

iFi Audio iCAN Phantom

Purist 'analogue only' headphone amps have a new champion in the form of iFi Audio's flagship iCAN Phantom, designed for in-ears to electrostatics and all 'phones inbetween
 Review: **Jamie Biesemans** Lab: **Paul Miller**

When you state your headphone amplifier is the 'Rolls-Royce of flagships' you must be very confident that it's a clear cut above rival high-end devices. But that's exactly what iFi Audio is doing with the iCAN Phantom, shown for the first time at High End Munich in May '23. This £3749 analogue headphone amplifier is positioned above all its previous efforts, including the erstwhile flagship Pro iCAN Signature headphone amplifier, which remains on sale at £2299.

That's quite a price hike, but the Phantom has new tricks, not least its integration of iFi Audio's Pro iESL Energiser (formerly an external add-on) to supply the high signal voltages for a wide range of 'statics [the bias resistors are pictured p53]. The result is a powerful headphone amplifier ready for use with dynamic, planar magnetic and electrostatic cans. This, as far as I can ascertain, is a world first, and it ties neatly into the up-tick in new electrostatic headphones coming from Audeze, Dan Clark Audio and HiFiMan, joining stalwarts Stax and Koss.

DOUBLE VISION

While the iCAN Phantom targets those in the enthusiast community who own a variety of headphones, and features both solid-state and tube-based input stages for those who like to 'season' their sound, it's still a one-box solution with an emphasis on convenience. The design, however, might make you think otherwise, as it melds a silver-coloured top half with a larger, more functional-looking lower section in black. It's a bit idiosyncratic, although there's no faulting the fit and finish, which is outstanding.

A nice touch is the smoked glass panel atop the aluminium case, which

NEAR RIGHT: Lower of two PCBs includes a choice of discrete JFET and General Electric 5670 tube-based inputs (top left)
FAR RIGHT: Top PCB carries the volume circuit and a large battery of film capacitors

gives a peek at its inner workings. Here you'll spy the GE5670 tubes, switched into circuit in the 'Tube' and 'Tube+' modes, and rated at around 100,000 hours of use. In any event, removing the panel to replace these is trivial.

The iCAN Phantom's impressive power [see PM's Lab Report, p53] is delivered by iFi Audio's 'True Differential Balanced' amp design, a further evolution of its PureWave circuitry concept. And there are more 'brand regulars' included, both in terms of technology (such as the capacitive battery pack and iPower Elite power supply) and functionality (XBass and XSpace analogue processing). All of which makes the iCAN Phantom just a little less purist than models like Ferrum's OOR [HFN Dec '21].

INFO-PACKED

Operating the Phantom can be done via two large rotary buttons on the top section – one controlling a sophisticated ALPS volume control – that flank a colourful, info-packed OLED screen and buttons for gain selection and tube/solid-state

operation. Alternatives include iFi Audio's remote control [p53], which makes some tasks a little less fiddly, and a new app made possible by the iCAN Phantom's built-in Nexis module [see boxout, p51].

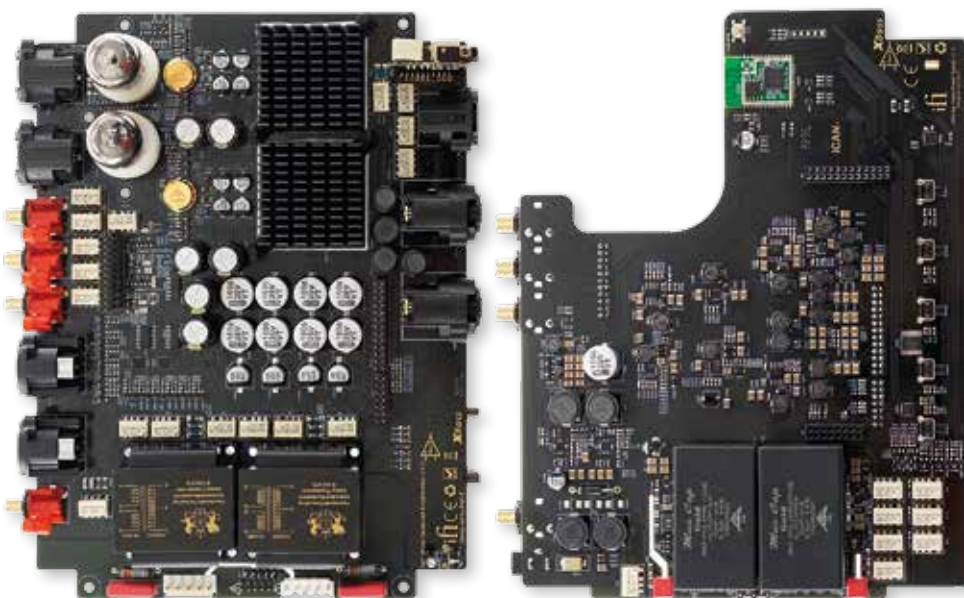
The amp's lower section sports a plethora of connections on both the front and back. On the rear are three RCA and one balanced XLR input(s) handling up to four analogue sources, plus single-ended

