

Neumann KH120 II

Active Monitors

Neumann continue to set new standards in compact nearfield monitoring.

PHIL WARD

If you read my review in the January 2023 issue of the Neumann KH150 you'll know that I was more than just a little impressed. To my ears, the KH150 significantly raises the standard of what's possible from a reasonably compact and relatively affordable active nearfield monitor. And now, in what seems almost indecent haste, Neumann have taken the engineering philosophies and electronic innards of the KH150 and integrated them in an updated version of their smaller KH120 model. So, here's the KH120 II. You may wish to refer to the longer and more comprehensive KH150 review for a little more background: <https://sosm.ag/KH150>.

The original KH120, launched in 2010, is Neumann's longest-established monitor and was the first new model to be introduced following parent company Sennheiser absorbing the venerable Klein + Hummel speaker company in 2005. The KH120 was, in fact, closely related to the Klein + Hummel 0110 model that was reviewed in these pages back in 2007. Of course the KH designation of all Neumann's monitor model numbers is a respectful nod to Klein + Hummel — founded, would you believe, way back in 1945.

Spot The Difference

Although slightly larger than the original KH120, the KH120 II is significantly more compact than the KH150. And rather than incorporating a 165mm (6.5-inch) bass/mid driver, it makes do with a smaller 130mm (5-inch) unit. The 25mm-dome tweeter fitted to both models is the same, but the elliptical waveguide of the KH120 II is necessarily slightly smaller than that of the KH150. A significant difference between the KH120 II and its predecessor is that where the enclosure of the original model was a fully die-cast aluminium component, the new model is constructed using the same technique as the KH150, with a wooden carcass and composite polycarbonate



front and rear mouldings. That might seem like a downgrade, but Neumann say that the new model's enclosure construction technique actually results in improved resonance performance (very rigid, die-cast aluminium enclosures can be prone to resonant ringing, much like bells are), while also offering dramatically better energy efficiency in manufacture. Around the back of the enclosure are a couple of M6 threaded inserts that enable the monitors to be installed using one of Neumann's wide range of mounting accessories.

In terms of aesthetic style, the KH120 II follows the established Neumann monitor design language very closely, and without

size reference in photos it's not easy to tell it apart from the KH150. The Neumann style isn't going to win any beauty prizes (to my jaded eyes anyway) but it looks suitably serious and professional, and is finished to a high standard. And speaking of finish, the review pair of monitors were dressed in Neumann's corporate, charcoal-coloured textured paint, but there's a white option available that looks classier to me. That's probably what I'd go for if I was buying my own pair. And while I'm on the subject of options, the KH120 II is available in both a standard version that offers just conventional analogue and digital audio inputs, and a network-enabled version that also makes possible connection to

AES67-compliant Audio over IP (AoIP) systems such as Dante and Ravenna.

Driving Force

The bass/mid driver is a new design and Neumann say that it follows the same principles as the driver fitted to the KH150, which emphasise linearity and low distortion — especially at high sound pressure levels. This is significant to my mind because I believe it's partly the implementation of those principles on the KH150 that makes it such an exceptional performer. Like the KH150, the KH120 II employs DSP-based bass/mid diaphragm excursion limiting (at a notably generous $\pm 10\text{mm}$) that helps improve the driver's inherent linearity. This is because DSP limiting means the driver suspension does not require the traditional in-built mechanical soft limiting that would otherwise be necessary but which has the down side of, in effect, introducing non-linearity.

The KH120 II bass/mid driver is reflex loaded by two triangular cross-section ports that exit at the lower corners of the front panel. Again, as with the KH150, the KH120 II ports are flared both externally and internally and designed to remain linear to as high a volume level as possible while also not encouraging the emergence of organ-pipe resonances. The KH120 II's bass/mid driver and its reflex-loaded enclosure, aided of course by some DSP massaging, yield some notable specifications. The low-frequency cutoff (-3dB) is at 44Hz and the max sound pressure level (half space, 100Hz to 6kHz, <3% distortion) is 117dB. These are pretty extraordinary numbers for a compact monitor, and by way of comparison, the equivalent benchmarks for the original KH120 (which was no slouch) and the KH150 are 52Hz and 111dB, and 39Hz and 119dB,

