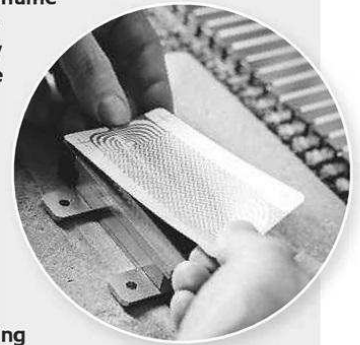




## PSEUD'S CORNER

Most loudspeaker designers are content to use dome tweeters of 25mm diameter or thereabouts for reproducing treble frequencies. They offer good directivity and, when well-designed, low distortion coupled with no breakup resonances within the audible frequency range. Genuine ribbon drivers – in which the diaphragm is also the electrical conductor – are rarely used because they are fragile and require a matching transformer due to the ribbon's low electrical impedance. More popular as an alternative to dome tweeters are pseudo-ribbon drivers like the Raidho tweeter. These have a thin planar polymer diaphragm which, usually on one side only, carries a flat 'voice coil' etched from a conductive surface coating which is bathed in the field of permanent magnets arrayed around it. In the Raidho tweeter, unusually, the conductor tracks are wiggly rather than straight – you can see more photos of one being assembled at <http://raidho.dk/downloads1>. Because the thin, flat diaphragm is prone to resonance – despite the distributed drive force – mechanical damping has to be carefully applied to ensure a flat frequency response and clean CSD waterfall [see Lab Report, p35]. KH



black as standard, but Raidho says it can be painted in any colour you like. There's also a striking walnut burl veneer which takes the price up to £42k. The metalwork on the front baffle is superb, and the whole object has a sense of solidity about it that its lovely, sylph-like proportions disguise.

Raidho claims a sensitivity of 89dB although in practice, and in keeping with KH's Lab Report [p35], it seemed to need a power amplifier with real heft – the £24k Constellation Taurus Stereo used in editor PM's listening room proving a great partner [HFN Dec '17]. The D-2.1 is also a little trickier than you would expect to position, and warrants a good bit of trial and error before everything makes musical sense. This is largely due to the tweeter, which appears more directional than most. The design seems to suit an equilateral triangle between the two speakers and the listener, with the speakers toed in just a touch. In terms of the bass, a good half metre or so from the boundary wall is preferable to avoid boom. This done, things snap into focus and you really begin to hear how special the big D-2.1 truly is.

### BLISTERING SPEED

One thing we can say about the D-2.1 is that it's emphatically not bland, but brings its own distinct qualities to the great pantheon of high-end speakers. The D-2.1 is smooth to the point of being laid-back, and as soon as you set your ears upon it, you can't help but notice that much of the presence region and lower treble is recessed. I couldn't

really discern the rising treble above this, noted by KH – only those young enough to hear it will react differently.

That's the headline news. When you've got used to the midband tapering down, you begin to peer into its sound a little further. At this point the qualities of that lovely planar unit begin to hold sway. It may be a little dull lower down but it's extremely fast. Transients are blisteringly quick, urging the music along with pace and fantastic definition, despite that rather unusual tonal balance. Many speakers give the illusion of speed by being falsely bright and forward, whereas this is the precise opposite – it is neither, but still seriously swift in its handling of transients.

### DELVING DEEP

Cue up Grant Green's beautiful 'Ease Back' [*Carryin' On*; Blue Note CDP 7243 8 31247 2 5] and you're wowed by the amazing speed of the hard-struck guitar. The sound zings around the room faster than a bullet, even though the overall balance is very slightly dull – it's a slightly odd yet far from unpleasant combination.

Despite this, the midband really does have great clarity. ABC's 'Date Stamp' [*The Lexicon Of Love*; Mercury 514 942-2] proved quite an arresting listen. It's possible to peer right into the mix – the expansive soundstage doesn't push out at you, rather it hangs back to let the listener delve deep inside. The more you listen, the more there is to hear, with instruments well defined and accurately located. I was struck by the way it was able to separate 



# LAB REPORT

## RAIDHO D-2.1



**LEFT:** Crossing over at 150Hz, the lower 'Diamond' bass driver works out of three vents in the rear spine of the speaker. Despite its three-way crossover, the D-2.1 does not support bi-/tri-wiring

to individual instruments and voices fun! There was a lovely timbre to the track's analogue synth noodles and glides, for example, often hidden by lesser loudspeakers. Vocals had a purity that could seem spookily realistic. Other details, such as the exquisitely fast, filigree detailing on the hi-hats was very satisfying, while the D-2.1's inherent smoothness ensured tracks like The Beatmasters' 'Rok Da House' [Anywawanna; Rhythm King Records LEFT CD 10] – often a little uncouth with other speakers – fell into place beautifully.

