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# Kii Audio Three

## Active Monitors

Yes, Kii Audio's flagship monitors are expensive — but then they might just be the best loudspeakers in the world...

PHIL WARD

Call me a curmudgeonly old Luddite but I'm always a little skeptical about the combination of complex digital signal processing with the 'art' of electro-acoustics — by which I mean the design and engineering of drivers,

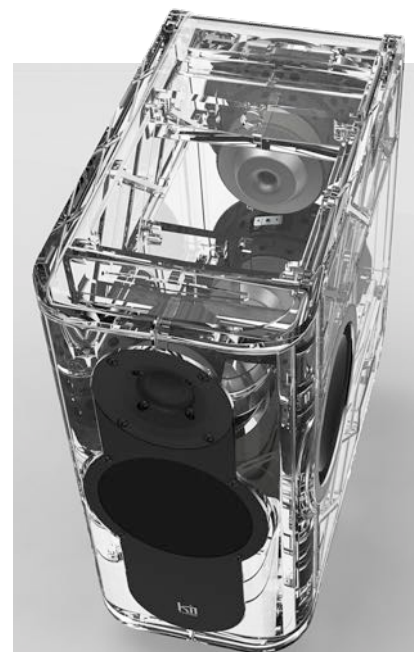


filters and enclosure. Whenever I read that a monitor incorporates DSP, my instinct is to wonder just what genuine performance benefits the DSP brings and how much of the manufacturing budget it diverted from the components that actually make the noise or fundamentally influence the speaker's quality. So, seeing as the subject of this review, the Kii Three active monitor, incorporates DSP technology, you might imagine it would press all my DSP-phobic buttons.

But here's the thing. A few issues ago, I reviewed the Geithain RL944K monitor, and its cardioid low-frequency

radiation characteristic, accomplished passively through some clever enclosure venting, got me wondering if a cardioid characteristic couldn't be achieved more effectively by designing a monitor with auxiliary, DSP-controlled rear-facing drivers. One of the unwritten laws of speaker design is that any great idea you come up with will almost certainly have occurred already to somebody else, and a quick Google search on cardioid speakers didn't disappoint: it resulted in my discovery of the Kii Three and, subsequently, this review. But perhaps I'm getting a little ahead of myself here. You are probably wondering who Kii Audio are and where the company sprang up from. So, before I explain why DSP on the Kii Three doesn't give me the heebie-jeebies, a little background may be necessary.

Kii Audio are a German-based start-up founded by some pretty high-profile audio industry names. In particular, the Chief Technology Officer is Bruno Putzeys. Putzeys' main claim to audio fame is his development of the Hypex NCore Class-D amplifier technology now found in numerous high-end active speakers and amplifiers, but he was also the designer behind the extremely well-regarded Grimm Audio LS1 monitors ([www.grimmaudio.com/pro-products/loudspeaker/ls1](http://www.grimmaudio.com/pro-products/loudspeaker/ls1)). Bruno's colleagues are all similarly experienced in pro audio, having variously spent time in senior roles with companies such as Digidesign, TC Electronic, Grimm Audio and SSL. So there is no shortage of pro-audio expertise among the people at Kii and, I suspect, if there was one thing their expertise told them about launching a new high-end nearfield monitor, it was that the monitor had to bring something innovative to the market. And the Kii



The Three's enclosure is made up of two polyurethane moulds, which incorporate all the necessary internal bracing.

Three definitely does that.

I'll get the less-good news out of the way first, however, because I'm afraid that unless you're in a decidedly fortunate position with regard to monitoring budget, the Kii Three will probably have to remain more of an aspiration than a realistic option. The UK retail price is around €10,000 per pair, and while that's in the same ballpark as quite a few other high-end nearfield monitors (the Geithain RL944K, for example, is actually more expensive), it's also clearly a serious sum of money to devote to nearfield monitoring, especially in the context of the kind of quality that can be found for far less. So the Kii Three had better offer something a bit special. Cutting probably prematurely to the chase, it does, but before I go there, some description is in order...