Neumann KH120 II From £1579

PROS

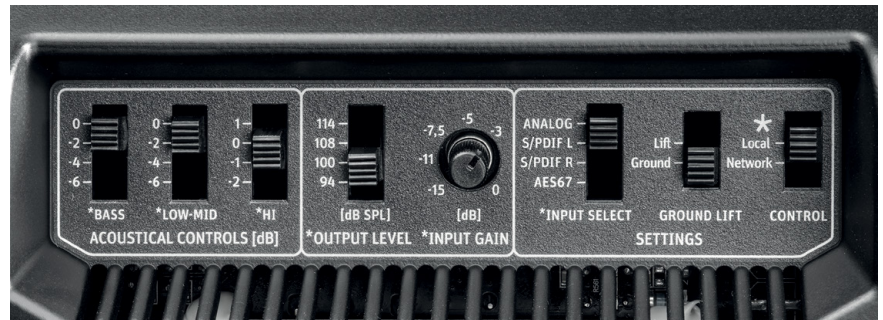
- Fabulous clarity, imaging and neutrality.
- Great bass extension and volume capability for the size.

CONS

- None.

SUMMARY

With the KH120 II Neumann have pulled off much the same trick they managed with the KH150. It's a stupendously capable compact nearfield monitor and a more than a worthy successor to the original KH120.



■ The rear panel hosts a number of switches for adjusting the input gain and output level, tailoring the speaker's frequency response, and selecting between local and network control modes.

respectively. So in terms of low-frequency bandwidth and maximum level the KH120 II is rather closer to the KH150 than it is to its predecessor.

The bass/mid driver hands over to the tweeter at a conspicuously low 1.7kHz, and that's partly made possible by the mathematically modelled waveguide loading of the tweeter. The term 'loading' is used because the waveguide modifies the acoustic impedance (the acoustic 'load') of the air that the tweeter dome radiates into, and that results in increased radiation efficiency. The increased efficiency of the tweeter then means its usable bandwidth can extend down to a lower frequency than it would without a waveguide. And in addition to increasing the tweeters efficiency, the waveguide also serves to modify the tweeter's directivity so that it better integrates with that of the bass/mid driver in the crossover region. The tweeter is the same 25mm-diameter dome unit used in the KH150 and other Neumann monitors.

Switching It Up

Amplification comprises the same 145W and 100W amplifiers as fitted to the KH150 for the bass/mid and tweeter elements respectively. Also shared with the KH150 is the KH120 II DSP engine and its extensive configuration functionality. That functionality is manifested on the KH120 II's rear panel by a range of EQ facilities that enable bass cut to -6dB in 2dB steps, low midrange (around 300Hz) cut to -6dB in 2dB steps and higher-frequency adjustment from +1dB to -2dB in 1dB steps. There's also both input gain and input sensitivity (expressed in terms of acoustic output level for 0dBu input) controls, and an input selector switch that offers analogue, S/PDIF (left), S/PDIF (right) and S/PDIF (mono) options, and a ground-lift switch.