and balanced outputs when using the iCAN Phantom as a preamplifier in a loudspeaker-based system. But it's the front panel that says 'I am not your average headphone amp', as just about every output you can think of is there. Next to

conventional 3.5mm and 6.35mm single-ended options are Pentaconn 4.4mm balanced, one XLR4 and two 3-pin XLRs. Remarkably, there's even a second 6.35mm connection with inverted phase.

The above cater to dynamic headphone types, leaving two outputs dedicated to high impedance electrostatic cans, sequestered off to the left next to an additional power button for the built-in

'This was a convincing demonstration of its muscle'



energiser. One output labelled 'Normal' offers a 230V bias, while the Custom/Pro connection can be bias-adapted.

This brings us to a neat surprise iFi Audio has hidden on the back of the amp. Use a little bit of force to detach the top heatsink, and storage space is revealed for what appear to be SD memory cards, but are actually bias cards [pictured, p53] to physically (and safely!) switch to a particular bias when listening to different brands of electrostatic cans. If you're not sure if you require 640V, 500V or another HT DC value, you can find names of popular ES headphones on each card. Useful, as selecting the wrong bias could be ruinous.

CHALLENGE ACCEPTED

I wonder if some might look at the two-tone styling of the iCAN Phantom, the app control, and its dizzying feature list, and think it lacks seriousness. They shouldn't

though, as it's a deeply impressive performer: powerful, revealing and suited to a variety of headphone flavours. Processing and 'tube' modes are there to massage its sound but, arguably, it doesn't need them as it conjures a stunning performance right out of the box.

I've always found Oppo's PM-1s [HFN Jul '14] to be rather 'difficult', needing a powerful amplifier to get the most out of their planar magnetic drivers – even though the specifications look amp-friendly enough. Yet connected single-ended, with a Chord Hugo 2/2go [HFN Aug '18] as a streaming source, the iCAN Phantom didn't seem challenged, bringing a lot of energy and drive to its portrayal of the crossover jazz of Snarky Puppy's *Empire Central* album [GroundUp Music; 96kHz/24-bit]. There was a palpable sense of movement when the bass drum kicked in on 'East Bay', giving an intense aspect to the listening.

ABOVE: One box, not two! Configuration and volume rotaries are joined by gain and 'Tube' options up top while the lower chassis hosts 3.5mm/6.35mm (SE); 4.4mm/4-pin and dual 3-pin XLRs (bal) & 5-pin/6-pin sockets for 'statics

At the same time, the percussion was nimble and well-defined, indicating that iFi Audio's new flagship is not only offering sufficient levels of power but also keeping a solid grip on proceedings. In this regard the iCAN Phantom compared positively with the headphone output of the Chord DAC, itself no slouch. And swapping out the Hugo 2 for an ADI-2 DAC FS from RME made me appreciate the even-handed and neutral sound of the Phantom even more.

