

DS Audio DS-E3

Those wizards of trickledown tech are at it again: DS Audio's new entry-level model, the DS-E3, gives you a taste of the Masters series at less than a tenth of the price!
 Review: **Ken Kessler & Paul Miller** Lab: **Paul Miller**

It's hard to name a cartridge brand as prolific as DS Audio. It seems every time you turn around there's a new model. Following a flurry of entries at the extreme top-end, including the Grand Master EX [HFN Oct '23], DS Audio has returned with a new optical cartridge at entry level, an absolute cracker called the DS-E3 – and with *no price increase* over the DS-E1 [HFN May '19] it replaces.

Pricing is crucial to the story, especially as companies including Soulnote [HFN Nov '23], Uesugi and others have added DS Audio-compatible energiser inputs to their phono stages. For users with multiple cartridges – and many of us enjoy both MMs and MCs – the presence of a DS Audio energiser/equaliser in an all-singing-all-dancing phono amp from another brand makes the DS-E3 (like the DS-E1) even more attractive. Here's why.

If you buy the DS-E3 cartridge/equaliser package, the price is £2295, which represents a £245 saving over buying them separately. The cartridge on its own is



£1270, as is the equaliser. But if you own one of the outside makers' compatible phono stages and you're curious about optical cartridges, the entry fee to the DS Audio club is no more onerous than that of many top-end MC brands.

I'm stressing this now because DS Audio's optical cartridges are among the few truly revolutionary high-end hi-fi products of the past decade or so. Many of you will be thrilled by them, especially if you are old enough to recall that a half-century ago, there were attempts at manufacturing photo-optical cartridges, but the concept was too early, awaiting low-temperature LEDs, etc. So when it comes to DS Audio's cartridges, I'm hard-pressed to name something in hi-fi as controversial or exciting.

PM GETS INSIDE

In the decade-plus since DS Audio launched its first optical pick-up, designer Tetsuaki Aoyagi has constantly evolved the cartridge's basic principle of operation [see PM's boxout, p69]. The DS-E3 is now the most affordable pick-up to utilise the

LEFT: Safe as houses – until setup time! All DS Audio pick-ups are securely shipped in a machined and anodised block of alloy

company's third-generation mechanism, originally debuted in the Grand Master [HFN Feb '21]. The green LED at the front of the pick-up is purely decorative, indicating 'power on', and mirrors the vertical LED indicator on the DS-E3 EQ's sculpted alloy fascia [see p71].

The real action happens inside the cartridge where not one, but two, special narrow-beam LEDs are positioned under the stylus tip and in front of the cantilever fulcrum, their output deflected by an extremely fine beryllium plate connected to the cantilever. These light beams fall onto two photodiodes, each generating an electrical current that represents the left or right channel audio signal.

In this third-generation mechanism the moving mass of the stylus/cantilever/plate has been reduced, improving tracking and high frequency response, while the

BELOW: The DS-E3 is equipped with a crimped aluminium alloy cantilever fitted with a good quality, elliptical-profile diamond stylus



use of two (dual-mono) LED/photocells is claimed to improve stereo separation. New photodiodes have also upped the cartridge's output level to ~70mV though, as this signal is fed directly into a proprietary equaliser, it's only of indirect relevance.

KEN CONTINUES

Every DS cartridge has its own energiser/equaliser, but they are all interchangeable. Of course, there's certainly a difference between the DS-E3 energiser and the next, the DS-003 [HFN Oct '21] at twice the price, up through the five-model equaliser range to the £42,200 Grand Master. However, I'd rather have a Grand Master EX cartridge working into the DS-E3 energiser – which I have tried – than the obverse, a DS-E3 cartridge into one of the £9000-plus energisers.

With the DS-E3 cartridge/energiser, it's like looking at a Grand Master EX Mini-Me. That is not a backhanded compliment. I hate to jump the gun rather than leave you in suspense but at this point I must say what you're getting today for £2295 is akin to what would have cost you £10,000 three years ago. Rarely have I seen such beneficial use of trickledown technology, and in such a short time.

Before you even install it, the DS-E3 cartridge immediately calls attention to itself via the visuals which it shares with all the 'Gen 3' and Master models. This is the new, sculpted shape with vertical LED, as now applied to all six models in the catalogue. However, the body is made from aluminium, with a semi-matte finish



ABOVE: The illuminated green 'power on' strip is quite separate from the special LEDs used inside the photoelectric 'mech'. DS Audio's body shape demands care in setting the arm height

which looks a bit like titanium, as opposed to the Grand Master EX's highly polished gold/chrome look.