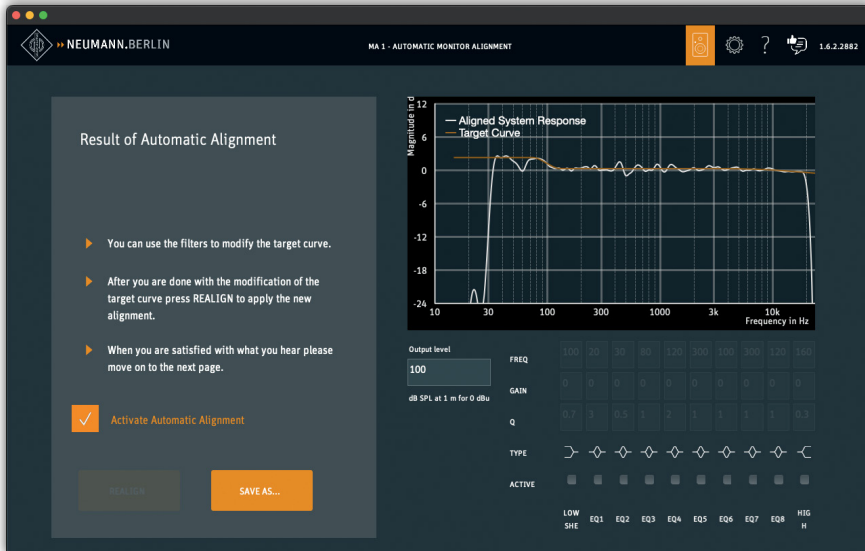
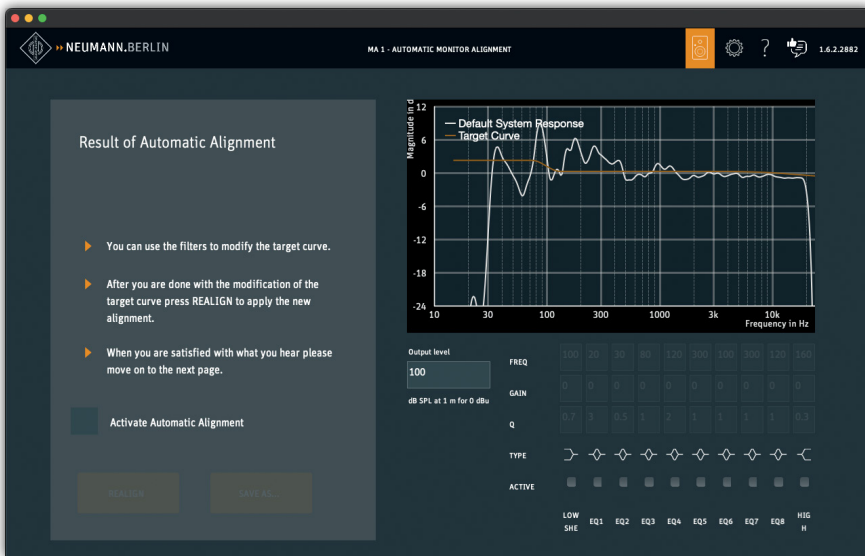
Alongside the ground lift is a further switch labelled 'local' and 'network'. In the local position, a KH120 II is configured in

EQ terms by its rear-panel switches, while in the network position it is controlled by Neumann's MA-1 room optimisation and monitor configuration app. Said integration is achieved via Ethernet sockets on the rear of the KH120 II that enable them to be connected to the same TCP/IP network as the computer running the MA-1 app.

MA-1 conceptually follows the pattern set by other similar systems such as Sonarworks SoundID, Dirac Live, IK Multimedia ARC, Trinnov and Genelec's GLM. A calibrated measuring microphone is used to take in-room acoustic data created by routing a predefined swept sine-wave signal to each monitor in turn. The mic output data is then used, via some sophisticated interpretative algorithms, to create a response profile for each monitor that pre-equalises their outputs to compensate for the influence of the room acoustics. The MA-1 configuration process requires measurement data to be taken in seven measuring positions dotted around a primary listening position, and once that's done the MA-1 app takes just a few moments to generate the appropriate equalisation profile for each monitor. I've included a couple of MA-1 screenshots that illustrate the before and after response, as captured by the MA-1 app of the pair of KH120 IIs in my studio room. Integration of the DSP-driven MA-1 technology of course means that the KH120 II works entirely in the digital domain internally. As with the KH150, the internal sampling rate is a modest 48kHz, fixed, say Neumann, to ensure that the tweeter is not driven much above >>

ALTERNATIVES

The KH120 II is hugely capable but it's not alone. Options such as the **Genelec 8030A**, **HEDD 07 Mk2**, **IK Multimedia iLoud Precision 5**, **Focal Solo6 ST6**, **Dynaudio LYD 8** and **ADAM A7V** might all be worth considering.



