

# DS Audio Grand Master

Following its groundbreaking Master 1 optical cartridge, DS Audio introduces the Grand Master, and a two-box energiser/equaliser, to up the ante even further  
 Review: **Ken Kessler & Paul Miller** Lab: **Paul Miller**

In every field, not just 'hypercars' and luxury wristwatches, there's an extreme, cost-no-object pinnacle. From chefs' knives to sunglasses to fishing reels, there are items which push engineering and price limits, a phenomenon we are used to in high-end audio. Thus, with shaking hands (not a desirable state with this item), I installed the DS Audio Grand Master cartridge, at £11,995 surely the most expensive pick-up I have ever reviewed, if not the most expensive on the planet.

That's not all: DS Audio cartridges, with their 'optical' engine, require their own dedicated energisers and specific equalisation – you certainly don't feed these into a conventional phono stage [see PM's boxout, p47]. To accompany the Grand Master, there is a brand-new two-box unit selling for a heart-stopping £38,000, though PM and I were just as shocked by the weight – a full 25.1kg for the equaliser and 29.8kg for the power supply, each occupying a space of 452x152x486mm (whd). Looking at the Grand Master's energiser/power supply, you'd think you were seeing a pair of over-engineered monoblock power amps. The finish, of course, is superlative.

## PHOTO BOOST

Before we get to the specifics, please note two important aspects of this new flagship product. The first is that every DS Audio cartridge can work into any of the company's energisers. The second is that there is a trade-in programme so one can upgrade from, say, a Master 1 [HFN Dec '17] to the Grand Master. That said, I may be the only person alive, outside of DS Audio, silly enough to try the entry-level DS-E1 cartridge [HFN May '19] into the Grand Master energiser, and the Grand Master cartridge into the DS-E1 energiser. But the findings were fascinating, and we'll get to those shortly.

Back to the Grand Master itself. DS Audio calls it 'the third generation of optical cartridges', reaching this plateau in

just seven years. Older readers will recall optical cartridges from a half-century ago, eg, Toshiba's effort, which were limited by the technology of the day, but DS Audio has clearly benefited from all manner of LED-related developments.

To advance beyond the still-amazing Master 1, DS Audio graced the Grand Master with independent LEDs and photo-detectors for the left and right channels. This provides a claimed 75% boost to the cartridge's output voltage, from 40mV to 70mV, also benefiting the S/N and stereo separation. Indeed, most impressive of the sonic benefits here, once past the astounding bass, is the lack of crosstalk [see PM's Lab Report, p51].

DS Audio also fitted a smaller 'shading' plate made from 99.9%-pure beryllium, halving its weight from 1.56mg to 0.74mg. The company points out that 'This is less than 1/10th of the mass of a typical core-and-coil system found in a traditional MC cartridge'.



**ABOVE:** Threaded holes in the Grand Master's alloy body allow it to be bolted tight, but the shallow profile requires care in adjusting rear arm height. The sapphire and boron cantilevers used in other DS models are replaced by a diamond rod in this flagship

Though not the first to use this as the cantilever material, DS Audio has opted for diamond, chosen for rigidity, fitted with a micro-ridge stylus. The original, and still with the shortest diamond cantilever is Dynavector's Karat 17D3 [HFN Jul '12], though this remains a 'conventional' MC...

Meanwhile, DS Audio's new cartridge body is fashioned from 'Ultra Duralumin' to maximise rigidity, and the internal wiring is 1.6x thicker than that used in previous models, to reduce its impedance.

Unfortunately, the one

change I would love to have seen has not been addressed: the body height remains abnormally low, and it proves difficult to fit this to tonearms with tapered barrels that widen at the pivot, potentially falling foul an LP's edges if lowered to their minimum height. In such cases a 2-3mm spacer fitted between the top of the cartridge and underside of the headshell will effect a solution, though this comes at the expense of added mass.

## THE EQUALISER

Now let's take a look at the bulk of the cost in this £50k package: the two-chassis equaliser and power supply unit. Connection is slightly more complex than simply feeding the tonearm leads into the back. For openers, there are three heavy umbilical cables, two sets generously supplied in both 500mm and 900mm lengths to aid in siting the two chassis. The two 7-pin cables connect power to the L/R equaliser channels, while the central, 5-pin cable feeds the LED power supply unit.

