



★ BEST PORTABLE HI-RES PLAYER

LOTOO PAW GOLD

Reviewed: October 2015 issue

The Lotoo PAW Gold is the nearest thing you can get to carrying your home hi-fi in your pocket.

Not only does it boast a full-blown hi-fi DAC in the shape of the Texas Instruments PCM1792 but it also has a LME49600 headphone drive chip and a powerful ADI Blackfin 541 signal processor for almost instant start-up. It is able to play almost any high-resolution digital file available as well as DSD. But more importantly it is a spectacular sounding player.

Playing Fleetwood Mac's *Dreams* the opening drum roll had both speed and punch and there was tremendous grip on pace. "Not only is there dynamic power aplenty but cymbals and percussion were rhythmically rock steady" we found.

With a fixed line output of 2V the Lotoo can also be connected to the CD input of an amplifier to deliver high-resolution files to your hi-fi. Add to that bomb-proof build quality with a machined aluminium case and a sapphire glass screen and the Lotoo PAW Gold sets the standard for portable players.

* For our original full review see page 40.

Lotoo Winner

It's big, it's bulky and it's finished with gold – but Noel Keywood discovers this new portable music player from China's Lotoo offers class-leading high-resolution sound.

In the technological arms race of the portable player market, the Lotoo PAW Gold I'm reviewing here is firmly in the 'interesting' category. This high-resolution digital player is big and heavy like few others; it is also £1495 – quite a ticket. But that's because it uses top-quality hi-fi parts – and to hell with power consumption! Just make the battery larger. But you end up with a machine that is more luggable than pocketable. I could almost describe the PAW Gold as a portable hi-fi rather than a portable player.

That's the basic and somewhat fundamentalist approach Lotoo (China) have taken in conceptualising this player. Not only is there

a current guzzling, full-blown hi-fi digital-to-analogue convertor (DAC) on board – a Texas Instruments PCM1792 – but also an LME49600 headphone drive chip and a powerful ADI Blackfin 541 signal processor that brings almost instant start-up, as well as the ability to handle even the most demanding DSD playback. So sound quality has been pursued to the exclusion of most else in this machine; it's an extreme design.

Before I start to peer into the details let me just make clear what I am dealing with here. The PAW Gold is a portable audio player designed to drive either headphones or a hi-fi system. You can think of it as a CD player, one able to play just about any high-resolution digital file available – and it has been designed as such, because it runs from an independent 12V power supply not the 5V line within USB like most other players.

There is no digital output for an external DAC but I guess Lotoo see no need because with a full blown, mains powered DAC on-board it out-performs most external DACs in any case, our measurements showed. And I read the other day a comment from FiiO (also of China) that few people use the digital output of their players. Whether this is justifiable only listening can tell, more of which later.

So what we have here then is a super high-fidelity player with masses of on-board lithium-ion battery power to sustain it on the move – 11 hours playing time no less – but with a well worked out architecture for delivering top quality as an analogue connected

'CD player' in the home, able to drive the hi-fi. This makes the PAW Gold a very interesting proposition to any audiophile, methinks – and a headbanger of a portable.

Lotoo are proud of the fact that the case is machined from a solid billet of aluminium that, they say, weighs 280gms – and it did on our scales. That's double the little 136gm FiiO X3 2nd gen I reviewed last month.

Like the FiiO, the Lotoo plays just about every music file format available, including SACD files, that are different in structure to DSD files, whilst using the same one-bit code. In addition you can play Flac, Wav, Alac, MP3 and DSD 64 and 128 in dff and dsf form. There's also less popular wma, Ape wavepack, Cue and m4a. But where is Apple's Aiff (their equivalent to Wav)? I thought this was a mistake but it isn't – the PAW Gold doesn't see them I found, so they must be converted with XLD or similar.

The PAW Gold feels brick-like in the hand – solid beyond expectation. It is very obviously machined with care and well finished too. Whether you like the gold finish of its parts is a matter of taste I think; I had slight reservations about the small and coarse 160x128 OLED colour screen, with its jagged-edged text – and in spite of price this is not a touch screen, as on Astell&Kern players. You have to click your way down through a cramped, grey on-screen music menu to select a track, using the central gold disc, that is a stationary selector, not a spin wheel as on FiiO's X3. None of this fitted too well with the price, but it did the job.