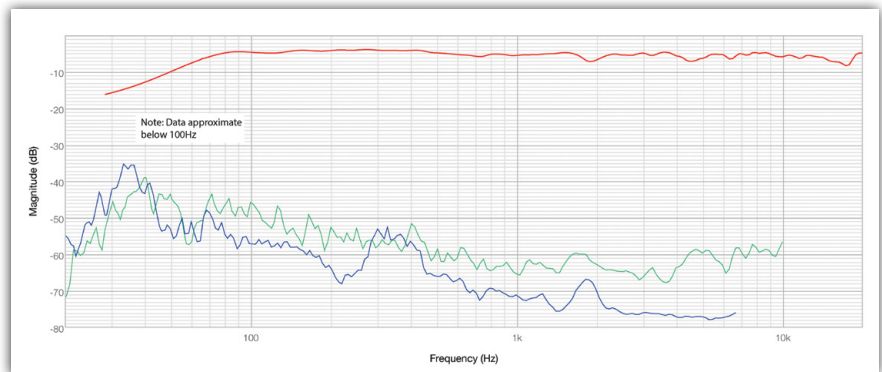
■ The in-room response of a pair of Neumann KH120 IIs, before and after MA-1 optimisation.

» 20kHz because doing so would risk dome break-up distortion products folding down into the audible band.

Measuring Up

I took one KH120 II to my speaker measuring space and launched FuzzMeasure to investigate a couple of aspects of its acoustic performance. Firstly, Diagram 1 shows the KH120 II axial amplitude frequency response at 1m distance. While not quite displaying the almost ruler-like linearity of the KH150, the KH120 II delivers an impressively flat line. Such measurements are finely sensitive to exact mic position, though, and if I'd spent some time experimenting with moving the measuring mic a few tens of millimetres in, out or sideways I could very probably have found a flatter sweet spot. However, the real significance of frequency response

curves is found in general trends or specific discontinuities that might point to particular flaws. And in the case of the KH120 II the general trend is flat, and specific discontinuities are noticeably absent.



■ Diagram 1: An on-axis measurement of the KH120 II (red trace), and second- and third-harmonic distortion levels (green and blue, respectively).

Diagram 1 also displays second- and third-harmonic distortion, and as with the KH150, both are extremely well controlled. The acoustic output level was 90dB at 1m and the distortion curves are generally around 50dB below the fundamental. Expressed in percentage terms this equates to around 0.3%. It's a very good result.

I mentioned earlier that the port design is specifically optimised to suppress the generation of organ-pipe resonance, and Diagram 2 illustrates Neumann's success. A port organ-pipe resonance can occur, as the name so clearly suggests, when a port tube displays a resonance primarily defined by its length. And due to typical port lengths, organ pipe resonances typically occur in the lower midrange, say 400Hz to 800Hz, where the human ear is inconveniently extremely sensitive, so they can be easily audible. Diagram 2 shows a frequency response captured with the measuring microphone located right at the mouth of a KH120 II port. Organ pipe resonances would normally reveal themselves through high-Q peaks in the curve as it decays above the port Helmholtz resonance (45Hz, in the case of the KH120 II). The KH120 II curve is completely clean until the port output decays into the noise floor. There's no sign of even the slightest resonance. This is truly unusual and genuinely impressive.

Listening In

So, describing and measuring done, I'll move on to listening. I've heard the original KH120 on a few occasions but never over an extended period in my own space, but I do still have the KH150 review samples in my possession, and the 'family likeness' between them and the KH120 IIs is unmistakable. The KH120 II is in many ways equally impressive as the KH150. The two are clearly cut from the same cloth and driven by the same design

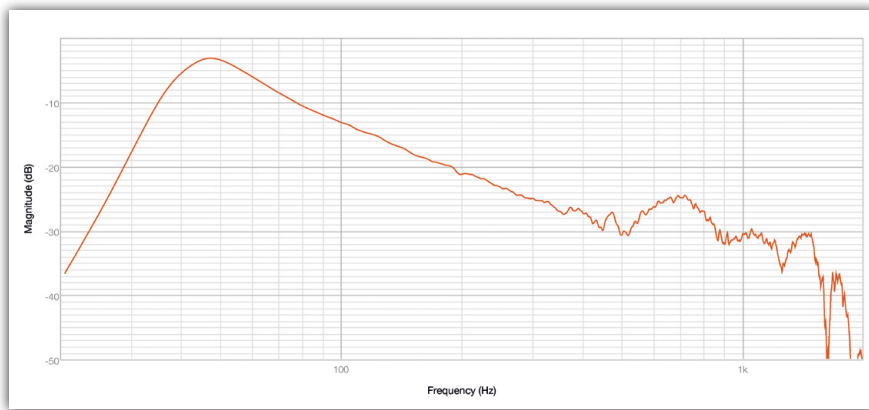


Diagram 2: A close-mic measurement of the reflex port output.

