

Kii Audio THREE

If the BeoLab 90 wowed you with its tech but daunted you with its size and price, here's a pint-sized alternative
 Review: **Keith Howard & David Price** Lab: **Keith Howard**

Kii Audio's THREE is an exemplar of what can be achieved when the hi-fi industry's, and hi-fi buyers', lingering obsession with passive loudspeakers is set aside and a 21st century approach – active operation in conjunction with digital signal processing (DSP) – is adopted instead. In short order we've experienced the B&O BeoLab 90 [*HFN* Dec '16], the KEF LS50 Wireless [*HFN* Oct '17] and now the Kii (pronounced 'key') THREE.

Each different to the others, each at a very different price point, but birds of a feather in that all are DSP active designs – and the B&O and Kii strengthen the bond by also incorporating directivity control. Hi-fi's long, some would say Luddite love affair with the passive loudspeaker is at last under challenge from more than long-term active stalwarts, Meridian.

COMPLETE PACKAGE

At a price of £10,990 a pair in its most basic form – £12,480 with controller, £13,475 with controller and stands – the Kii THREE packs a lot into its compact, 400x200x400mm (hwd) cabinet and makes you wonder how many passive speakers at a similar price can possibly justify their cost. With the Kii THREE all you need is a music source, analogue or digital, and you have a complete audio system.

On its front baffle there are two drivers, a 5in bass-mid unit and a 1in dome tweeter with a shallow waveguide that's unusual in not having continuously curved walls but two coaxial 'steps' within the flare which act – somewhat like the diffraction slot in a constant directivity horn – to improve the tweeter's off-axis behaviour.

This is the passive part of the Kii THREE's directivity control. The active part comprises four 6.5in bass drivers with dished black-anodised aluminium diaphragms, two located on the sides of the cabinet towards the front baffle,

and two on the rear panel firing backwards. Controlled by the onboard DSP, these four drivers radiate different signals to the sides and rear in such a way as to achieve – from 100Hz to 1kHz – a polar pattern similar to that of a cardioid microphone. This has the benefit of reducing the room's contribution to the sound you hear, while also unifying the spectra of the direct sound and early reflections.

Below 100Hz the THREE reverts to being omnidirectional, as conventional monopole speakers are at low frequencies, which assists with power handling given that the response is extended, again courtesy of the DSP, to below 20Hz. Of course, those four small bass drivers don't have the displacement capability to provide high output at such low frequencies, so the DSP is again called upon to provide driver excursion protection. This is achieved by a high-pass bass filter with dynamically variable corner frequency, configured to keep the driver movement within safe bounds.

