



PHOTO 1: Front view of the NES10-2 Mk4.

bhi

NES10-2 Mk4

noise reduction speaker

The British company, bhi, has a well-established reputation for their range of noise reduction solutions so new releases always attract attention.

The unit reviewed here is their NES10-2 Mk4 powered, noise reducing, speaker. The NES10-2 is a simple to use, compact speaker unit that employs the latest bhi noise reduction technology. The basic design is well established and the new MK4 model adds the latest noise reduction chip and a reconfigured volume control. The volume control in the new design is used to balance the sound levels as you switch the noise reduction on/off. The change means that you can now switch the noise reduction in/out without having to alter the rig volume control. In addition to the noise reducing features, the NES10-2 Mk4 can deliver 5 watts RMS of audio into its compact elliptical speaker.

Connecting up

The bhi NES10-2 Mk4 connects directly to the external speaker output of your rig and operates as a standard external speaker when switched off. As you can see from **Photo 1**, the supplied swivel bracket provides a flexible mounting option. The mounting bracket also doubles as a useful stand when using the speaker free-standing on the bench. Alternatively, you can attach the supplied rubber feet and remove the mount entirely.

To use the internal amplifier and noise reduction, the NES10-2 requires a 10-18V DC supply at 500mA. The shack 12V supply is ideal and there's a convenient, fused, red/black lead in the box. Alternatively, you can use a plug-top 12V mains power pack with a suitable coaxial power plug and +ve on the centre-pin.

Also in the box is a small control knob. This knob is clipped onto the preset switch on the rear panel and is used to adjust the

amount of noise reduction, **Photo 2**. In addition to operating as a powered speaker, the NES10-2 has a mono headphone jack on the side panel that automatically mutes the speaker.

One important point to note here is that it employs an efficient Class D audio amplifier that has a balanced output. As a result, it is important not to ground either leg of the headphone lead. In normal use, with headphones, this is not a problem. However, if you want to use the headphone jack to make recordings or connect to other equipment, you will need to add a DC block or groundbreaker. These are simple enough to homebrew, but bhi have a ready-made groundbreaker available. Their GB8M, **Photo 3**, has a flying lead with a 3.5mm mono plug on one side and a 3.5mm mono jack on the other. The bhi Ground Breaker uses transformer coupling to completely isolate the input from the output.



PHOTO 2: Rear view of the NES10-2 Mk4 showing the DSP control knob.

bhi noise reduction

All the bhi noise reduction units employ bhi's custom DSP (Digital Signal Processing) chip to achieve their noise reduction. Their DSP algorithm has been refined over the years and the NES10-2 Mk4 is fitted with the latest version. bhi's noise reduction operates by dividing the incoming audio into narrow bands and examining each band for evidence of a speech signal. These bands include sub-audio frequencies because these can be key identifiers for speech. After the bands are separated, those identified as containing speech signals are allowed to pass, whilst the remainder are attenuated. In reality, the algorithm is more complex, but that covers the basic principle. The NES10-2 Mk4 has an 8-step noise reduction switch mounted on the rear panel. This is marked 1 to 8, with 8 providing the deepest noise reduction. An important point to note here is that this noise reduction process is primarily designed for processing voice signals and is not suitable

for use with any other radio modes. However, the one exception is CW and I'll cover that in the next section.

Performance

It's difficult to put meaningful figures together to assess the performance of this type of noise reduction, so the real test is how it performs on-air. For the review, I used the NES10-2 with a wide range of equipment including a Yaesu FT-897, Hermes-Lite 2, RadioBerry 2 and Airspy HF+ Discovery. I also used SDR-Console and SDR Sharp as my main SDR packages. I listened across all bands from LF to UHF to get as wide a range of signals as possible. The bhi noise reduction was very effective, but I found that I had to use the settings carefully as the optimum noise reduction depended very much on the quality of the incoming signal. On one occasion, I was monitoring a very weak Ukrainian station on 14MHz, just as the band

was closing down. Without noise reduction, I don't think I would have even noticed him. However, with the noise reduction set on level 2, I could just dig him out of the noise. I tried increasing the noise reduction, but that didn't improve the copy, because the increased level of artefacts slightly worsened the intelligibility. I tried the same technique on other bands and that confirmed that the lower settings between 1 and 3 were particularly good for improving the intelligibility of marginal signals. I would stress that the noise reduction artefacts from the bhi unit were very low-level.

Whilst primarily designed for speech, I had heard that the bhi noise reduction worked well with CW signals. I tried CW on a several bands and, sure enough, the NES10-2 Mk4 worked surprisingly well to tidy up weak and noisy signals. It was the lower settings that worked best and I found it really helped to lift the CW signals from the noise.

I then started looking at stronger, but still noisy, signals to see what improvement I could make with the NES10-2 Mk4. I soon found a selection of strong US and Italian stations on 14MHz. Despite good signals, there was still a lot of noise around that was especially noticeable between overs. For this situation, I found I could use the higher noise reduction settings (4 to 6) to good effect. In addition to improving the received audio, the noise reduction also suppressed the noise between overs, which was helpful. In the absence of speech, there were a few watery artefacts but these disappeared once the speech signal returned. Moving on to VHF and UHF the noise tends to be smoother than on HF so is easier for the processor to remove. On these bands I found the lower settings gave the best overall results.

Summary

The NES10-2 Mk4 worked very well during the review and gave a useful noise reduction. The degree of noise reduction employed is very much a personal choice as the higher noise settings inevitably provide some degradation of the audio quality. In my tests I found the noise settings between 1 and 4 to be the most effective. The 5 watts of audio was plenty and should allow the speaker to be used in noisy environments. The NES10-2 Mk4 is available direct from bhi on 01444 870333, www.bhi-ltd.com or their authorised dealers and costs £119.95 including VAT. The GB8M Ground Breaker is also available from bhi and costs £29.95 including VAT. My thanks to bhi for the loan of the review model.



PHOTO 3: The bhi Ground Breaker, GB8M.

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