### PROPULSIVE BASS

A 'badly done' bottom end would certainly have spoiled the speed of this Raidho loudspeaker, but while it's not as vast and all-encompassing as many cost-no-object designs, it gets the job done in a professional way. So the bass proved highly propulsive, integrating very well with the mid and treble. That Beatmasters track showed it to be fast, firm and crisp, with no tendency whatsoever to lag.

I loved the way the bass synthesiser line syncopated with the electric piano track, which was playing on and off the beat in a James Brown kind of way. Things were so fast and propulsive that the song almost sounded as if it had been speeded up. Once again, the D-2.1's bass, like the speaker as a whole, is both smooth and quick. ☺

### HI-FI NEWS VERDICT

This is a distinctive sounding speaker all right, at a price point that includes many grand designs offering all the musical flavours you could wish for. Although not quite as neutral as it might be, the Raidho D-2.1 nevertheless proves to be a highly enjoyable and sophisticated sounding floorstander, with its own unique character. However, an extended audition is mandatory to confirm if it will truly satisfy your soul.

Sound Quality: 84%

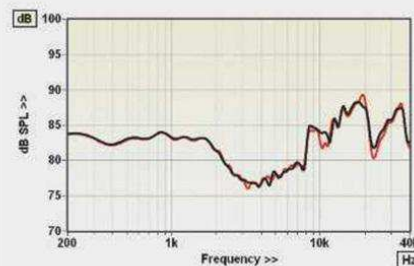


out all the different strands of the mix, making the keyboard overlays so easy to discern, while you could hear the individual instrumental parts start and stop with surgical precision. The same went for Gregory Isaacs' 'Night Nurse' [Island Records 254 846] – here every strand was laid out on a plate, to reveal bass guitar, bass drum, keyboard, snare, hi-hat, ride cymbal and maracas.

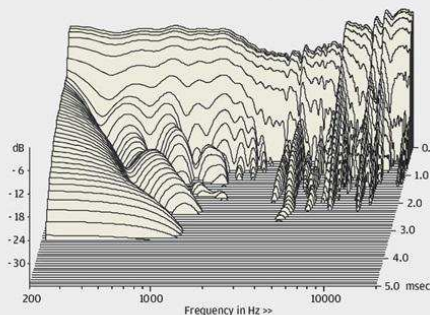
There were stark spaces between the notes but the ensemble was still strung together coherently. This very open and agile sound made listening

Raidho claims an 89dB sensitivity for the D-2.1 but that is remote from the 83.0dB pink noise figure we recorded. Impedance could have been reduced to increase this somewhat but Raidho appears to have preferred to make the D-2.1 a little easier to drive than many modern floorstanders. Although the measured impedance dips to a minimum of 3.7ohm, a little below the >4ohm quoted by Raidho, impedance phase angles are low so the EPDR (equivalent peak dissipation resistance) falls to a minimum of 2.0ohm at 20Hz with a more practically relevant second dip to 2.4ohm at 210Hz. Compare this with the 1.7ohm we more typically record.

The forward frequency response(s), measured at 1m on the tweeter axis, show a deep, broad presence band suckout, followed by rising treble output above 10kHz [see Graph 1, below]. These contribute to quite high response errors of ±6.0dB and ±6.7dB respectively for the pair, and matching of the two was also a little wayward at ±1.9dB over the same 300Hz to 20kHz frequency range, although much of this is accounted for by a narrow-band disparity at 11kHz. Ignoring this the pair matching error drops to ±1.3dB, and still further to ±1.0dB below 9.8kHz. Diffraction-corrected nearfield measurements recorded a bass extension of 37Hz (-6dB re. 200Hz) – a good figure for a speaker of this size and further justification for the low sensitivity. The CSD waterfall [Graph 2] confirms that much of the treble unevenness is associated with tweeter resonances. Past experience has shown that isodynamic tweeters give variable distortion results when measured nearfield, so the D-2.1's was measured at a mic distance of 250mm. KH



ABOVE: Forward response indicates a depressed presence band relative to a fairly bright treble



ABOVE: Cabinet modes are well contained but the pseudo-ribbon tweeter shows numerous resonances

### HI-FI NEWS SPECIFICATIONS

Sensitivity (SPL/1m/2.83V – Mean/IEC/Music)	84.8dB/83.0dB/81.5dB
Impedance modulus: minimum & maximum (20Hz–20kHz)	3.7ohm @ 146Hz 15.9ohm @ 3.1kHz
Impedance phase: minimum & maximum (20Hz–20kHz)	-18° @ 6.1kHz 34° @ 968Hz
Pair matching/Resp. error (300Hz–20kHz)	±1.9dB/ ±6.0dB/±6.7dB
LF/HF extension (-6dB ref 200Hz/10kHz)	37Hz / >40kHz/>40kHz
THD 100Hz/1kHz/10kHz (for 90dB SPL/1m)	0.9% / <0.1% / 0.3%
Dimensions (HWD) / Weight (each)	1055x200x520mm / 44kg