There's a choice of three single-ended RCA and three balanced XLR outputs, differing by their low frequency cut-off points – a flexibility it shares with the Master 1 energiser. The appropriate filter is selected according to one's speakers and system needs [again, see PM's Lab Report, p51]. As I auditioned this through

*'I was simply getting too emotional to be critical'*



both Falcon Acoustics' LS3/5As [HFN Dec '18] and Wilson Sasha DAW loudspeakers [HFN Mar '19] I had ample opportunity to try the various options available and can confirm they will markedly affect behaviour in the bottom octaves.

## CUSTOM MADE

Along with moving to two boxes for the PSU and equaliser, DS Audio has now utilised custom-made film capacitors and non-inductive resistors. Inside the PSU enclosure can be found three transformers, one for each of the left and right equalisers and the third for the LED supply. Overkill perhaps, but the Grand

Master design also includes a claimed 2.34 farads of electrolytic capacitance within the equaliser and 2.97 farads within the power supply. Once more, the main gains over the smaller equalisers were audible down below, so this package really does cater for bass obsessives.

Switch-on is via a push button on the power supply. Both chassis have soft white power-on lights, which match the light on the cartridge itself. The lights stay on for some time after power is switched off, attesting to the reserves within.

**ABOVE:** Machined, bead-blasted and anodised casework hosts the over-sized PSU [bottom] and energiser/equaliser [top]. They are more substantial than many a high-end power amp

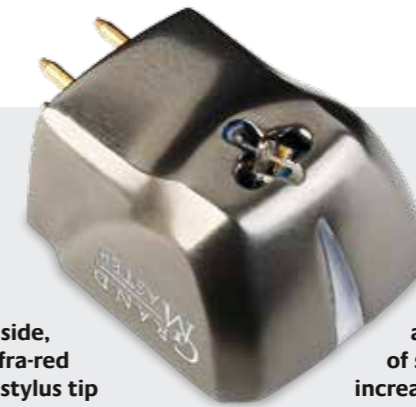
As mentioned, I tried assorted DS Audio cartridges with their non-matching equalisers (non-matching in price, that is). All the gains and losses were audible when making such swaps, so you should purchase the best equaliser you can afford.

## LET THERE BE LIGHT

The shocker was trying the DS-E1 cartridge – the company's least expensive model at £1010 – into the Grand Master (GM) energiser, rather than when playing the GM

## LIGHT THERAPY

While the Grand Master shares the same LED/photocell concept as all DS Audio's proprietary pick-ups, the core internals of this flagship are both further miniaturised and separated into a dual-mono construction. The white LED at the front of the pick-up is purely decorative. Inside, however, not one but two narrow-beam infra-red (850µm) LEDs are positioned between the stylus tip and cantilever fulcrum, their output deflected by an extremely fine beryllium plate that's fixed to the rear of the diamond cantilever. The plate modulates the IR light falling onto two photodiodes, each generating an electrical current that directly mirrors either the left or right channel signal. Moreover, as the moving mass of the stylus/cantilever/plate has been reduced in this model, the Grand Master's



high frequency sensitivity (its response) is further extended just as the dual-mono LED/photocells have reduced any residual crosstalk [see Lab Report, p51].

But what of the equaliser? A traditional RIAA phono preamp is designed to accommodate the velocity-sensitive output of standard MM/MCs where the signal voltage increases with groove excursion and, thus, increasing signal frequency. By contrast, DS Audio's photoelectric conversion is sensitive only to the amplitude of the movement of the stylus and requires only a relatively subtle HF boost to realise a 'flat' response with all RIAA pre-eq'd LPs. Incidentally, the ~70mV output of the photocells is carried by the L+/R+ cartridge pins while the 12V DC input to the IR LEDs (and white LED) enters via the L-/R- pins. PM

## CARTRIDGE

cartridge through the DS-E1 energiser, which is also 'entry level' at £1410. I learned from the swaps that 1) the DS-E1 – cartridge and energiser – is even better value than I first realised, and 2) that the GM's virtues were not masked by the DS-E1 energiser, even if it is far less refined than the GM energiser at 27x the price. Hence, I would posit that the cartridges contribute more to the overall result than the energisers, so the best way to approach DS cartridges if one wishes to upgrade is to focus on the cartridges first, and then the energisers.

Of course, the listening was done in balanced, all-Grand Master mode, and what knocked me out was the bottom end on the remastered John Lennon set, *Gimme Some Truth* [Universal 2435 00198]. Aware that these were completely remixed, I listened to them a few times on my reference system, rather than recall the originals.