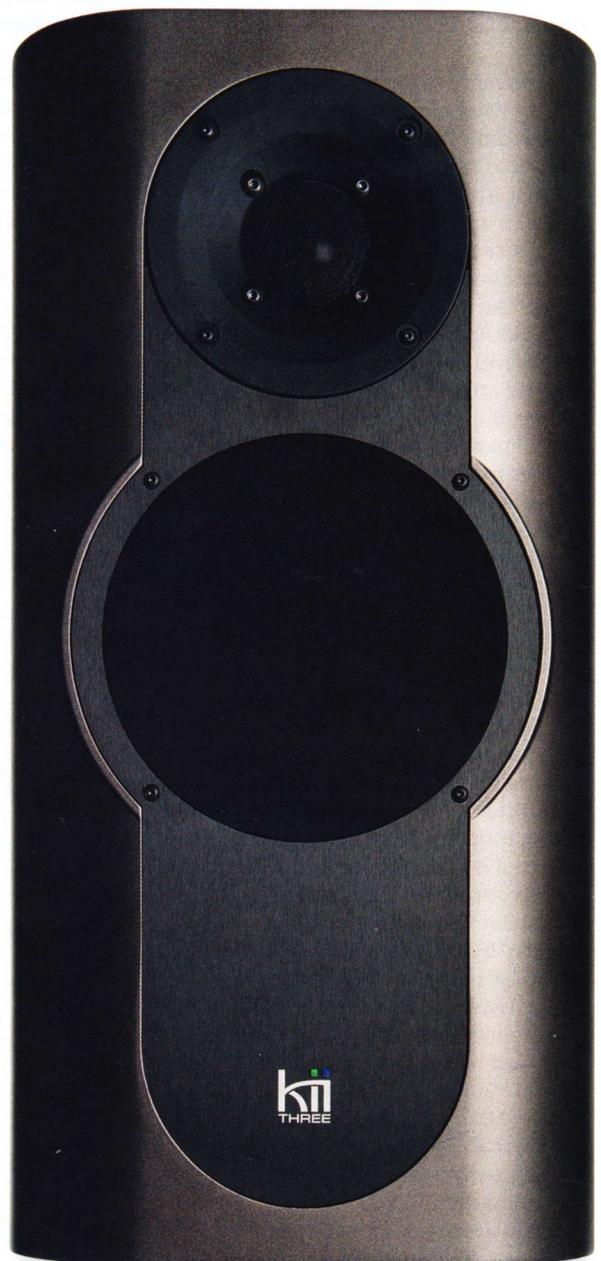
SMALL BOX, BIG POWER

Each of the six drivers has its own power amplifier, of course. And given that Bruno Putzeys [see p43], designer of the Class D Hypex, Ncore and Mola-Mola amplifiers [*HFN* Aug '17], is also a key member of the Kii Audio team, it's no surprise that these are Ncore modules rated at 250W each.

Crossover filtering is, naturally, also performed in the internal DSP. Fourth-order Linkwitz-Riley slopes are used as Bruno Putzeys considers these optimal. To correct the crossover phase distortion, FIR (finite impulse response) digital

filters are added but as these entail a 'pre-response' they increase the DSP's latency to about 90 milliseconds – more than enough to cause lip-sync issues if the audio accompanies a moving picture. To obviate this the THREE can be operated in low-latency mode – latency about 1msec – but this sacrifices the phase correction.

Both analogue and digital inputs are provided via a slim connection and control panel located beneath the two rear drivers [see p45]. To the left a three-pin female XLR socket provides for both balanced analogue input and balanced AES/EBU digital input, a small three-position switch immediately to its right selecting between R (right channel analogue input),



UNDER CONTROL

Although the THREE can be used 'as is', most buyers will surely want to add the optional Kii CONTROL external controller/preamp. With it, input options are considerably expanded to include coaxial and optical S/PDIF (maximum sampling rate is 192kHz) as well as USB, which supports PCM files up to 384kHz as well as DSD files of up to DSD128. In addition, the controller provides volume, source selection and mute controls alongside armchair adjustment of the DSP's boundary and contour filtering, facilitated by a small OLED display. Although the CONTROL uses a wired connection to the master THREE, the main functions can alternatively be remote controlled using either an Apple Remote or RC-5 protocol infra-red handset. Some potential buyers will inevitably question why Wi-Fi isn't supported to allow control via iOS/Android apps, but perhaps that will come. Others will thank heaven for a proper, chunky control solution with real buttons and a real volume knob that won't get lost between sofa cushions and never tells you it's having a problem connecting with the network.



D (digital input) and L (left channel analogue). Note that there are no unbalanced digital inputs (coaxial or optical) and no USB input either. There are two RJ45 sockets for the KiiLink control system – one for Kii's controller [see boxout, above], if used, and the other to daisy-chain to the second, slave speaker of the pair. Beneath these, two rotary 'Boundary' and 'Contour' controls provide frequency response variation, the former to correct for LF boundary gain and the latter to tweak the tonal balance to taste. Incidentally, all digital inputs are resampled to the fixed internal sampling rate of 93.75kHz. DSD, of course, is not supported unless you add the Kii CONTROL. A three-pin IEC mains socket completes the connections.

CUSTOM COLOURS

Kii Audio says little in its literature about the cabinet, giving the impression that much greater design emphasis was put on the THREE's electronics, but it too is unusual. The front baffle and sides are formed of a painted, one-piece, U-shaped polyurethane moulding, closed by another shaped moulding that forms the back panel and flat panels on the cabinet top and bottom. Two standard paint colours are

LEFT: Three of the six actively-driven drivers are visible here – a front-firing 1in waveguided tweeter and 5in midrange, and one of two side-firing 6.5in woofers. Two rear-firing 6.5in woofers are positioned at the back [p45]

available for the main moulding: high gloss white and graphite satin metallic. If you'd like the speakers to match your Bentley or have wacky interior design ideas, custom colours can be specified in a choice of high gloss, matt or metallic finishes for a price premium of £1000 per pair.