RME's studio DAC isn't one for colouration – and neither is the iCAN Phantom. The resulting precision and control ensured a massive but rhythmically astute wall of sound during 'State Of Slow Decay' on In Flames' *Foregone* [NB 6514-2; 96kHz/24-bit], via MrSpeakers Ether CX closed-back planar headphones. There's little subtlety about this release from the Swedish melodic death metal band, but the Phantom powered through it and ensured all the musical info was made available.

MAKING THE SWITCH

Swapping between Solid-State, Tube and Tube+ modes is a headline feature of the iCAN Phantom, but if you are expecting 'two or three amps for the price of one' you'll be disappointed, as going from one mode to another doesn't produce a very pronounced effect. With Tube activated, there was a slight increase to the sense of high detail and spatiality when listening to the piano on Melanie De Biasio's 'We Never Kneel To Pray' and the echoing vocals on 'Now Is Narrow', two tracks from her

LAB REPORT

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ABOVE: No hint of 'digital' – just one balanced (XLR) and three single-ended (RCA) inputs with single sets of (variable) RCA and XLR preamp outs. The biasing resistors for different electrostatic 'phones are stored behind the chassis (reversed here)

upcoming *Il Viaggio* [PIAS 96kHz/24-bit]. It was a nice embellishment that I liked with this album but didn't miss when playing others.

HIGHS AND LOWS

The XBass function is a perennial iFi Audio favourite, and on the iCAN Phantom it's offered in 10Hz, 20Hz and 40Hz settings. As PM notes [see Lab Report, opposite], these give a broad low-shelf boost to sub-bass frequencies, up to a gargantuan 10dB! 'Noticeable' is an understatement with such values, especially with content already rich in low frequencies. Both the underlying beats and sweeping synths on Moderat's 'Fast Land' [*More Data*, MTR122DNL; 48kHz/24-bit] were fat and overpowering with 40Hz XBass and Oppo PM-1s.

This was a convincing demo of its latent muscle, but I had more joy with the 10Hz setting, as this 'filled out' the rather bright sound of Beyerdynamic's DT-1990 headphones, and proved XBass has its uses. So too does iFi Audio's loudspeaker-emulating XSpace crossfeed mode, offered with the 'speakers' virtually positioned at 30, 60 and 90 degrees. The latter was rather extreme, but the first two options worked well.

Another feature included on the Phantom is iEMatch, which adjusts the amp gain to suit the

LEFT: Alloy Phantom remote offers control over input, volume and the various gain, tube, XBass, XSpace, iEMatch and display brightness options



power and low noise requirements of in-ear monitors. Listening to a set of Meze Audio Rai Penta in-ears, over a balanced connection, it did feel like I was using only a fraction of the power on tap. When the volume indicator says '4' (out of 100) and Natalie Duncan's *Free* [Fallen Tree 1Hundred; 44.1kHz/16-bit] is rolling out at quite a respectable level, you start to wonder why you need the other 96 steps. However, the iEMatch function is a boon when listening to sensitive IEMs, giving a smoother sound and a finer control over levels. The Rai Pentas were driven to excellence by the iCAN Phantom – the trumpets and horns underlining Duncan's singing on 'Pools' were amazingly lifelike.

Such a stellar performance was duplicated with a pair of balanced Sennheiser HD 660 S2s. 'Delighted', by Benjamin Clementine [*And I Have Been*; Preserve Artists 0197146378190; 48kHz/24-bit], found strings and Hammond organ combining as a colossal, weighty background, and Clementine's beautiful singing voice naturally rising out of the mix. Nary a sign of stress was to be heard from this truly flagship-worthy performance. ☺

HI-FI NEWS VERDICT

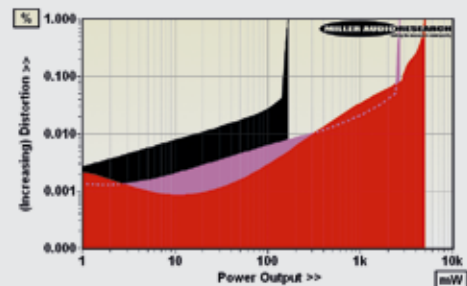
Looking past some extra functionality that you may or may not find useful, iFi Audio's iCAN Phantom is a headphone amp that delivers the goods in style. Its potent power and steadfast tonal qualities will let your DAC and chosen pair(s) of cans strut their stuff. On top of that, the integration of its iESL energiser technology means this top-of-the-range design will suit even the most avid headphone collector.