### Born Three

The Kii Three looks like no other monitor and is clearly a product of thoughtful and classy industrial design. Strangely, after decades of working with speakers that are either a shade of black or finished in a wood veneer, the last couple to have passed through my world have both been finished in black and white: the Dynaudio LYD and now the Kii Three. What are the chances of that?

The black-and-white Kii Three is actually the 'domestic' version of the product. The 'pro' version, which differs in >>

### Kii Audio Three €10,000

#### PROS

- Fantastic detail and hear-through clarity across a huge bandwidth.
- Exceptional depth and stereo image.
- Cardioid character means less room influence.

#### CONS

- None.

#### SUMMARY

A genuine innovation in speaker technology results in a truly exceptional and unusual monitor.



These two rear-facing drivers are the key to the Three's cardioid LF response.

» no other respect, is finished in a dark grey. I think I prefer the back and white and, to be honest, I suspect quite a few potential pro customers will too. Having said that, custom colours are available to order for an extra €500. I'll have mine in Surf Green please. Fender guitar enthusiasts will know what I'm on about.

The Kii Three is not a particularly compact nearfield monitor, but it's not enormous either. If any of its dimensions have the potential to cause a problem it will be the 40cm depth, which, when combined with the suggested positioning minimum of 8cm from a rear wall, means that if the monitors are to be shelf-mounted, said shelves need to be deep. They'll need to be reasonably sturdy shelves too, because a Kii Three weighs in at 15kg. Installing the Kiis on the uber-shelves either side of my workstation was just about viable, but only just. Matching Kii Three floor stands are available for those that need them.

I'll finish off my description by covering the Kii Three connection panel. Located on the lower-rear corner, the panel provides a single XLR input that can be switched between analogue and AES-3 digital (in digital format, the two speakers

are connected by a Cat 5 link cable), a mains input, a reset button, an EQ Contour trim pot and a Boundary trim pot, but more about the trim pots later. Downstream of the input socket are the A-D conversion, DSP, the D-A (all running at 192kHz) and six NCore Class-D power amplifiers, each rated at 250 Watts. The enclosure is constructed in two halves from injection-moulded polyurethane structural 'foam' with integral internal bracing and fittings. The two halves are glued together and then painted, the drivers fitted, and finally the aluminium panels (to which the electronics modules are mounted) attached. The Kii Three has no power or standby button but switches on automatically in response to a signal. Switch-on was a little tardy and seemed to require too healthy an input level for my preference, but that probably falls into the nit-picking category.

### As Three As The Wind Blows

Probably the most apparently conventional aspect of the Kii Three is its use of a 110mm-cone MF driver and 25mm-dome HF driver arranged vertically on the front panel. The drivers are framed by a brushed anodised-aluminium panel that also provides relief for the logo and indicator LEDs. Both front-mounted drivers are obscured behind grilles so their identity in terms of manufacturer or diaphragm material is not easy to establish. Bruno Putzeys is reluctant to divulge engineering details of the drivers on the grounds that, particularly in the hi-fi sector, such details have a tendency to provoke prejudice either for or against a particular species of driver or diaphragm material. He explains the problem thus: "It's the delusion that knowledge of the parts confers instant expertise to judge the soundness of a design". It's a valid argument, I think.

If the Kii Three appears relatively conventional on its front panel, it is around the sides and back where things stray into unusual territory. To begin with, on each cabinet side, just aft of the heavily radiused front edges, is a 140mm-diameter LF driver, and then on the rear panel is another pair of the same units. The side and rear drivers are not obscured by grilles, and a gentle tap with a fingernail suggests that their spherical section diaphragms are metallic — aluminium, most probably. Side-mounted LF drivers are not entirely unheard of on nearfield monitors.

### Control Box

I mentioned in the text that switching the Kii Three to low-latency mode requires a quick press of the reset button. It's a perfectly easy thing to do but does require a reach around the back of the monitors and a grope for the button, so strays into awkward territory. The Contour and Boundary trim pots are not the most friendly in use either. However, Kii will have these issues covered later in the year with a wired (Cat 5) remote control unit that will provide access to all the setup functions, along with volume control and S/PDIF, Toslink, USB and Bluetooth audio inputs.

