Press release

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NEO iDSD 2
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***Above** iFi NEO iDSD 2 ultra-res DAC/headphone amp*

NEO iDSD 2: iFi's new sensation

Sporting a host of upgrades and industry 'firsts' including lossless Bluetooth, iFi's NEO iDSD 2 ultra-res DAC/headphone amp is every music lover's perfect housemate

Southport, England – Since its inception in 2012, iFi audio has been at the forefront of DAC technology for home and portable use, delivering exemplary sound with digital music sources both online and offline. A cornerstone of the company's current range is the NEO iDSD – a mains-powered DAC/headphone amp that launched iFi's mid-level home-oriented NEO Series in 2020 and quickly found fame for its versatility and performance.

Three years on and iFi's second-generation NEO iDSD is ready to launch, sporting a host of upgrades to improve upon its award-winning predecessor. One headline-grabbing inclusion is aptX Lossless – the first Bluetooth format enabling 'lossless' CD-quality streaming. The NEO iDSD 2 is the world's first DAC that can process aptX Lossless, further extending the quality of iFi's class-leading Bluetooth technology beyond that of competing devices. (Of course, like its predecessor, the NEO iDSD 2 offers USB, optical and coaxial digital cable inputs too.)

Numerous other upgrades have been applied to the NEO iDSD 2's design, ranging from a new colour display and an array of sonic tuning options to under-the-hood circuit enhancements pushing sound quality to even greater heights. Among these is a redesigned headphone amplifier which can now deliver more than 5,550mW into 32 ohms from its balanced 4.4mm output – this makes it the most powerful headphone amp of its type.

Like its predecessor, the NEO iDSD 2 is designed to deliver class-leading versatility and performance across

a range of applications. Its compact size (214x41x158mm) makes it easy to accommodate on a desk or shelf, with the ability to lie horizontally or, for an even smaller footprint, stand vertically. The new two-inch retina-grade TFT colour display rotates automatically to suit its owner's preferred orientation, while a smooth-acting multifunction rotary control helps to ensure the NEO iDSD 2 is eminently simple to use, despite the array options available to the listener.

Three operational modes ensure the NEO iDSD 2 covers all bases with aplomb. It can be used as a pure DAC with a fixed-level analogue output to connect to a separate integrated amp or preamp in an audio system. Or it can operate as a DAC/preamp with a variable output, ideal for connecting directly to a power amp or active speakers. And, of course, users of headphones and IEMs (in-ear monitors) can make use of its excellent amp stage to create a fabulous 'head-fi' system.

Whether connected to source devices via cable or Bluetooth, the NEO iDSD 2's next-level 'digital engine' and balanced PureWave analogue circuits supply scintillating sonics with every audio format in a home environment – brilliant with music, multimedia content or to enhance your gaming experience.

Left *The NEO iDSD 2 can be positioned vertically as well as horizontally, held steady by the supplied aluminium stand*

Custom-designed digital engine

The NEO iDSD 2's DAC stage incorporates a Burr-Brown chip that iFi uses extensively, selected for its natural-sounding 'musicality' and True Native architecture. iFi's experience with this IC means it knows how to make the most of it; but whilst intrinsic to the resulting sound, the creation of an exemplary digital stage involves much more than the selection of a particular DAC chip.

One such critical component is the XMOS chip that iFi uses to process audio data received over the digital inputs. The NEO iDSD 2 incorporates a 32-bit, 16-core XMOS Cortex microcontroller, its processing power utilised by iFi to optimise sound quality and unlock the full potential of the Burr-Brown DAC chip. Extensive jitter-eradication technologies are also applied, including the latest version of iFi's GMT (Global Master Timing) femtosecond-precision clock and smart storage cache. This combination of technologies forms the basis of a proprietary 'digital engine' that is unique to iFi.

Every format at the highest quality

Hi-res audio support is state-of-the-art, handling PCM data to 32-bit/768kHz and all levels of DSD to 22.5792MHz (DSD512). Thanks to the Burr-Brown DAC chip's four-channel True Native design, PCM and DSD take separate pathways – this enables DSD, as well as PCM, to remain 'bit-perfect' in its native form right through to analogue conversion.

MQA – the hi-res streaming technology, as used by Tidal's 'HiFi Plus' tier – is comprehensively supported, with full decoding/upsampling of MQA files right up to the format's highest 384kHz specification. Full decoding means that the full 'three unfold' decoding process is performed internally, as opposed to only the final unfold in the manner of an MQA 'renderer'.

