

Lehmann BC Linear (£650)

Specialising in diminutive high-end hi-fi, Lehmann makes preamps, small power amplifiers, phono stages and a rather special 'Black Cube' headphone amp
Review: Keith Howard **Lab:** Paul Miller

My very first hi-fi system featured headphones rather than loudspeakers, since when I've had a love-hate relationship with cans of more varieties than Heinz. If you believe the propaganda that the last great barrier to wonderful sound is the listening room – which I don't – then the headphone ought to have a lot going for it. And yes, indeed, you can hear things via headphones that aren't readily apparent via even the best loudspeakers.

But it's as if having the transducer that close to your ear makes all the infidelities of reproduced music, and the system you're using to deliver it, the more obvious. So for optimum results with the best headphones you must use

LOCAL & GLOBAL

Negative feedback is a very useful circuit technique for flattening frequency response, lowering distortion, suppressing hum and noise, and reducing output impedance. But for many decades some designers have claimed that applying too much of it harms sound quality. So-called 'zero feedback' designs are a result but, as Lehmann Audio carefully states for the Black Cube, this usually means zero global or loop feedback. Local feedback, within the circuit, is still present.

a first-class sound source, and a first-class headphone amplifier. On the face of it, the latter shouldn't be too difficult to realise. After all, the headphone amp's life is easy-peasy compared to that of the loudspeaker amplifier's. Headphones – even the lower impedance types – present a much easier load than the vast majority of loudspeakers, and a mere volt or three of signal is usually sufficient to have them generate deafening sound pressure levels. But that transducer proximity effect comes into play again, so that headphone amplifiers are just as influential on sound quality as their larger brethren.

ALL YOU NEED

Lehmann Audio's Black Cube Linear headphone amplifier has been on sale for over five years and in that time has garnered numerous enthusiastic reviews. Despite its name it is slim, narrow and deep but incorporates all you really need in a headphone amp: a pair of input phonos, of course; a pair of output phonos, so that it can be inserted in a preamp processor loop or between pre and power amps; two paralleled quarter-inch output sockets, one of which cuts the output feed when

a headphone jack is inserted; and a volume control. Finish of the fascia plate and volume knob is optionally either black or silver.

Unusually, the Black Cube also has three switchable gain settings with 10dB increments, selected via DIP switches on the underside of the unit. These are provided to accommodate headphones of different sensitivity; I used the highest-gain 0dB setting for my listening. (Confusingly, the 10 and 20dB settings have progressively lower gain.)

'A time-capsule vision of a bucolic English idyll ploughed under by WWI'

Other technical features include a Class A output stage, as you'd hope, and zero global negative feedback (see box-out).

HARD-WIRED

As soon as I started playing music through the Black Cube it was obvious that it sounded very different to the resident Musical Fidelity X-Can v8 when driving either of the headphones used for the listening – Sennheiser's fine



LEFT: A high quality volume control and two 0.25in headphone sockets grace the diminutive fascia. The preamp gain may be changed from 0dB to +10dB and +20dB via switches on the base of the chassis

LEHMANN AUDIO BLACK CUBE LINEAR (£650)

You might think that any good line preamp would be equally adept at driving a pair of headphones, but this is not always the case. While a preamp can typically be assured of driving a power amp with an input impedance of 20k Ω or more, many headphones present an impedance that's far lower – often down to 20 Ω . So a headphone preamp needs a very low *output* impedance if you're not to experience a seriously modified response with low impedance cans. At 5.9 Ω (flat from 20Hz-20kHz) the Black Cube Linear is low enough for all but the most taxing of in-ear 'phones (which have been known to drop to 7 Ω). The amp's native response [see graph 1, below] is not as ruler flat as, say, PS Audio's GCHA [HFN, July '07] which held true to within one-hundredth of a dB from 20kHz-100kHz, but figures of -0.4dB/20kHz and -5.3dB/100kHz are perfectly sensible.