The Barefoot MM35, for example, incorporates a similar arrangement of drivers, as does the Avantone Abbey. The Kii Three's use of twin, rear-mounted LF drivers is unusual — unique, even — and it is with these that the Three fundamentally leaps into the unknown.

Kii make little hard detail available of exactly how all their drivers are integrated and how that integration results in a cardioid radiation all the way down to around 50Hz. There's no doubt that it works, however: diagram 1 shows on-axis and 40-degree horizontally off-axis frequency response curves taken using FuzzMeasure. Even as low as 200Hz (about the limit of reasonable measurement accuracy in my studio space), there's a 3dB reduction off axis. Presumably, the combination of the physical distance between the side-mounted and rear-mounted LF drivers with time delays implemented through the DSP results in wide-band acoustic cancellation off axis and backwards, and constructive interference forwards. I suspect, however, that in reality Kii's cardioid achievement with the Three falls very much into the 'easier said than done' category.

Despite the nominal 250Hz LF to MF crossover, there is a significant degree of LF driver overlap, up to around 700Hz, configured to help narrow the naturally wide dispersion of the MF driver at the lower end of its operating band. As frequency rises, however, the Kii Three behaves along the lines of any other moving-coil speaker and inherently tends towards a cardioid dispersion pattern, so less DSP intervention is required above a few hundred Hz, and none once the HF driver takes over. The MF driver hands over to the HF driver via conventional

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» fourth-order filters at a relatively low 2kHz. And speaking of the HF driver, it incorporates a short wave-guide-style horn which, along with the subtle edge discontinuities in its profile (known by the commercial acronym DXT), controls dispersion to match that of the upper end of the MF driver's band.

The Geithain RL944K I referred to earlier, with its entirely passive cardioid technique, offered no dispersion adjustment. The Kii Three, however, through modifying the level and time delays on its rear- and side-mounted LF drivers, offers control of low-frequency level and dispersion to enable its performance to be fine-tuned to suit different installation locations and acoustic environments. The Boundary trim pot on the rear connection panel offers 'Free' at one end of its range and 'Corner' at the other end. And yes, adjusted appropriately Kii are comfortable with the idea of their monitors installed towards room corners. They even suggest that it is not necessary to have each speaker of a pair located in the same acoustic environment — one near a corner and one against a wall is, they say, perfectly feasible. Between Free and Corner are 16 steps, with the Wall setting, which I used most of the time, towards the middle of

The XLR input can accept either an analogue or AES-3 digital signal. In the latter case, speakers are connected in pairs with a Cat 5 cable.

the range. The Contour trim pot on the rear panel offers 16 different EQ curves based around cut and boost options at 300Hz, 3kHz and 10kHz. The combination of the Boundary and Contour trim pots provides a huge range of adjustment to tailor the performance of the Kii Three to different environments and preferences.

### As Three As The Grass Grows

While Kii are reluctant to divulge too much technical detail on their dispersion control, some other techniques employed on the Kii Three that they were happy to talk about reveal, I think, something of the philosophy and engineering skill behind the product. For example, when I first received the monitors I was slightly surprised to find that all four LF drivers are loaded by a shared, sealed cabinet. I'd initially assumed, due to dispersion control requiring each driver to operate independently to some extent, that each one would work into a discrete enclosure — but gently pushing one diaphragm produces a visible kick to all the others. I asked Bruno about this and he explained that engineering four discrete sealed compartments within the enclosure is fraught with design and manufacturing difficulties (in particular, air leaks through cable access holes). So he decided to use one shared enclosure and then to model and compensate for the resulting driver crosstalk within the overall DSP.

A second neat idea that the Kii Three employs, and one that seems to have passed by most manufacturers of active speakers, is not one of Bruno's but was described by Dr Malcolm Hawksford of Essex University in a paper presented to the Audio Engineering Society in 1989. The technique goes by the name 'current drive', and involves placing a small resistor in series with the driver and using the voltage measured across it (which will be proportional to the current flowing through the driver voice coil) as a feedback signal. In a conventional arrangement, an amplifier will deliver any amount of current required to make the output voltage follow the input voltage. A current drive amplifier, however, will compare the input voltage with the measured output current and adjust the output voltage to make sure they track. So, now, the output current depends only on the input voltage and not the load. The amplifier delivers any voltage required to make the output current track the input voltage. The primary advantage of current drive is significantly reduced distortion, especially that caused by non-linearities in a driver's magnet/voice-coil system.