AUDIO DYNAMITE

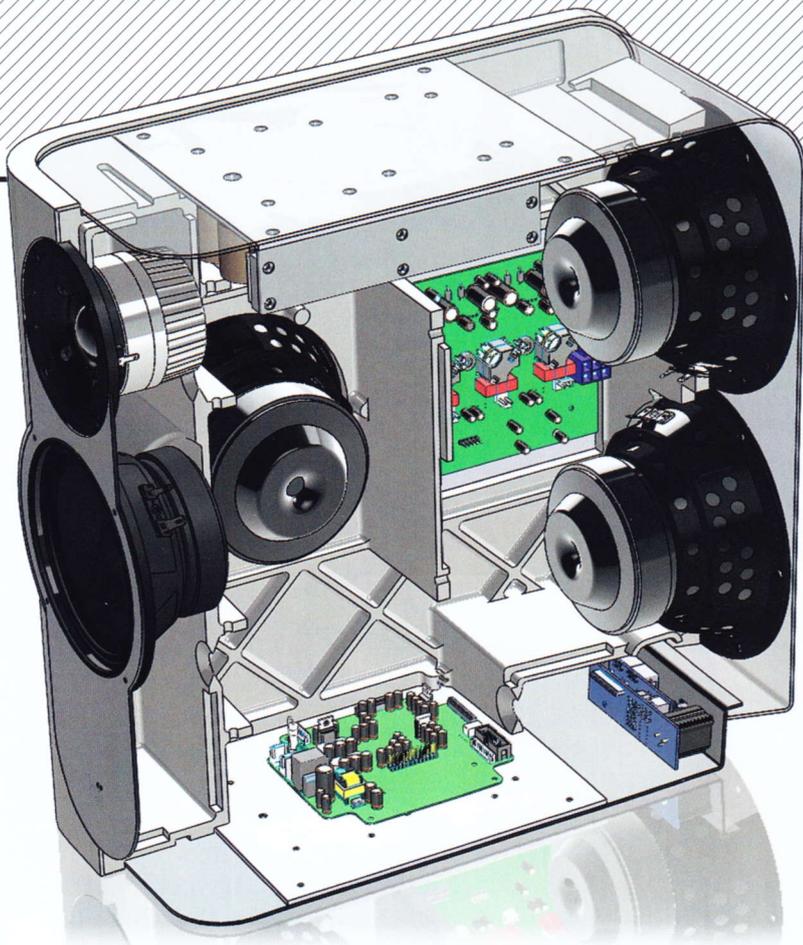
This is a very clean, open and detailed sounding DSP-governed/active speaker – one that sounds far larger than expected, and is able to deliver serious amounts of clean power without tears, into fairly large rooms. As soon as you set ears upon it, it is obvious that the designer has managed to integrate

'With the
THREE you
have a complete
audio system'

the multiple drive units very successfully indeed, because the result is a spacious, three-dimensional sound that's generally seamless from top to bottom.

The Kii Audio THREE's problem – if you can call it that – is that it fools the listener into thinking it's actually a much larger loudspeaker, whereupon you begin to judge it more harshly for, if not a lack of bass extension, then its limited physical bass power. This is rather ironic, because it excels in these respects considering how compact a design it actually is.

Feed the THREE with a well-recorded modern jazz track, such as Herbie Hancock's 'The Sorcerer' [*Speak Like A Child*; Blue Note TYCJ-81015] and you are left in no uncertain terms that this is a highly refined loudspeaker. It is never less than clean, fast, expressive and accurate – just as you might expect from



BRUNO PUTZEYS

While our review was underway, Kii Audio announced its supplementary BXT bass module [www.kiiaudio.com/bxt.php and see p19], so we asked CTO Bruno Putzeys to provide some detail. 'In the Kii THREE, the two pairs of woofers, front and rear, are operated as a cardioid between 50-250Hz, and below 50Hz they're fully in phase. The BXT also has two sets of woofers, four on the front and four near the rear, tripling the output below 250Hz.

'So the BXT significantly off-loads the woofers of the THREE over their entire operating band. Headroom improves by 10dB and distortion drops by the same amount or better. The added cone area also safely allows bass extension to be dialled half an octave deeper.

'The main item that makes the BXT compelling is that the system is now, in addition to a cardioid, also a line source. The benefits in eliminating the "floor dip" and ameliorating the "ceiling dip" are well known, and come on top of the Kii THREE's ability to deal with the wall behind the speakers. To our knowledge, a "cardioid line source" hasn't been done before, and it's remarkably effective in rooms of all sizes, including very small ones.