### ULTRA VIVID

That aside, the first impression was of an extended, unconfined bass, with 'Cold Turkey' – menacing in any form – acquiring more mass, more substance. It was a repeat of my earlier experience with the Master 1. There's a whole layer of *schmutz* removed from the bottom. 'Clean bass'? Is it even a thing, compared to 'clean treble'? Whatever standard one applies to



**ABOVE:** Supply unit includes three AC mains transformers/three banks of electrolytics for the IR LED PSU [centre] and Eq PSUs [top/bottom]



**ABOVE:** Gold-anodised plates inside the GM equaliser connect the six huge electrolytics feeding each side of the fully discrete, fully balanced filter and output stage [far right]

the lowest octaves, this cartridge delivers weight to support all that comes above, which is a glorious, open, fast sound.

'Open' is the crucial adjective, because this cartridge is so clean, so transparent that listening *into* the music is as easily accomplished as with ½-track reel-to-reel tapes from the 1950s. To hear even the jaunty 'Oh Yoko' – an ode to the woman responsible for more pretentious, insufferable noise than anyone I can name – as an irresistible jingle was as disconcerting as what followed. Let's not mince words: any old Beatles fan like me knows Lennon's voice. And yet these familiar vocals, via the Grand Master, were more real, more vivid – the intimacy afforded 'Oh My Love' had Lennon delivered to my room with such conviction that I was getting too emotional to be critical.

### BLUES WORKOUT

As the next track was his hateful 'How Do You Sleep', grounds enough to think less of Lennon, I was relieved to turn to something scrappy, an album one could hardly call 'audiophile', even if I was listening to the new, superlative edition from the Speakers Corner label.

The Paul Butterfield Band's *East-West* [Elektra/Speakers Corner EKS-7315] is an oddity: Chicago blues segueing into 'raga' ☺

## TETSUAKI AOYAGI

Over the last four years DS Audio's President, Tetsuaki Aoyagi, has been making a list – an Excel spreadsheet to be precise – detailing all the minor revisions that might add up to a major advantage in the evolution of the brand's 'optical' pick-up.

'To improve the S/N ratio we needed to obtain a higher output from the cartridge', says Tetsuaki, 'so we decided to use independent left and right LEDs and photocells. The position of these two LEDs could now be optimised to achieve a more substantial output from the cells'.

Tetsuaki also sought to reduce the mass of the moving parts while improving stiffness with a diamond cantilever. 'In addition, the size of the light-shielding plate was reduced, so the left and right sounds were less likely to mix and the separation of high frequencies would be greatly improved.

'Sound quality was significantly affected by the use of solid beryllium for the shading plate. This pure beryllium material is very expensive [and very difficult to work with], but switching away from aluminium made such a change to the sound that everyone could tell the difference – it was a surprise to me!'

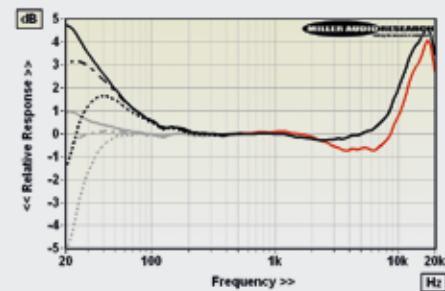
Tetsuaki's list extended to every material in the pick-up. 'This is not often mentioned, but by using stainless steel for the parts that hold the cantilever, the fulcrum is fully stabilised and the freshness of the sound is improved. But if the cartridge body is made entirely of stainless steel, the sound is too hard, so we used it only for internal support and alloy for the shell'. PM



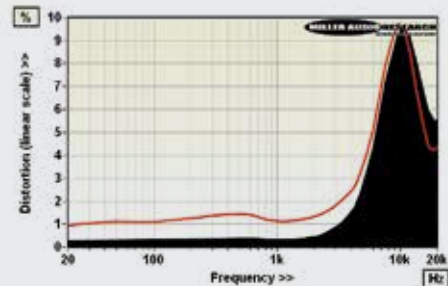
## DS AUDIO GRAND MASTER

There are clear parallels between the performance of the Grand Master flagship, its predecessor the Master 1 [HFN Dec '17], the DS-002 [HFN Jun '17] and DS-W2 [HFN Jan '19] – see boxout, p47 – but the stiffer diamond cantilever, reduced moving mass and dual-mono LEDs/photocells within the GM clearly benefit its performance. The 2V output (1kHz/5cm/sec) is a function of the equaliser as are the six tailored ‘bass contours’, three rolling off from a notional 50Hz and three from a lower 30Hz. Output A gives the strongest bass in both 30Hz/50Hz settings [black/grey traces, Graph 1], the former’s +4.3dB/20Hz boost similar to the default response of earlier DS pick-ups. Output B/50Hz [dashed grey trace] gives the flattest bass with Output C/50Hz (–5.6dB/20Hz) proving the ‘safest’ with big, reflex-loaded speakers.