Computer connection is through a USB lead. Memory comprises a full size SD card.

The settings menus were similarly small, cramped and illegible. There is, however, some mitigation in an output level bar-graph display that covers 50dB dynamic range and gives some idea of the intrinsic recorded range of any music file; however, it is situated after the volume control

reduces this to a sensible 0.8V, about right for most else and not so far from European recommendations concerning limitation of hearing damage.

The Line output can be connected to the CD input of any amplifier, through a 3.5mm jack-to-

"Mick Fleetwood's opening drum roll of 'Dreams' (24/96) suddenly had both speed and punch and there was tremendous grip on pace; this player has chiselled timing"

to show output volume, rather than before it to show absolute recorded level. You can see recorded level by turning volume up to maximum – but only after removing the headphone plug because the PAW Gold goes fiercely loud!

On that subject I'll note that our measurements showed this player produces a massive 4.4V output from the headphone (Phone) socket with output set to High (H) – more than enough for insensitive planar magnetic phones (e.g. Audeze, HiFiMan, Oppo). The low setting (L)

phono plug adaptor lead, and it gives full CD output level. But whereas a CD player provides only low-res PCM digital of 1983 vintage, a hi-res player like this can send any exotic audio file to your hi-fi.

Since the player gave me a 'battery discharging' warning whilst connected via USB to my powered USB hub, power is not drawn from the 5V USB line at all, unlike most players. Instead the PAW Gold charges from its own 12V/1.5A, switch-mode, wall-wart power supply that connects to the usual



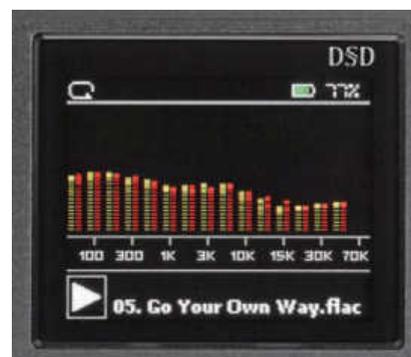
The top carries headphone and line (fixed volume) outputs, a Low/High switch and rotary volume control.

power input on the player, marked 12V/1A. Although it seems a little more cumbersome, this is the best way to deliver power: it gives higher supply volts to the DAC and output amplifiers – and that's why 4.4V output is available, because that's what you get from a 12V d.c. supply. It also means the PAW gold comes as an all-in-one, optionally mains powered player; an external USB supply is not needed to keep it up and running.

There is no internal memory, and just one slot for a full sized SD card – addressable at up to 2TB Lotoo say. But 128-256GB is the common maximum for an SD card and it will



The small screen conveys lots of info, including track format and music level.



A multi-band equaliser is included.

store plenty of 400MB files if you feel you need to do this. The PAW Gold will play not just 192kHz sample-rate PCM, but even 384kHz, and these are of huge size. But I have yet to hear any difference between 96kHz and 192kHz sample rate files, let alone 384s like DXDs, so it is a non-issue for me for the time being – and I think a little off-the-planet as things currently stand.

OK, DSD files are large and they do sound exceptional, so DSD users may or may not feel 320 songs of 400MB on a 128GB card limiting, but the solution here is to have/carry multiple cards.



Lotoo include a wide range of filters and equalisers to alter sound according to taste.

SOUND QUALITY

The last time I listened to a player and thought “wow” was with Astell&Kern’s original AK-100. It blew everything else away. Clamping Oppo PM1 planar magnetic phones onto my ears and setting the PAW Gold to play again had me thinking “wow”. This is a spectacular sounding player. It has vast dynamics, deep insight and is almost brutal in its delivery. Where a lovely player like FiiO’s X3 2nd gen came over as pure and delightful, the PAW Gold comes over as crushingly powerful in its sound. The Oppos usually sound a tad warm and slow against other phones, if deeply smooth rich and insightful. All this changed. The PAW Gold lit a fire underneath them; they picked up and ran, suddenly displaying speed and pace, driven hard by the player’s LME49600 output amplifier. Mick Fleetwood’s opening drum roll of ‘Dreams’ (24/96) suddenly had both speed and punch and there was tremendous grip on pace; this player has chiselled timing.