'All signal processing remains in the DSP of the THREE. As soon as it detects that a BXT is connected, it loads a new set of filters and sends two channels of pre-processed audio down the Kiilink connection to the BXT. The BXT contains its own D/A converters and NCore Class D amplifiers but no further DSP.'

the designer of Hypex's NCore amplifiers. For example, the tape hiss on this 50-year old jazz standard was clear to hear, yet was neither invasive nor distracting from the musical experience. The THREE takes the listener deep into the recording, unpeeling layer upon layer of detail – the soaring saxophone showed the midband to be commendably smooth and devoid of coloration, while the hi-hat and ride cymbal work had a silky, finely etched quality worthy of a product of this price.

DRILLING DOWN

Indeed, the Kii THREE's combination of natural transparency and couthness ensured that even the likes of Kanye West's 'Slow Jamz' [*College Dropout*; Roc-A-Fella Records 9862061], which is a long way from audiophile status, sounded fun. The speaker picked its way through this densely compressed hip-hop tune, drilling down into the detail of the recording, making the distinctive lead and backing vocals easy to hear and pleasingly textured despite the complexity of the mix.

Almost as a matter of course, the THREE boasts great rhythmic snap, even at seriously high volumes. Moving to Kraftwerk's 'Tour De France Étapes 1-3' [*Tour De France*; EMI Electrola 7243 8 87421 0 8] – some would say finer form of electronica – and the THREE showed off its dizzying speed. Attack transients were

ABOVE: Illustration shows the distribution of the drivers (minus one side) and one of two three-channel Ncore Class D power amps [top right], installed into the THREE's side panels. These total 6x250W – one for each driver

excellent, especially across the midband and treble, with a plethora of detail rendered in super fast time.

It was only at really high volume that this track did begin to reveal the limits of the loudspeaker, for there are times when the THREE will bite off more than it can chew. It almost gets away with it but then you'll come across a recording with prodigious amounts of low bass that the speaker will congeal rather than delineate – the rhythm is there but the detail less so.

In part this is aggravated by the fact its mid and treble sound so remarkably clean at high levels that you're rarely inclined to back off the volume. In other words, it lulls the listener into a false sense of security. On such occasions, met with vast tracts of low frequency energy, there's a sense the THREE's bass doesn't go up and down the scale as fluidly as it should, with a tendency to 'one note' things.

In fairness, small speakers can never perform miracles in the bass, especially at high levels, and it's to the THREE's credit (and testament to the onboard DSP) that it even tries. Furthermore, as a tacit

'It picked out this instrument as if it was laser targeted'



KII AUDIO THREE

The benefits of an active crossover and utilising one dedicated amplifier per drive unit in place of a passive crossover network have been known for decades. But going no further than that is to squander so many possibilities, as the THREE demonstrates.

Its forward frequency response, measured at 1m on the tweeter axis [Graph 1, below], provides some evidence of this. It is, to within tight limits, flat, the response errors being ± 2.1 dB for both speakers, 300Hz-20kHz. Below 12kHz this reduces to ± 1.1 dB and in reality will be less because the ripples below 1kHz are an artefact of time-windowing the impulse response to remove room reflections. This isn't quite the ± 0.5 dB that Kii Audio claims but it's remarkable nonetheless, particularly as it's achieved using generic equalisation plus careful driver matching, not by individually EQ-ing each loudspeaker.

Pair matching, over the same 300Hz-20kHz, is ± 0.8 dB, reducing to an astonishing ± 0.3 dB below 15kHz. Also astonishing is that the response really *does* reach down to 20Hz. Although our diffraction correction utility isn't designed for use with such a speaker, our corrected nearfield measurements indicate a sub-20Hz bass extension (-6 dB re. 200Hz). At the lowest frequencies all four bass drivers operate in phase to share the excursion load but even so this bass extension will not be achievable at high output levels, which the DSP compensates for by raising the bass corner frequency. Above 50Hz, where the THREE is still omnidirectional, it quickly (within an octave) transitions to a cardioid polar response.