However, it’s the boosted and extended HF response of +3.4dB/20kHz that marks out the GM as the most advanced DS Audio pick-up to date – its extended bandwidth also reflected in the 9% THD peak being pushed out from ~7kHz to 10kHz here [see Graph 2, below]. The dual photocells increase midband stereo separation by ~5dB to 34dB while the diamond stylus/cantilever combination offers a more accurate 22° VTA. Compliance is ‘stiffer’ at 11cu but bodyweight slightly lower at 7.7g so the GM is arguably more compatible with mid/heavy effective mass arms. Finally, while downforce is increased to 2.1g, the GM gains little in tracking security, clearing the 75µm groove pitch (65µm on the left channel), but not making it to 80µm. PM



ABOVE: Frequency response (–8dB re. 5cm/sec) lateral (L+R, black, Output A/30Hz; dashed, o/p B; dotted, o/p C; grey, o/p A/50Hz; dashed, o/p B; dotted, o/p C) versus vertical (L–R, red, Output A/30Hz)



ABOVE: Lateral (L+R, black) and vertical (L–R, red) tracing and generator distortion (2nd-4th harmonics) vs. frequency from 20Hz-20kHz (–8dB re. 5cm/sec)

## HI-FI NEWS SPECIFICATIONS

Generator type/weight	Photo-optical / 7.7g
Recommended tracking force	2.0-2.2mN (2.1mN)
Sensitivity/balance (re. 5cm/sec)	2050mV / 0.30dB (from Eq unit)
Compliance (vertical/lateral)	11cu / 15cu
Vertical tracking angle	22 degrees
L/R Tracking ability	65µm / 80µm
L/R Distortion (–8dB, 20Hz-20kHz)	0.60–8.8% / 0.33–9.2%
L/R Frequency resp. (20Hz-20kHz)	+4.0 to –0.5dB / +4.5 to –0.4dB
Stereo separation (1kHz / 20kHz)	34dB / 25dB



ABOVE: Rear view of the PSU [bottom] and equaliser [top]. The pick-up’s internal LEDs are powered via the R– and L– pins while the output is returned via R+ and L+, all via the ‘Input’ RCAs. Three eq’d line outs, on RCAs and balanced XLRs, offer three bass roll-offs from two different – 30Hz and 50Hz – turnover freqs. [see Graph 1, opposite]

rock’. Even so, I sat through the album’s title-track closer, normally something I eschew because it’s 13 minutes of hippie excess.

On the other hand, it starred the guitars of Mike Bloomfield and Elvin Bishop, as well as Butterfield’s harp, so this provided a workout for the Grand Master cartridge above its bass capabilities and irrespective of the spatial concerns.

### MASTER AT WORK

It’s hard to describe the fluidity and attack of Bloomfield, whose legend is slipping out of the public consciousness simply due to the passing of time. If you know the work of the also-departed Stevie Ray Vaughn, you have a handle on this sort of prowess. For the Grand Master, the transients were conveyed with absolute precision, no decay issues, no marring of

either the clarity or the screech, as required. As the solos are identified in order, one gets to compare the funkier Bishop with the more aggressive Bloomfield, and the guitarists among you will even be able to identify the guitars, if not the string manufacturers. This cartridge therefore comes across as both a tool for assessment as well as a means for musical fulfilment.

Another new remastering of note is The Doors’ anniversary reissue, *Morrison Hotel* [Rhino/Electra R2 627602]. ‘Roadhouse Blues’, kicked off what many critics felt was their best album to date, raw raunch that wouldn’t have embarrassed Butterfield and Co. This, too, was a showcase for a familiar voice, Morrison’s nasally sneer not quite as acidic as Lennon’s but conveyed with such authority that I was forced to dig out their eponymous debut [Elektra EKS-74407] and listen to it in its entirety, transfixed by the Grand Master’s, well, *mastery*. Yes, it’s that kind of cartridge. ☺

### HI-FI NEWS VERDICT

DS Audio cartridges are so ghostly quiet compared to MCs that there could be culture shock when first hearing one. I’ll never forsake Deccas or Koetsus, but the Grand Master is so truly supreme in resolution, transparency, spatial recreation, neutrality and any other parameter I can name that it’s impossible for me not say what I usually try to avoid: ‘This may be the best cartridge I’ve ever heard.’

Sound Quality: 90%



ABOVE: The DS GM’s pins are clearly marked and separated. Just visible is the diamond cantilever, tie-wire suspension and microridge stylus [see also p47]