### Licence To Kii

Before I move on to describe how all this technology sounds, there are two final elements of the Kii Three that need to be covered. Firstly, along with



controlling dispersion, the DSP is also used to equalise the Kii Three's wide-band phase response. So the delays inherent in its low-frequency alignment and in its crossover filters are corrected. Secondly, the Kii Three incorporates low-frequency overload limiting that works by 'looking ahead' and, if driver power-handling limits are likely to be reached, subtly adjusting the signal bandwidth (LF limiting is indicated by the front-panel LEDs). However, this being a universe in which effect follows cause, these features can only be implemented by adding latency to the system. In standard operating mode the latency is 90ms, which is of course far too long if the Kii Three is to be used as a tracking monitor. However, a quick press and release of the rear-panel reset button puts the Kii Three in low-latency mode. Low-latency mode brings the in/out delay to a perfectly usable 1ms, by disabling the look-ahead element of the LF overload limiting and also by switching off the system phase correction. It makes for a fascinating listening experience. I very much doubt that a change in LF

overload protection would be audible at the kind of moderate levels I listen at, however the change of phase response is clearly audible. The monitor loses a little of its imaging ability and overall precision in low-latency mode so that things sound a little less 'together'. As will become apparent in the next paragraph or two, though, this slight loss of performance is all relative.

### Rockin' In The Three World

So, to the bit you've perhaps been waiting for: how does the Kii perform? Well I could honestly finish this review in one line simply by writing that the Kii Three is one of the finest speakers I've ever heard and undoubtedly the best I've ever had the privilege and pleasure of using in my own home. But I'm guessing you'll want a little more detail than that.

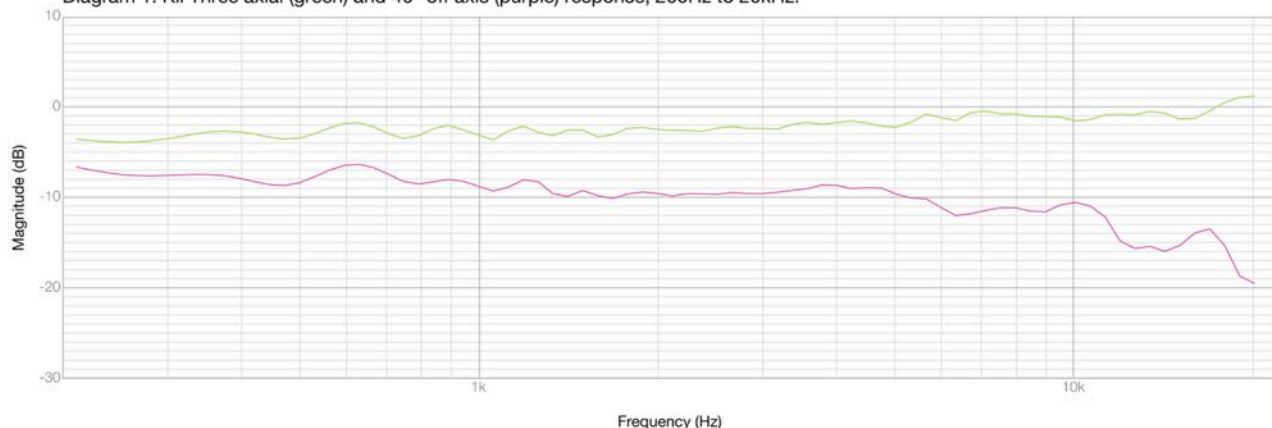
Firstly, the traditional kind of subjective analysis we speaker reviewers default to — describing the tonal balance and making a judgement about the competence of a monitor's basic frequency response — is somehow

### Alternatives

I've already mentioned the **Geithain RL44K**, but also inhabiting the same market sector, and offering serious, albeit more conventional quality, are monitors such as the **ATC SCM45A**, the **Barefoot MicroMain 35**, and the **PSI Audio A25-M**.