Bluetooth as you've never heard it before

iFi has earned a peerless reputation for its Bluetooth technology in recent years, with comprehensive format support and clever engineering delivering the convenience of device-to-device wireless audio transmission with far less sonic compromise than is commonly associated with Bluetooth. The company has now redesigned its Bluetooth module to further elevate its performance, and the NEO iDSD 2 is the first device to include it.

Left *From ultra-res 32-bit/768kHz PCM and DSD512 via USB to lossless Bluetooth, the NEO iDSD 2's sonic credentials are impeccable*

The headline addition for this next-generation iFi module is aptX Lossless – the first 'lossless' Bluetooth audio format. While other Bluetooth formats described as 'hi-res' already exist – for example, aptX Adaptive can stream audio up to 24-bit/96kHz and LDAC's specification stretches up to 32-bit/96kHz – these are 'lossy' formats. That means they compress the file by removing audio data that is considered less important to the end result. These 'hi-res' Bluetooth formats apply compression that is more efficient and less audibly detrimental than older codecs, but sound quality is still compromised.

aptX Lossless is the first Bluetooth audio format capable of streaming CD-quality (16-bit/44.1kHz) audio 'losslessly' (although technically it still applies some compression). It achieves bitrates of up to 1.2Mbps at CD-quality – that's more than twice the maximum bitrate of aptX Adaptive and aptX HD, and roughly 20 per cent higher than LDAC's maximum figure. The format's potential to further elevate the sound quality that can be achieved over Bluetooth is very significant indeed.

aptX Lossless is part of Qualcomm's Snapdragon Sound platform. To benefit from the format, both the source device (perhaps an Android smartphone) and the receiving device (Bluetooth headphones or earphones, a DAC or an audio system) must incorporate a suitably equipped Snapdragon chipset. The NEO iDSD 2 is the world's first DAC – indeed, the first audio component of any kind – to include aptX Lossless decoding and iFi has worked closely with Qualcomm to ensure its benefits are maximised.

In addition to aptX Lossless, a full suite of Bluetooth formats is supported, including aptX Adaptive (backwards compatible with aptX and aptX HD), LDAC, HWA/LHDC, AAC and SBC. This means that every source device is covered at the highest resolution its Bluetooth specification allows. iFi's Bluetooth module can also be updated over-the-air, so further codecs may be added as they emerge in future.

As well as being the first DAC to support aptX Lossless, the NEO iDSD 2 is the first to include Bluetooth version 5.4 – the newest Bluetooth standard, announced earlier this year. This ensures the greatest wireless range and stability, highest speed and lowest latency between the source device and the DAC. The NEO iDSD 2 stores up to eight paired Bluetooth source devices in its memory, making it easy to switch between them.

Left *The Bluetooth antenna is internal, with a quarter-circle acrylic section cut into the NEO iDSD 2's aluminium enclosure to aid reception*

PureWave – exemplary circuit design for the purest sound

The digital stage is only half the story in any DAC/headphone amp; when it comes to the crucial analogue circuitry, many such devices fall short. Balanced, differential analogue circuit design has long been championed for its ability to reduce noise and crosstalk in the signal path, but its additional cost and complexity means it has traditionally remained the preserve of high-end hi-fi components.

Since launching the Pro iCAN headphone amplifier in 2016, iFi has gradually introduced balanced circuit designs of various levels of sophistication across its range. The original NEO iDSD featured a new twin-mono topology, fully balanced from input to output – iFi calls this level of circuit design 'PureWave', referring to the sonic purity it achieves thanks to exceptional linearity and infinitesimally low levels of noise and distortion.

PureWave circuits are highly sophisticated in design and implementation, incorporating premium-quality components, and are therefore reserved for the upper tiers of iFi's DAC and amplifier range. The NEO iDSD 2 features the latest generation of iFi's PureWave design, further enhanced to elevate audio quality and headphone amp power.

High-quality components are used throughout, including custom-made ultra-low-distortion op-amps, multilayer ceramic TDK C0G capacitors, MELF thin-film resistors and inductors from Murata and Taiyo Yuden. These are more costly than common equivalents, but class-leading qualities such as low ESR (Equivalent Series Resistance), high linearity and low noise pay great dividends in terms of sound quality.

The headphone amp stage maintains an engaging balance between sonic power and poise, no matter what it is tasked to drive – from high-sensitivity in-ear monitors to current-hungry planar headphones. The amp can deliver 5,551mW/13.3V into 32 ohms and 650mW/19.5V into 600 ohms through its 4.4mm balanced output – up to ten times the power of the original NEO iDSD. In fact, that's more power to drive the toughest headphone loads than any other DAC/headphone amp at its price point. To retain maximum resolution, volume is adjusted in the analogue domain via a resistor ladder, under precise microprocessor control.