MODEL LOOKS

As for DS Audio's matching energiser, this is no longer a prosaic, rectangular box, with flat, unadorned front panel, like the DS-E1. Instead, it's a miniature version of the higher end models, complete with its prominent, protruding curve and central on/off button. At the back are just sockets for

input and output, and a switch that selects bass response – choose by ear because its effect is loudspeaker-dependent. The boost is quite audible, so attend to it with a favourite LP with prominent lower octaves [see PM's Lab Report, p73].

Finally, while DS Audio's costlier models boast exotic cantilevers and line-contact styli, in the DS-E3 the former is aluminium, the latter elliptical.

LIGHTING THE WAY

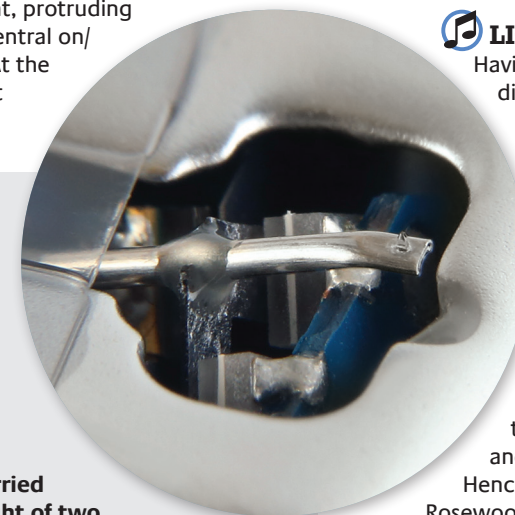
Having now used at least six different DS Audio cartridges and energisers, I keep two permanently on-hand alongside a selection of MMs and MCs. If you are curious, and would like a general short-cut to ponder, one might say the 'family sound' of DS Audio's optical cartridges falls somewhere inbetween the two dominant, coils-and-magnets technologies.

Hence, if you mated a Koetsu Rosewood with a Decca Gold, a DS Audio cartridge would be the progeny. The DS-E3 bears out this theory and explains why I am predisposed toward them: if you like chocolate and you like oranges, you'll like chocolate oranges.

It was the wide stereo of the track 'Wipe Out' on *Lost Legends Of Surf Guitar Featuring The Impressions* [Sundazed LP5622] which made me fire up my MM