Sound Quality: 88%

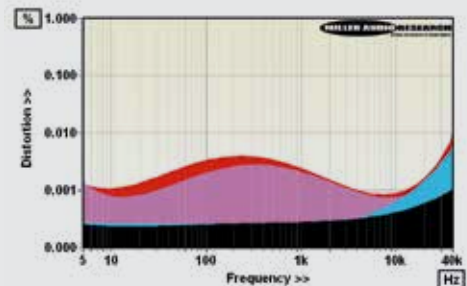


While the Phantom's J-FET/triode topology is shared between the pre and headphone outputs, the latter does have its own output buffer that drops the (line) 73ohm source impedance down to 2.5ohm. This, in turn, limits the signal loss to 0.6dB into a 32ohm headphone load and restricts the impact of low/variable impedance loads on system (amp/headphone) frequency response. In 'solid-state' or 'tube' modes, the Phantom is flat to within a tight $\pm 0.05\text{dB}$ from 20Hz-20kHz, declining gently to $-0.2\text{dB}/100\text{kHz}$ but with a near-DC boost of $+0.7\text{dB}/1\text{Hz}$. Enabling 'XBass' invokes a tilt control operating below $\sim 200\text{Hz}$ to provide a final boost of $+10\text{dB}$ at 10Hz, 20Hz and 40Hz, respectively – its effect will not be subtle! The A-wtd S/N is a wide 101.9dB (re. 0dBV) via the balanced line or headphone output (98.5dB in 'tube' modes) while the low $-99.5\text{dBV}/10.6\mu\text{V}$ residual noise ensures the iCAN Phantom is subjectively silent with high sensitivity in-ears.

The 0dB (-0.7dB), $+9\text{dB}$ ($+8.3\text{dB}$) and $+18\text{dB}$ ($+17.9\text{dB}$) gain settings are consistent via preamp and headphone outputs, although power output is influenced by gain to the tune of 1060mW to 2450mW and 2650mW/32ohm at 0dB, $+9\text{dB}$ and $+18\text{dB}$, respectively. The maximum 10.0V output will sustain 167mW/600ohm and there's sufficient current to support a massive 5050mW (5.1W) into very low 8ohm loads [see Graph 1]. THD is impressively flat with frequency at 0.00013-0.00035% via the balanced line outs [black trace, Graph 2], increasing slightly at HF in 'tube' mode [blue trace], and through the midrange at 0.0008-0.0026% via the SE headphone outputs (0.001-0.033% at 10mW/32ohm). Compared to the distortion incurred by even the best cans, these are still vanishingly low figures! PM



ABOVE: Power output vs. THD into 600ohm (black), 32ohm (pink) and low 8ohm (red) headphone loads



ABOVE: THD vs. frequency (preamp, black; tube, blue; headphone 0.6V unloaded, pink; 10mW/32ohm, red)

HI-FI NEWS SPECIFICATIONS

| | |
|-------------------------------------|---|
| Maximum output (<1% THD) | 20V (XLR, pre)/ 10V (SE, headph) |
| Power output (<1% THD, 600/32/8ohm) | 167mW / 2650mW / 5050mW |
| Output Impedance (20Hz-20kHz) | 2.5ohm (73ohm, preamp) |
| A-wtd S/N ratio (re. 0dBV/32ohm) | 101.9dB / 98.9dB |
| Distortion (20Hz-20kHz, 0dBV) | 0.00013-0.00035% (preamp) |
| Distortion (20Hz-20kHz, 10mW/32ohm) | 0.0008-0.0026% (headphone) |
| Freq. resp. (20Hz-20kHz/100kHz) | +0.03 to -0.05dB / -0.2dB |
| Power consumption | 19W (1W standby) |
| Dimensions (WHD) / Weight | 256x120x185mm / 4.2kg |