Left *The NEO iDSD 2's headphone amp delivers remarkable power to drive any pair of headphones with consummate ease*

The NEO iDSD 2's low-noise, high-bandwidth power supply circuity sports linear regulation and delivers excellent PSRR (Power Supply Rejection Ratio) performance. BiCMOS semiconductor technology using a PMOS device achieves ultra-low distortion and excellent transient response. This couples with iFi's iPower 2 AC/DC adapter, which engenders significantly less noise than other similar devices thanks to Active Noise Cancellation and is included with the NEO iDSD 2 (£69 when sold separately).

The colour display, which indicates audio format, sample rate, volume level, input mode and settings, offers user-adjustable brightness and SilentLine design, ensuring there is no electrical noise to interfere with the audio signal. Even the way the NEO iDSD 2 switches between settings has been engineered to ensure sonic transparency – FET-based switching is handled by a microcontroller, which only 'wakes up' when the user changes a setting, thus eradicating any sonically deleterious interference.

In terms of measured performance, all this painstaking attention to detail results in THD (Total Harmonic Distortion) of <0.0015 per cent and SNR (Signal-to-Noise Ratio) of >120dB – highly impressive at any price. To the ear, this translates as more clarity and texture, and a more dynamic and engaging performance – quite simply, you hear more of the music, just as the artist intended.

Dial in the sound – just the way you like it

The NEO iDSD 2 adds a range of sonic tuning options to the original NEO iDSD's specification, enabling the listener to adjust the sound according to their preference. The versatility these settings provide is valuable, given the variation in the way DAC/headphone amps are used – the divergent qualities of different sources of digital audio and the technical contrast between different headphone and earphone types, not to mention differences in personal taste.

The DAC stage offers four user-selectable digital reconstruction filters – Standard, Bit Perfect, Minimum Phase and GTO (Gibbs Transient Optimised). These provide subtle but notable sonic modifications that can be selected 'on the fly' via the NEO iDSD 2's menu. Switch between filters if you find that different settings suits different sources or choose the one you like best and keep it dialled in – it's up to you.

The headphone amp supplies four gain settings to tailor its output to suit the connected headphones or IEMs. The default mode is Normal (0dB); from there you can step up to Turbo (+8dB) or Nitro (+16dB). There is also an IEMatch attenuation mode (-12dB) – this is particularly useful with super-sensitive IEMs, removing potential background noise and increasing the usable volume range.

Left *A range of sonic tuning options is easily accessed via the NEO iDSD 2's front-mounted controls*

Further sonic tuning is provided by iFi's analogue processing modes. XBass is a proprietary circuit that can be engaged to enhance low frequencies, its sophistication enabling it to do so whilst maintaining bass definition and without muddying the midrange. This is useful with, for example, some open-back headphones that sound bass-light; it 'corrects' the bass so that the listener hears low frequencies as the artist intended. The NEO iDSD 2 sports an expanded version called XBass II, offering three separate headphone EQ options: 'Bass' (which targets low frequencies), 'Presence' (which focuses on the upper midrange) and 'Bass + Presence' (which implements both together).

XSpace is another analogue processing mode, designed to compensate for the 'in-head localisation' effect that can occur when using headphones to listen to music that was mixed using a pair of speakers. When engaged, XSpace widens the headphone soundstage to deliver a more spacious and speaker-like experience. Both XBass II and XSpace operate entirely in the analogue domain, rather than messing with the digital signal via DSP, and may be switched in or out of the signal path.

Stay in control

The NEO iDSD 2 comes with a new aluminium remote handset, replacing the simple 'credit card' style remote supplied with the original NEO iDSD. But that isn't the only way to control the NEO iDSD 2 remotely – owners can also opt to use iFi's Nexis app, available for Android and iOS devices.

Following hot on the heels of iFi's new range-topping iCAN Phantom headphone amp, the NEO iDSD 2 is the second device to incorporate the Nexis module, which combines with the free Nexis app to provide a comprehensive, scalable, network-connected control system. It can be used to set up the NEO iDSD 2 and manage its functions, as an alternative to the remote handset and device-mounted controls, and also deliver firmware updates over the user's Wi-Fi network.

Nexis will be incorporated into more iFi devices over time. As the number of Nexis-compatible iFi devices grows and the app's functionality expands, a network-connected iFi 'ecosystem' will develop – one app for all your requirements, like a concierge service for iFi customers. It will enable additional software-driven functionality to be delivered and shared across existing iFi devices, as well as providing a direct technical support service and even potentially an online store within the app.