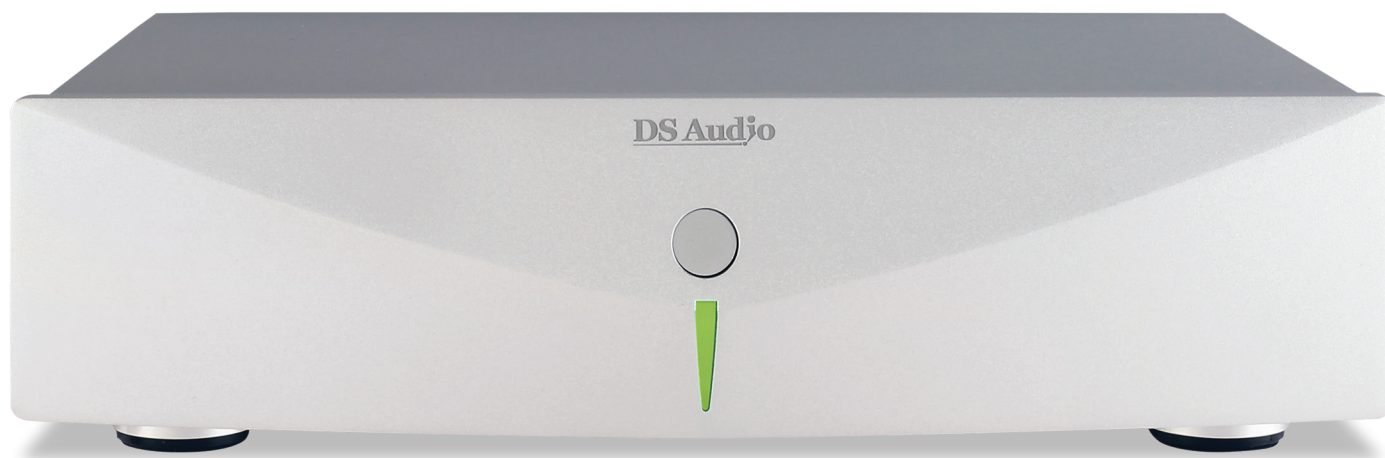
LIGHT TO SOUND

Although DS Audio's phono cartridges employ photo diode technology, they still track the vinyl groove using a mechanical stylus and cantilever, just like every other cartridge. However, while audiophiles still need to be mindful of cartridge compliance, tracking force, tracking ability, tracing accuracy and tonearm matching, as we are with conventional MMs and MCs, optical cartridges do not rely on electromechanical principles to generate an output. Instead, the DS-E3's discrete, two-channel output (carried by the L+ and R+ terminal pins) is derived from the light of two fixed, narrow-beam 5V/850µm (IR) LEDs – seen in the inset picture as two dark blue 'blocks' – shining on a pair of photocells at the back of the mechanism. The invisible light from these LEDs (powered via the R– and L– pins) is 'chopped' by a V-shaped sliver of beryllium on its way to the photocells. Again, our picture reveals this so-called 'shading plate' glued to the middle of the cantilever, its movement directly mirroring the passage of the stylus through the groove. It's important to remember that the chopped (modulated) light path is still 'analogue' – not digital – as is the current derived from the photocells. PM



ABOVE: Seen end-on, the miniature infra-red LED 'transmitters' are just visible at the front of the mechanism. A clear plastic cover limits dust getting inside and onto the receiving photo cells

CARTRIDGE



and MC soundstage yardsticks, respectively the Garrott Decca Gold and the Denon DL-103 [HFN Jul '09], to confirm what I was hearing. DS Audio's Master models have already shown me how wide and deep was the soundstage afforded by an increasingly more refined design. Since the introduction of the first Master model, it was impossible to detect any condensing of the perceived dimensions, so close are the DS Audio cartridges to those venerable, tried-and-tested classics.

FAST AND FLUID

This large, open dais allowed greater access to what are surprisingly good home recordings and impromptu live tracks more than 50 years old. The signature snap of Fender Jaguar transients, essential when reproducing the sound of a wild surf band, was crisp, rapid and yet had enough twang to exhibit that bizarre but necessary blend of attack and fluidity. DS Audio's cartridge is quick – like Decca quick.

As the Impressions album is one of those raucous, play-it-loud affairs, next on the stack was the exceptional-sounding, unplugged, lean-as-filet-mignon *Today!* [Craft Recordings/Vanguard CR00744], Skip James' magnificent 1966 recording from his later years, when rediscovered by the world at large. This is just James on

acoustic guitar or piano, with added bass from Russ Savakus on one cut. So spare yet so rich-sounding is this album you'll swiftly dismiss thoughts that mono would have sufficed. DS Audio's new DS-E3 turned it into a room filler thanks to the life-like scale it reconstructs.

Despite the unplugged, acoustic nature, this set also raised the matter of the DS Audio bass 'bump', something which never bothered me after four decades of listening to LS3/5As. What this album asked of the cartridge was to reveal the full grandeur of a piano, but primarily the resonance of an acoustic guitar. In both cases, there was a weight to the sound which belied the use