Lehmann's Black Cube Linear also scores with its fabulously low distortion, just 0.0003% through bass and midrange and rising to an insignificant 0.0025% at 20kHz [see graph 2, below]. Noise is vanishingly low too, sufficient to raise an A-wtd S/N ratio of 99dB in its +10dB gain mode. This is 20dB ahead of the PS Audio amp tested two years ago! These figures, together with its maximum output of 9V and input overload of 6.1V, suggest the Black Cube Linear is as near a bomb-proof solution as you'll find. Readers are invited to view a comprehensive QC Suite test report for the Lehmann Black Cube Linear headphone amp by navigating to www.hifinews.co.uk and clicking on the red 'download' button. PM



ABOVE: Not two inputs but a combination of L/R stereo input and variable preamp output, controlled off the same volume control as the two front headphone sockets

new HD 800 (reviewed on page 76) and my established budget favourite, the Audio Technica ATH-AD700. Despite negligible differences in their frequency responses, the Black Cube consistently sounded warmer and fuller-bodied.

Hilary Hahn's violin tone on her recording of Vaughan Williams' lyrical *The Lark Ascending* [DG 00289 474 8732, CD layer] was sumptuous and the orchestral accompaniment rich and haunting, a time-capsule vision of a bucolic English idyll ploughed under by WW1. It was a sound that drew you in and sustained its emotional grasp.

This hard-wiring to the human core of the music was also very apparent on vocals, male and female. Eric Bibb's heartfelt 'I Want Jesus To Walk With Me' (from the Opus 3 *Showcase* sampler SACD 2100, CD layer), for example, conveyed such supplicant intensity – which Opus 3's unadulterated recording does everything to preserve – that I happily set aside my staunch atheism to share in the spiritual experience.

Elton John's 'Sixty Years On' – from the eponymous *Elton John* album – I've mentioned in these pages before as a real surprise package for those who hear the name and think of populist pap like 'Rocket Man' or 'Candle In The Wind'. My mum probably likes both those songs but she'd clap

her hands over her ears at Paul Buckmaster's searing, discordant strings which open and punctuate this track. It was always one of the better sounding items on the album and is even better on the SACD release [Island B0003607-36, CD layer].

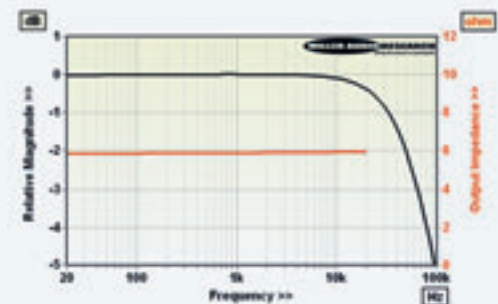
FOOD FOR THOUGHT

That angry hornets' nest of an opening should unsettle you with its anharmonic intensity before the bitter lyric provides reassurance that this really is Elton John and not Second Viennese School. Lehmann's Black Cube Linear handled the changing moods superbly, dishing up the sweet and sour of this remarkable piece of early-'70s progressive pop as if its experimentalism were freshly minted. ☺

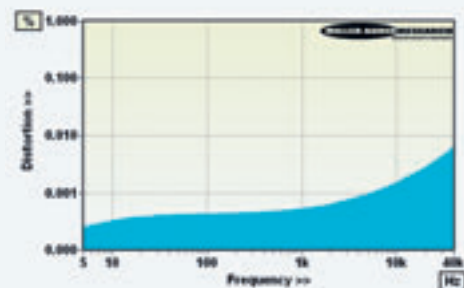
HI-FI NEWS VERDICT

The Black Cube may look unprepossessing but it's a very fine headphone amplifier indeed. It measures well and delivers unusually clear insight into the 'how?' and 'why?' aspects of music making, not just the 'what?'. All the hi-fi virtues are there but it's the manner in which the Black Cube draws you into a musical performance that marks it out from the crowd. A fine sound at a great price.

Sound Quality: 88%



ABOVE: Extended frequency response (black, 20Hz-100kHz) vs. output impedance (red, 20Hz-20kHz)



ABOVE: Distortion versus extended frequency at 1V out from the headphone socket (+10dB gain setting)

HI-FI NEWS SPECIFICATIONS

Maximum output level	9Vrms
Output impedance	5.9 Ω
Input sensitivity (re. 0dBV)	329mV (+10dB gain setting)
Input overload	6100mV
A-wtd S/N ratio (re. 0dBV)	99.0dB
Frequency response (20Hz-100kHz)	+0.0dB to -5.25dB
Distortion (20Hz-20kHz, re. 0dBV)	0.00025-0.0025%
Power consumption	5W
Dimensions (WHD)	118 x 52 x 315mm