Left *A useful array of inputs permits the connection of up to five source devices, with fully balanced outputs for stereo amps and headphones*

Making connections

In addition to Bluetooth, the NEO iDSD 2 provides asynchronous USB-B, optical and coaxial digital inputs, plus a 3.5mm analogue input that has been added to the spec. Thus, up to four devices may be connected simultaneously – three outputting digital audio data and the other an analogue signal – plus a fifth via Bluetooth, with a choice of automatic input sensing or manual selection via the multifunction rotary control, remote handset or iFi's Nexis control app.

Balanced analogue outputs are supplied, making the most of the NEO iDSD 2's fully balanced circuitry. At the front, alongside a standard 6.3mm single-ended headphone socket, resides a 4.4mm output for headphones offering balanced connection. An increasing number of high-quality headphones and IEMs either come so equipped or give the option of detaching the cable and upgrading to a 4.4mm balanced connector. Around the back, single-ended RCA outputs are accompanied by balanced XLR sockets, to connect the NEO iDSD 2 to an amp and speakers (or a pair of active speakers).

The NEO iDSD 2 sports a new Bluetooth antenna arrangement, no longer external but neatly hidden away within the unit. A clock input has also been added, enabling the connection of an external master clock which provides a potential upgrade path.

Hear everything, lose nothing

As comfortable on a desktop as it is in a hi-fi separates system, the NEO iDSD 2 is a versatile, uniquely specified DAC/headphone amp. With its ultra-res True Native specification and the inclusion of lossless

Bluetooth, it is the only DAC that can deliver hi-res and lossless sound over both wired *and* Bluetooth connections, to the maximum specification that any source device will allow. Its PureWave balanced circuitry delivers lashings of power – more than any other comparable DAC/headphone amp – able to make the most of virtually any pair of headphones on the planet. And its size and ability to stand vertically make it ideal for all kinds of situations, even where space is tight.

However you connect your source device, your music is delivered in full effect. The attack of a plucked string, the decay of a snare drum, the character of a vocal performance, the dynamic rush of an orchestra in full flight – the NEO iDSD 2 ensures you experience *everything*. For many people, this is the only DAC/headphone amp they will ever need.

With an RRP of £899, €899 and US$899, the NEO iDSD 2 is available from selected retailers from October.

AT A GLANCE – NEO iDSD 2 UPGRADES OVER NEO iDSD (ORIGINAL)
New iFi Bluetooth module – Bluetooth 5.4 and aptX Lossless
Redesigned PureWave fully balanced, twin-mono audio circuitry
Up to 10x more power to drive tough headphone loads
Enhanced GMT femto clock system
4x user-selectable digital filters
4x headphone amplifier gain settings
XBass II and XSpace analogue processing modes for headphones
Additional audio input – 3.5mm analogue
External clock input
Two-inch colour display
New internal Bluetooth antenna
New aluminium remote control
Nexis app support
Improved iPower 2 ultra-low-noise 12V AC/DC power supply

AT A GLANCE – KEY SPECIFICATIONS	
Maximum file resolution	32-bit/768kHz PCM; native DSD512; full MQA decoding to 384kHz
Bluetooth format support	aptX Lossless; aptX Adaptive (aptX, aptX HD, aptX LL); LDAC; HWA/LHDC; AAC; SBC
Cable inputs	USB 3.0 Type B; optical S/PDIF; coaxial S/PDIF; 3.5mm analogue; external clock
Line outputs (fixed/variable)	Balanced XLR stereo; RCA stereo
Headphone outputs	4.4mm balanced; 6.3mm
Digital filter settings	Standard; Bit Perfect; Minimum Phase; Gibbs Transient Optimised
Headphone gain settings	0dB; +8dB; +16dB; -12dB (IEMatch)
Headphone analogue processing modes	XSpace; XBass II (Bass, Presence, Bass + Presence)
Headphone output power – 4.4mm	>19.5V/650mW (@600Ω); >13.3V/5551mW (@32Ω)
Headphone output power – 6.3mm	>10.5V/184mW (@600Ω); >9.5V/2832mW (@32Ω)
Included cables and connectors	USB 3.0 Type A to Type B cable; stereo RCA cable; 3.5mm to 6.3mm headphone adapter
Other included accessories	iPower 2 PSU, aluminium stand for vertical placement, aluminium remote control
Dimensions	214x41x158mm

iFi is the sister-brand of Abbingdon Music Research (AMR) and is headquartered in Southport, UK. The two brands respectively design and manufacture portable, desktop and lifestyle audio products and high-end hi-fi components. Combined in-house hardware and software development teams and a 'music first' approach enable iFi and AMR to create advanced audio products that deliver new levels of design, functionality and performance at their respective price points. Since iFi's formation in 2012, its products have earned many awards around the world, helping it to become one of the fastest-growing brands in its field.

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