philosophies. This is especially the case with the MA-1 room optimisation working; in these circumstances they sound even more alike. And speaking of MA-1, my experience of it with the KH120 II was just as positive as it was with the KH150. In a reasonably well-behaved studio room, MA-1 doesn't transform the monitor's performance, but it definitely adds a confidence-building safety net. If I were a KH120 II user, I'd not hesitate to go with the MA-1 option.

Again like the KH150, there's a deep clarity and accuracy to the sound of the KH120 II. Its overall tonal balance is consistently and reliably neutral and its ability to create extraordinarily well-focused stereo images speaks of really well sorted electro-acoustic design. But it's not just tonal balance and imaging that impresses. The KH120 II reveals mix detail and insight throughout the audio band in a way that makes mix work a pleasure. There's no

guesswork. It's all there. The slight reduction of low-frequency bandwidth and maximum level compared to the KH150 is noticeable in a direct comparison, but heard on its own, KH120 II bass is both impressively extended and usefully informative of pitch and dynamics. And I can't really imagine running out of nearfield volume level in any reasonable work scenario with the KH120 II. There wouldn't be too many occasions in a smallish studio space where you'd need a nearfield monitor with more bass and volume potential.

The KH150 and now the KH120 II demonstrate without doubt that Neumann's monitor design team not only have a very clear idea of what's needed in electro-acoustic terms to create really effective nearfield monitors, but how to put those ideas affordably into practice. They're on fire. **///**

£ £1579. AES67 version £2390. Prices are per pair, including VAT.

T Sennheiser UK +44 (0)1628 402200

W www.sennheiser.com

W www.neumann.com

FREE eBook - RECORDING TECHNOLOGY: Basics & Beyond

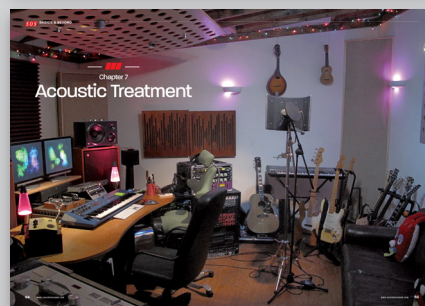
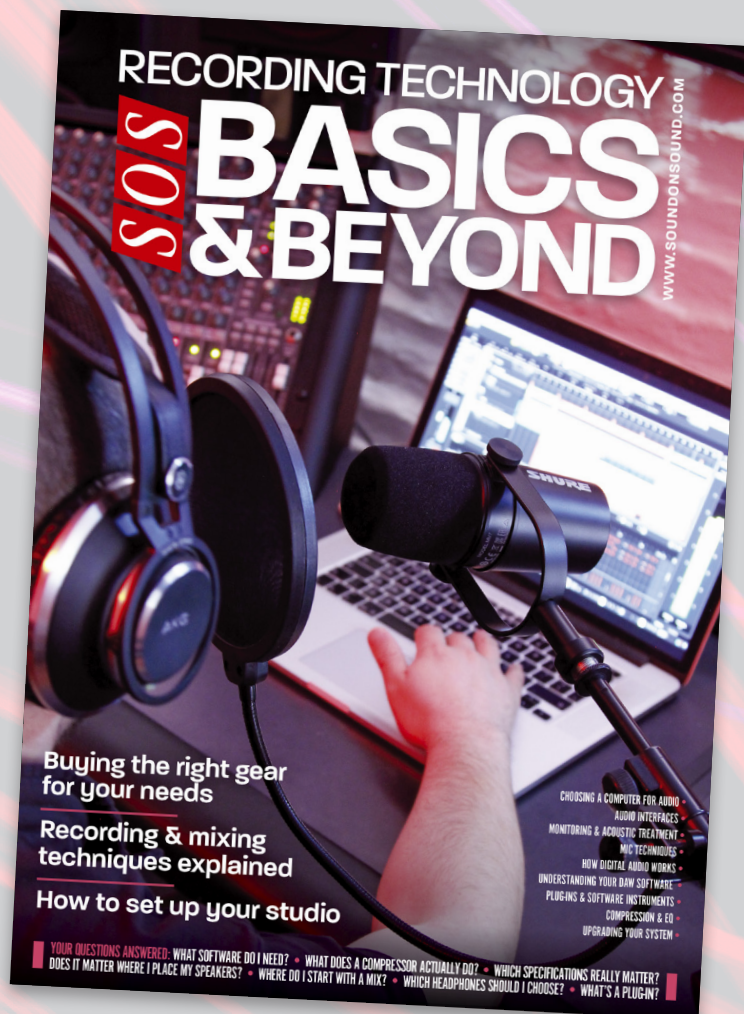
Get your FREE digital publication from Sound On Sound