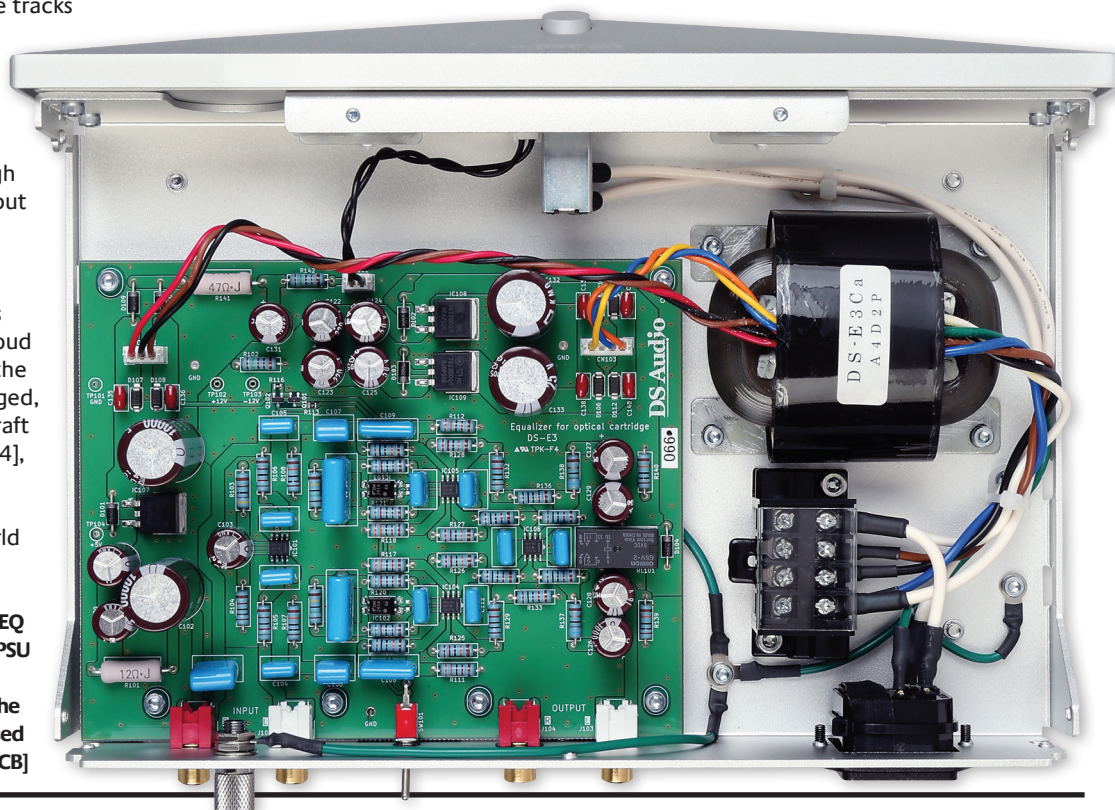
ABOVE: While taking its industrial design cues from the larger Master series energiser/ equalisers, the DS-E3 EQ – with matching green power on LED – is significantly more compact

solely of unamplified instruments. I was driven to bang out some chords on the upright next to my desk for comparison, just to make sure it wasn't wishful thinking.

BODY BUILDING

Thank goodness, too, for stereo, as James' guitar was positioned just off-centre enough to intimate the form of a real singer holding and playing it. Moreover, this LP was delivered with body and timbre as lifelike as the sound of Muddy Waters' legendary audiophile favourite, the oft-reissued *Folk Singer* from 1964. ➔

'It's like
looking at a
Grand Master
EX Mini-Me'



RIGHT: Inside the elegant DS-E3 EQ energiser and equaliser showing PSU transformer [right] and regulated supplies [top and left of PCB] for the optical pick-up and op-amp IC-based equaliser/output circuit [centre PCB]

CARTRIDGE



ABOVE: The DS-E3 EQ provides power for the optical pick-up's internal LEDs via the input RCAs [left]. The output RCAs [centre] offer alternative bass turnover frequencies [see Graph 1, opposite] via an 'Output 1 / Output 2' toggle switch

Arguably as impressive, given that James' voice is as high as a castrato's, was the super-clean midband. The noise floor via DS Audio pick-ups is so low that you can pretty much hear all of the minuscule aural clues, and as James' voice lacks the force or textures of, say, Albert King or John Lee Hooker, the DS-E3 was asked to display finesse and delicacy. It succeeded, creating intimacy and realism.

COMING UP ROSES

This was one of those listening sessions where a guitarist could identify the brand of James' strings, or a pianist the make of piano. While the latter itself yielded enough bass to further explore the two low-frequency EQ settings of the DS-E3 energiser, I countered it with Paul McCartney & Wings' *Red Rose Speedway* [Capitol 02448 58324]. This was a no-brainer as all of McCartney's albums are as bass-prioritised as a Charles Mingus record, and it presented an

alternative to the gentler acoustic bass of the Skip James LP.

I have the half-speed-mastered edition *Red Rose Speedway*, released for 2023's Record Store Day, which some might find controversial as half-speed mastering goes in and out of fashion. Yet from start to finish this LP has undeniable lower-octave mass and weight – no, make that substance – which challenges other releases. To what surely would be PM's relief, the DS-E3 kept Macca's bass on the right side of 'fat' or 'overabundant', the two EQ selections chosen according to the loudspeakers in use.