While it would need an anechoic chamber or outdoor measurement to see this clearly, I performed off-axis measurements out to 90° using an Outline turntable which confirmed that up to 1kHz the response steps down progressively and remains almost as flat as claimed. The cumulative spectral decay waterfall [Graph 2] is also very clean, with little evidence of treble resonances. KH



LEFT: Two 6.5in rear woofers augment the forward bass output. Inset panel carries an analogue/digital XLR input, ethernet in/out and 'contour' and 'boundary' controls

is, and not expect it to do things for which it was never designed. For example, it isn't a louche, soft, fluffy 'comfort blanket' of a loudspeaker that makes everything sound nice and easy.

Put on a grimy late '70s New Wave anthem such as The Stranglers' cover of 'Walk On By' [Peaches: *The Very Best Of The Stranglers*; EMI 5 40202], and the THREE is just a little too deconstructive for some tastes. Although it instantly latches on to the track's infectious rhythm and sets up an enjoyable groove,

acknowledgement by Kii Audio, there's its recently announced 16-driver BXT 'extension module' destined to really bring home the bacon in the bass [see boxout, p43].

WIDE OPEN SPACES

Soundstaging, meanwhile, is excellent. This is a modestly-sized standmount speaker, yet no one seems to have told it. So while the Kraftwerk track was pleasingly wide and deep-sounding, what really alerted me to the THREE's ability to place stereo images in the listening room was Kevin Armstrong's masterful guitar work on Prefab Sprout's 'Bonny' [Steve McQueen; Columbia COL 466336 2].

As you would expect from any Thomas Dolby production of that era, this is a complex, dense and multi-layered affair. Things can easily get submerged, yet the THREE picked out this instrument as if it was laser targeted, and hung it right at the back of the acoustic – just where it should be.

In very many respects, the Kii THREE is the poster child for DSP-governed active loudspeakers. It has all the attributes of the best of the breed – speed, power, punch, precision and a three-dimensional, out-of-the-box sound. Yet it's important to take it for what it

you can't help noticing the grim quality of the recording, production and/or mastering!

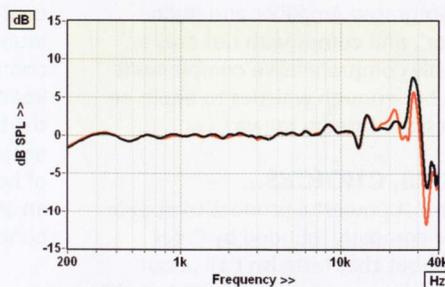
'No surprise there, who knew?' you might say, but this speaker does seem to relish telling you all about how compressed the recording is, how narrow the bandwidth is and the poor quality of the mastering – rather than setting out to capture the raw emotion contained within.

In short, the THREE is not everyone's idea of fun, and demands serious source material to really give of its best. It won't flatter to deceive; the better the recording quality, the better the outcome every time. ☺

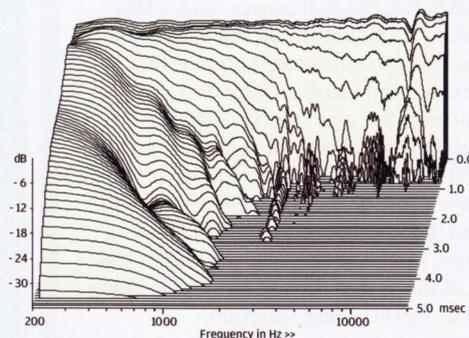
HI-FI NEWS VERDICT

Bearing in mind the technology, connectivity, sound performance and substantive amplification built into the Kii Audio THREE, this sublime standmount surely sets the standard for every 'system-in-a-speaker' to match. The fact that its inbuilt DSP also allows great flexibility in the placement of the THREE is a further inducement. But with the BXT module in the wings, we can't help but wonder if the best is yet to come...

Sound Quality: 87%



ABOVE: The Kii Audio THREE's forward response is remarkably flat and even, with sub-20Hz bass



ABOVE: Broad cabinet modes persist over the 5msec test time window but, above 2kHz, it looks v. 'clean'

HI-FI NEWS SPECIFICATIONS

Frequency response error (300Hz-20kHz)	± 2.1 dB / ± 2.1 dB
Pair matching (300Hz-20kHz)	± 0.8 dB
LF/HF extension (-6 dB ref 200Hz/10kHz)	<20Hz / 37.2kHz/33.1kHz
THD 100Hz/1kHz/10kHz (for 90dB SPL/1m)	3.4% / 0.1% / 0.4%
Dimensions (HWD) / Weight (each)	400x200x400mm / 15kg