This FREE illustration-rich eBook is aimed primarily at newcomers to the subject, but will prove equally valuable to anyone struggling with the complexities of today's sophisticated recording technology.

The purpose of this 170-page guide is to introduce readers to the essential components of a modern recording system and to explain the recording process in an easy-to-follow way, demystifying the inevitable jargon, both as it crops up, and with a comprehensive glossary.

Written in the accessible, no-nonsense style of the Sound On Sound team of authors and editors, **Recording Technology: Basics & Beyond** covers:

- What to buy
- Studio setup
- Computers for audio
- Audio interfaces
- Monitoring
- Acoustic treatment
- Mic techniques
- How digital audio works
- Understanding your DAW software
- Upgrading your system
- Software instruments
- Wiring your studio
- Plug-ins
- Recording audio
- Understanding MIDI
- Recording vocals
- Mixing
- Compressors
- Equalisation
- Mastering
- Glossary



Don't miss out! Sign up and **share the link** with friends and colleagues on social media.

<https://sosm.ag/recording-ebook>



MIX WITH THE BEST

“I have been a reader of *Sound On Sound* for as long as I can remember. The amount of enlightening information, the intelligence of the writing, the beautiful print quality, and the personal stories make it as useful as the audio tools it covers. I’m a huge fan.”

Jacquire King
Engineer, mixer, producer, Grammy Award winner (Kings of Leon, Norah Jones, Tom Waits, James Bay).

“I love the magazine. There are certain magazines you read where you take everything with a grain of salt and you’re not quite sure if you believe it. And *Sound On Sound*, when I read it, I believe it. It feels as though its only agenda is people reporting on stuff they’re interested in.”

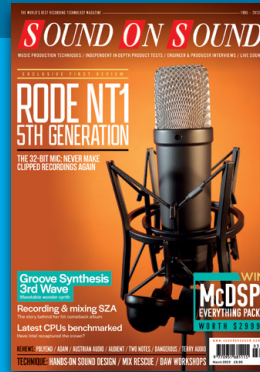
Andrew Scheps
Engineer, producer, mixer, Grammy Award winner (Lana Del Rey, Hozier, Jay-Z).

“*Sound On Sound* is informative from cover to cover, and I always read it. I always learn something from reading the interviews, and I rely on the new gear reviews. I look forward every month to the next edition.”

Cenzo Townshend
Engineer, producer, mixer, two-time winner of Best Mix Engineer at Music Producers Guild Awards (U2, the Maccabees, Jungle).

SOUND ON SOUND

This article was originally published in *Sound On Sound* magazine, June 2023 edition



Subscribe and Save Money!

Visit our subscriptions page at www.soundonsound.com/subscribe for more information on the *Sound On Sound* App go to: www.soundonsound.com/app



All contents copyright © SOS Publications Group and/or its licensors, 1985-2023. All rights reserved.

The contents of this article are subject to worldwide copyright protection and reproduction in whole or part, whether mechanical or electronic, is expressly forbidden without the prior written consent of the Publishers. Great care has been taken to ensure accuracy in the preparation of this article but neither *Sound On Sound* Limited nor the publishers can be held responsible for its contents. The views expressed are those of the contributors and not necessarily those of the publishers.