hi-res material, accepting LPCM up to 768kHz and DSD streams up to and including DSD512 via its USB-B input. The coaxial S/PDIF, optical and AES/EBU (XLR) inputs [see p61] are limited to 192kHz/24-bit but full MQA unfolding is at hand, if you so desire.

The Tube DAC 2.10 is part of Canor's Premium Line, which is an apt description

for a series that boasts such a luxurious appearance. The front façade stands slightly proud on all sides, its panel divided into three rows with a brushed aluminium finish above and below, and a black glass strip in the middle which dips towards a large power button in the centre. A nice contrasting look, but if you prefer a more subdued approach the DAC is also available in full black, as pictured here.

## LISTEN AND LEARN

The use of orange for the Canor logo and lettering of the display is equally on-brand. Out of the box this 3.5in screen shows a lot of information, arguably too much, with



the screen real estate dominated by 'PCM' or 'DSD', plus an icon indicating which source input is selected. Sitting a few metres away, this meant the information I really wanted to know – the incoming sample rate and selected filter – wasn't particularly legible. Then again, it's probably more interesting to just listen while trying out the different DAC filters on offer, letting your ears determine which sound you prefer.

*'The music is deliberately minimalist and sparse'*

And I shouldn't grumble too much, as Canor has actually given some thought to this. Its solution is a 'Theme' button on the supplied remote that switches the display over to the classic Canor look of large retro characters

and pared down information (input and sampling rate). For some reason the word 'Atari' popped into my mind when I saw it. Remote controls are an area where so many brands drop the ball, but in line with

the 'premium' branding, Canor's is a sturdy metal unit that's both firmly in the luxury camp yet easy to operate. There's even a spare battery, a negligible cost but a nice gesture all the same. You can also navigate the settings of the Tube DAC 2.10 using the twist/press rotary encoder on the front, but, with dedicated buttons to change most of the options on the handset, there's little reason to dive into the system menus.

**ABOVE:** Canor's 'multi-theme' display is big and bold while its rotary encoder (not volume) helps navigate the menus, supplemented by small buttons [centre] and compact remote [see p61]

The Tube DAC 2.10 was tested in a system featuring a Hegel H590 integrated amplifier [HFN Oct '18] driving a pair of Focal Sopra N°2 floorstanders [HFN Sep '15]. As Hegel's amp recently received (long-awaited) Roon Ready status, this let me switch quickly from Canor's DAC (streaming handled by an Auralic Aries LE) to the AKM-based digital stage in the Norwegian-built H590.

## OPTIMAL EXPERIENCE

My previous experiences had indicated that the fine internal digital stage of Hegel's amp could still be bettered by an external DAC, and that was certainly the case here. Canor's Precision Tube DAC 2.10 immediately showed itself as an upgrade, with a greater sense of scale and timing.

The mellifluous voice of Samuel T. Herring was revealed to the world when he guested on DJ Shadow's recent 'Our Pathetic Age' album, a performance which in turn exposed Herring's own Future Islands to a larger audience. And the group's 'As Long As You Are' [4AD 4AD270; 96kHz/24-bit], a slice of relatively simply constructed synthpop, proved a fine choice for analysing the effect of the DAC's filters.

This is music deliberate in its minimalism, with sparse synthesisers and percussion forming the backdrop to Herring's vocal. Playing around while listening, I eventually settled on 'Optimal Transient' – the newly added filter from John Westlake. On the tracks 'Waking' and 'The Painter' in particular, this was an excellent middle-ground choice, delivering rhythmic drive and rich detail. I wouldn't say that using the upsampling/reclocking options with the other filters had a big impact on these pieces, however.

Portraying the full textural wealth of the latest Akademie für Alte Musik Berlin recording was something the Tube DAC 2.10 appeared to managed with ease. ↪

## A FAMILY AFFAIR

It would surely have been far simpler for Canor to 'lift' the digital heart from its CD 2.10 player [HFN Apr '21] into this partnering Precision Tube DAC 2.10 but, for reasons that are familiar to us all these days, it was encouraged to transition from its SRC43921/AK4490EQ upsampler/DAC solution to one based on tried-and-tested ESS silicon. So, while the Precision Tube DAC 2.10 still employs Canor's familiar 6922 triode tube-based analogue output stage and XMOS USB input, the digital 'filling' is now a combination of ESS's ES9311 regulator, three separate crystal clocks and a pair of surface-mount ES9038Q2M DACs. Now if this latter section sounds familiar, and the production engineering of its digital PCB looks familiar, then there's good reason because Canor is also a longstanding sub-contractor for what is arguably the world's leading hi-fi brand – Pro-Ject.