CLOSING THE GAP

What the DS-E3 has also acquired is a hint of needed dryness or control, making it easier to appreciate the ebb and flow of McCartney's playing. This works hand-in-hand with even greater transparency, narrowing the difference between the entry-level cartridge in DS Audio's lineup and its more expensive siblings. With this model, all six DS Audio pick-ups have now made the transition to 'Gen 3' – and not just in looks. ☺

HI-FI NEWS VERDICT

DS Audio does it again! Its entry-level models always offered easy access to optical technology and superb sound but the DS-E3 extracts even greater overall refinement, tighter bass and other sonic gains. The pick-up and equaliser combined elevate this entry model to the standards of its mid-range of two years ago, which cost thrice the price. If you've been waiting to try a DS cartridge, wait no longer.

Sound Quality: 90%



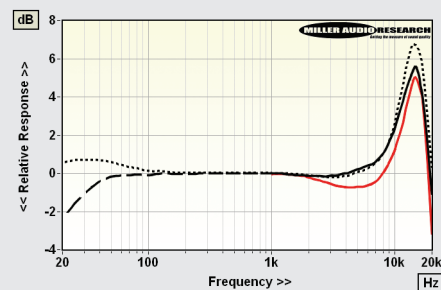
ABOVE: The DS-E3's pins are clearly marked and separated. Also visible are the shading plates, cantilever and IR LED light source [see also p69]

LAB REPORT

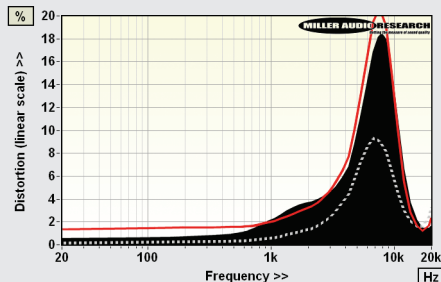
DS AUDIO DS-E3

In practice, while DS Audio's 'third generation' mechanism brings the DS-E3 some of the benefits over the DS-E1 [HFN May '19] we saw in the Master 3 [HFN Jan '24], other features of its performance are inescapably linked to the retention of a basic crimped alloy cantilever and elliptical stylus. So, despite the compliance being slightly 'stiffened' from 15cu to 11cu, tracking has improved slightly further over the DS-E1, with the DS-E3 clearing the maximum 80µm groove pitch on both channels and the most severe +18dB modulation (315Hz lateral cut, re. 11.2µm) at just 0.65% THD. How? Because the recommended tracking force has increased from 1.7g to 2.1g! VTA is now slightly more accurate too at 22°. One of the real benefits of the DS-E3's 'dual mono' optical path is improved stereo separation – a full 35dB midband here – although, for whatever reason, channel balance was a poorer 0.9dB in our sample. The 790mV output from the DS-E3 EQ unit is not far off that of the DS-E1 EQ.

Another benefit of the 'Gen 3's' reduced moving mass is a deferment of the inevitable cantilever resonance at ~12-13kHz (DS-E1) to ~15-16kHz here [see Graph 1] leading to a +6.5dB treble peak. Note the impressive symmetry between lateral [black], vertical [red] and stereo [dotted] responses, and also the reduced bass boost of the Output 1 and 2 options – a sensible update on DS Audio's part. Distortion [see Graph 2] necessarily reflects the response trend with, again, excellent L+R and L-R symmetry – a boon to 3D soundstaging – and a low of just 0.3% (re. -8dB re. 5cm/sec) through bass and midrange before hitting 9%/8kHz where the 2nd harmonic meets the response peak. PM



ABOVE: Frequency response curves (-8dB re. 5cm/sec) lateral (L+R, black) vs. vertical (L-R, red) vs. stereo (Output 1, dotted; Output 2, dashed)



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

HI-FI NEWS SPECIFICATIONS

Generator type/weight	Photo-optical / 7.7g
Recommended tracking force	20-22mN (21mN)
Sensitivity/balance (re. 5cm/sec)	790mV / 0.9dB (from Eq unit)
Compliance (vertical/lateral)	11cu / 15cu
Vertical tracking angle	22 degrees
L/R Tracking ability	80µm / 80µm
L/R Distortion (-8dB, 20Hz-20kHz)	0.9-12.7% / 0.3-9.1%
L/R Frequency resp. (20Hz-20kHz)	+2.7dB to -4.4dB/-2.1dB to +6.8dB
Stereo separation (1kHz / 20kHz)	35dB / 18dB