Not only is there dynamic power aplenty, but cymbals and percussion in this piece were rhythmically rock steady; it was almost eerie!

‘Go Your Own Way’ gave more of the same: Usain Bolt pace straight out of the blocks, every step perfectly timed; the PAW Gold is a breathtaking listen. My only surprise was that the Oppos were dried out a

little, sounding less bloomy and warm, tighter and under better control; the player exerts a lot of grip and this alters bass quality, but for the better.

There was plenty of low level atmosphere around close-miked vocals and this quality was very apparent with Benjamin Grosvenor’s rendition of Chopin’s ‘Nocturne No5, Opus 15 No2’ (24/96), where the piano stood in a sense of open space, each struck key having a well-hewn presence of his finger work under wonderful control.

Life and listening got better with a 352kHz sample rate DXD file running at prodigious 17Mbps bit rate of Mozart’s ‘Violin Concerto in D Major’, played by Marianne Thorsen and the Trondheim Solistene (soloists), that occupies a mere 1.2GBs of storage space. OK, so there’s tape hiss at the start – or is it the mic preamps that my Oppos detect? – but the violin and orchestra sounded crystal clear, upon a huge sound stage – and again I heard wonderfully precise timing. The PAW handled DSD 64 and 128 files in tests; it flinched at nothing except Aiff.

CONCLUSION

Lotoo’s PAW Gold is an impressive piece of dedicated engineering. It isn’t the sleekest player by a long mile, but its sound quality is quite extraordinary. If you want to carry your home hi-fi with you, this is the one. It has a lofty price tag as portables go but not as hi-fis go, nor high quality digital sources; a good CD player can cost more. Yet this machine far surpasses CD, playing all high-resolution digital music files with an ability that is astonishing. A superb player then, even if its user interface could be a little more attractive.



The screen is small and has low resolution, so text is jagged looking.

MEASURED PERFORMANCE

Frequency response through the headphone output, at maximum output (H), measured flat to 49kHz with 192kHz sample rate digital, our analysis shows, with a roll off above the frequency to the 96kHz upper limit – a good result that shows the PAW Gold exploits high

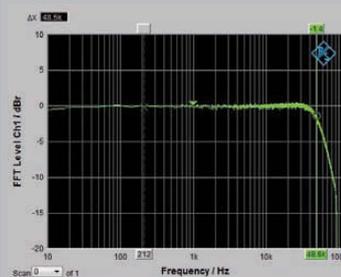
sample rate digital. Results on low output (L) setting were the same and the Line output gave an identical result to headphone.

Distortion at full output (4.4V) measured a low 0.0003% and at -60dB a very low 0.05%, with 24bit resolution digital. We measured EIAJ Dynamic Range at a very high 122dB, exactly in line with Lotoo’s own result and that quoted by Texas Instruments. This is around 7dB more than rivals, that mostly come in around 115dB.

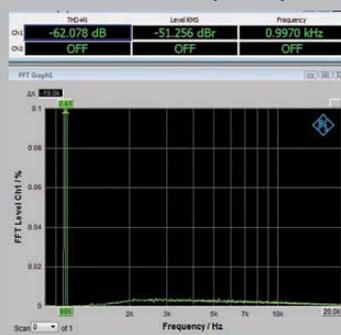
The fixed Line output delivers 2V, like a CD player, and its dynamic range was similar at 122dB.

The Lotoo PAW Gold measured very well in all areas. It’s massive 4.4V output will drive even the most insensitive headphones and dynamic range is that of top mains powered DACs. **NK**

FREQUENCY RESPONSE



DYNAMIC RANGE (60+62)



Frequency response (-1dB)	
CD	4Hz-49kHz
Distortion (%)	
0dB	0.0003
-60dB	0.05
Separation (1kHz)	110dB
Noise (IEC A)	-120dB
Dynamic range	122dB
Output (headphone)	4.4V
Output (Line)	2V

LOTOO PAW GOLD £1495



OUTSTANDING - amongst the best

VERDICT

Fabulous sound quality from a technically superb portable that also serves as a hi-fi player able to deliver devastating digital into any audio system.

FOR

- sound quality
- great portable and stationary player
- plays all digital audio files
- solid build

AGAINST

- heavy
- low resolution screen
- needs menu refinement

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