Audio Tuning Vertriebs GmbH, the parent of Pro-Ject Audio Systems, also owns the Musical Fidelity brand and it's one of this company's recent products, the EISA Award-winning M6x DAC [HFN Jul '22], that shares a very similar DAC/clock PCB layout. The cooperation between the two brands makes great sense, and aside from the benefits brought by economy of scale, the two companies remain linked by geography and personnel – one of Pro-Ject's key electronics designers having been on the board at Canor. The high-tech production facilities at Canor's Slovakian plant are perfectly placed for Pro-Ject's higher-end electronics separates, leaving the fullest capacity of Pro-Ject's own SEV Litovel factory devoted to building its seemingly inexhaustible range of turntables [see p66].

But you don't need *Hi-Fi News'* technical expertise to imagine some sharing of genetics between the M6x and Precision Tube DAC 2.10, as both products share a very specific set of user-selectable digital filters. Seven of these are baked into the ESS9038 DAC – five with 'fast' (sharp) roll-off characteristics and two with 'slow' (gentler) treble roll-offs – but these are joined here by a custom 8th 'oversample bypass' mode that invokes a unique, low-overhead minimum phase filter. For a deeper dive into these filters, see the Lab Report on p61. PM

# LAB REPORT

## CANOR PRECISION TUBE DAC 2.10



**ABOVE:** The Precision Tube DAC 2.10 offers USB-B (768kHz/DSD512), AES, coaxial (192kHz) and two optical ins with fixed analogue outputs on RCAs and balanced XLRs

I was fascinated by the classical outfit's (second) recording of Bach's Brandenburg Concertos last year, but its *Paul Wrantzky: Symphonies* set [Deutsche Harmonia Mundi 19658702252; 96kHz/24-bit], released earlier this year, doesn't disappoint either. The album exudes the grandeur of 18th century symphonic set-pieces, in this case played on era-authentic instruments – that's the Akademie's thing, after all – and I loved how Canor's outboard DAC managed to unearth all the little nuances, even with Wrantzky pieces that start out quietly but build quickly to an attention-grabbing climax.

When the percussion makes its impressive entry in 'III. Allegro of Symphony in C Minor – La Paix' the sense of realism was immense. The sound was so dynamic and natural, with the drum beats resonating through the concert hall, that I nearly jumped out of my seat. Talk about *fortissimo!*

### CAN I GIVE YOU A LIFT?

At the same time, the Tube DAC 2.10 had the insight to give the flutes their own discrete place in the soundstage, not neglecting the subtleties while the timpani player goes for broke. Lifting small details out of the whole without disturbing the overall balance is where this unit really excels, with the added fun of switching from, say, Linear/Minimum Slow to Apodising Fast to add a little bit of sparkle.

A DAC such as this might predominately be used with streaming hardware via USB, considering current listening preferences, but

**LEFT:** Canor's compact remote accesses upsampling, reclocking, digital filter and 'display theme' options plus power on/off and audio mute



let's not forget there are other worthy digital sources out there. And, with the Tube DAC 2.10 hooked up to a Pro-Ject RS2 T CD transport [HFN Sep '19] via its optical input, some of that 'sound tuning' becomes more enticing. Sure, the various filters didn't make a noticeable difference when streaming hi-res files, but that's less the case with *The Colours You See* [Naim Records Naimcd365] from the Gauthier Toux Trio. Even discounting the small level difference when going from the non-upsampling 'Optimal Transient' filter, the nimble piano and intricate drum playing were decidedly more precise and natural with upsampling in play on most of the other filters.