rendered a little pointless with the Kii Three. It sounds so transparent and creates such fundamentally believable audio that thoughts of 'dull' or 'bright' seem somehow superfluous. Having said that, decades of speaker evaluation can't be entirely denied and the Kii Three does have a satisfyingly neutral balance (and lots of potential for adjustment), and as wide a bandwidth as anybody could ever need (it's specified as -3dB at 20Hz), but it is dominated by such a sense of realistic clarity, imaging, dynamics and detail that you begin almost to forget that there's a speaker between you and the music. There are of course other monitors that can display similar levels of clarity and detail, but they mostly do so over particular portions of bandwidth. A monitor that has a great, informative >>

Diagram 1. Kii Three axial (green) and 40° off axis (purple) response, 200Hz to 20kHz.



mid-range, for example, might not be quite so good elsewhere. The Kii Three is a hugely rare beast in being exceptional all the way up from 20Hz to beyond audibility.

The manner in which the Kii Three so explicitly presents audio detail has something of the character of headphone listening about it. Imagine the sound of a really great pair of headphones, then delete the discomfort of wearing them and replace the ‘inside the head’ effect with audio spread out in sharp focus before you. That’s the trick the Kii Three pulls off, and in the context of using it for mix or mastering work, I’ve never heard anything anywhere near as adept at separating the elements of a mix and revealing exactly what is going on. I found myself endlessly fascinated, in particular, by the way the Kii Three presents vocals within a mix and ruthlessly reveals how good the performance was and how the voice was subsequently treated (or mistreated). Performance idiosyncrasies, microphone character, room sound, compression effects, reverb and delay techniques and pitch-correction artifacts that I’d never noticed before became blindingly obvious — it was addictive.

I guess the big question the performance of the Kii Three raises is, why? Why does it work so well? Well, there’s undoubtedly some classy DSP and conventional electro-acoustic engineering within the Kii Three, and its component parts and construction are of very high quality, but the trunk-swaying beast in the room, I think, is the cardioid dispersion. In suppressing rearward radiation the Kii Three drives a listening environment very differently. In most

room and monitor combinations, the first and most destructive reflection is from the wall behind the speakers. It’s usually the closest reflection in terms of arrival time to the direct sound and is also the most distorted in terms of frequency response. With the Kii Three, however, that reflection is significantly suppressed and this makes a huge difference. You

that I’d never noticed or appreciated before. The review period became a near continuous frenzy of, “I wonder what that will sound like.” Furthermore, every one of my own mixes that I listened to would undoubtedly have been done differently if I’d had the Kii Three at the time, which brings me on to my single misgiving. I wonder if the Kii Three isn’t so unusual

**“The Kii Three is one of the finest speakers I’ve ever heard and undoubtedly the best I’ve ever had the privilege and pleasure of using in my own home.”**

hear the direct sound of the speakers rather than a blurred composite of the direct sound and a response-distorted first reflection.

But it’s not just in the nearfield that the effect is apparent. Right out in the room, the Kii Three retains its quality and it is noticeably more consistent in its performance throughout the space than are conventional monitors. Put simplistically, wide-band cardioid dispersion means the room has far less influence over the sound of the speakers, and if the speakers are good you don’t half hear the difference!

### Kii To Success

One of the joys of auditioning new audio gear, especially speakers, is that I occasionally get to rediscover CDs or mixes that I thought I knew intimately. I can honestly say that with the Kii Three, every time I played some old familiar material I heard something significant

in the way it performs that mixes might not transfer to more ordinary speakers? I suspect, in reality, that the Kii Three would do nothing but improve mixes, and that transfer would be fine, but it would perhaps require a period of training and personal recalibration.

So, as I write, with Tom Waits’ *Swordfishtrombones* playing in the background and sounding like I’ve never heard it before, I have two more days with the Kii Three before the distributor visits to reclaim the review samples. I don’t quite know what I’m going to listen to when they’re gone. If I had €10,000 to spend on monitors I wouldn’t hesitate, and if you happen to be in that fortunate position you really should hear them. **///**

**W** <http://kii.audio>

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