### SOLID COMPETITION

There's a subtle diversity offered by these features, and the overall performance of the Tube DAC 2.10 is exemplary. What surprised me the most during my audition, however, was that I expected the tube output stage to impact playback in another way – imparting a touch of softness and smoothing over edges, perhaps. What I got, on the other hand, was a DAC that came across as wonderfully meticulous and clear, and with a greater sense of detail and balance – and some extra warmth – than I've experienced with most entirely *solid-state* implementations of this popular ESS chipset. ☺

### HI-FI NEWS VERDICT

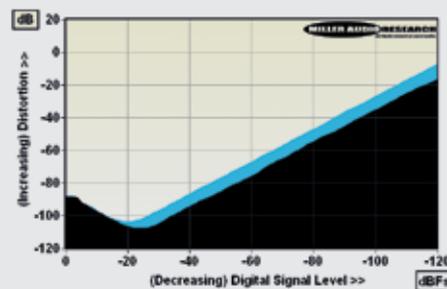
Canor's Tube DAC 2.10 is premium as promised, both in terms of fit and finish, and its engaging portrayal of music. The tube output stage is a brilliant addition to proven ESS chips capable of playing nearly all hi-res files, resulting in an accomplished DAC that delights with its precise but resolutely organic sound. The choice of eight filters is a further boon, making this a superb upgrade for restless audiophiles.

Sound Quality: 85%

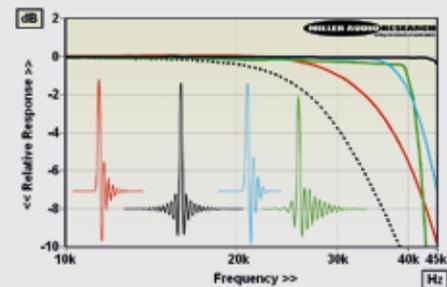


This well-implemented 6922 triode-based analogue output incurs a mere 0.0075% distortion across the full 20Hz-20kHz audio range at the max. 3.9V balanced output. Distortion falls to just 0.0005% over the top 30dB of its dynamic range [see Graph 1], the A-wtd S/N ratio remains a wide 110dB and low-level resolution is good to within ±0.1dB from 0dBfs to -100dBfs. 'Reclocking', incidentally, has very little impact on jitter which remains exceptionally low at 6-10psec but the triode output does raise its head in the increased (bass) source impedance (205ohm/1kHz to 1.65kohm/20Hz). However, it's your choice of filter (digital or analogue) that'll have greatest subjective impact.

In order, the filters are Linear Phase Fast [black traces, Graph 2], Linear Phase Slow, Minimum Phase Fast, Minimum Phase Slow [blue], Apodising Fast, Corrected Phase Fast [or Hybrid, green], Brickwall and 'Oversample Bypass' [red]. The Linear/Minimum/Apodising Fast and Brickwall all have sharp roll-offs [the Hybrid filter has a steep but early roll-off], with Linear/Minimum Slow and 'oversample bypass' offering gentler treble roll-offs, reduced 'ringing' but poorer stopband rejection. Specifically, the five 'Fast' filters offer a 75-99dB rejection of digital aliasing images with 48kHz media, falling to 12-18dB with the Slow and 'Oversample Bypass' filters – these are best suited to higher sample rate files. With 48kHz media the responses reach out to -0.0dB, -3.5dB, -0.04dB, -5.0dB, -0.8dB, -12dB and -4.0dB/20kHz, respectively (and -0.3dB/20kHz with 'Oversample Bypass'). With filter 1 (Linear Phase Fast), enabling the analogue filter limits the response to -0.4dB/20kHz, -15dB/45kHz [dashed trace, Graph 2] and -30dB/60kHz. PM



**ABOVE:** THD versus digital level over a 120dB range with 24-bit/48kHz data (1kHz, black; 20kHz, blue)



**ABOVE:** Freq. and time resp. (96kHz files) with fast linear (black; w analogue filter, dashed), slow minimum (blue), hybrid (green) and 'oversample' (red)

### HI-FI NEWS SPECIFICATIONS

Maximum output level / Impedance	3.9Vrms / 205-1650ohm
A-wtd S/N ratio	109.7dB
Distortion (1kHz, 0dBfs/-30dBfs)	0.0075% / 0.0005%
Distortion & Noise (20kHz, 0dBfs/-30dBfs)	0.0076% / 0.0007%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0 to -0.0dB/-0.5dB/-0.7dB
Digital jitter (48kHz / 96kHz)	6psec / 10psec
Resolution (re. -100dBfs / -110dBfs)	±0.05dB / ±0.6dB
Power consumption	32W (1W standby)
Dimensions (WHD) / Weight	435x120x405mm / 11kg