

Background control

Want to improve the sound quality of your equipment without spending a fortune? If so, you need a DSP speaker. Steve White takes a look at two.

Just as digital signal processing (DSP) becomes more common in transceivers, DSP loudspeakers too are being found in more and more shacks. They offer the owners of older or less expensive equipment the ability to listen with significantly reduced levels of interference, be that background noise, static crashes or heterodyne. The two models reviewed here are the latest offerings from British company bhi and American company SGC. They are similar to models that have been reviewed before in *RadCom*, but each has been updated and now includes additional facilities. They are similar to one another in many respects: both are about the same size; both rely heavily on digital electronics to reduce noise and heterodynes; both contain audio amplifiers; and they are similar in price.

DESCRIPTION

The bhi NES 10-2 Mk2

This speaker is housed in a sturdy two-piece black plastic case with rounded corners. Behind the inset metal speaker grille there is a single LED that indicates power (red) and power plus noise cancellation (green). On the top is a slide switch to turn the noise cancellation on/off and a preset potentiometer for setting the audio input level.

On the bottom is a slide switch that turns the unit on/off and also acts as an audio bypass when turned off. On the rear there is the DC power socket and a bank of DIP switches for selecting the level of noise and tone reduction (see **Table 1**). Just below the switches the 2.1m audio input lead



Right
Inside the bhi is a single PCB located on lugs. The DSP chip and DIP switches are mounted on the back of the board.

Left
Underneath the bhi is a switch that enables it to be used as a straightforward loudspeaker.

emerges. Finally, on the left hand end, there is a 3.5mm headphone socket. The plug-in DC power lead supplied is 1.75m long and bhi offers an optional mains adapter. All the controls are nicely labelled.

Inside the speaker there is a PCB that fills the entire back of the case. This is located on lugs.



Table 2

SGC filter settings.

Level	Stated bandwidth	Measured bandwidth
0	Full	-
1	1800Hz	300-2100Hz
2	500Hz	300-900Hz
3	100Hz	400-600Hz

Table 3

SGC noise reduction settings

Level	Noise reduction
0	None
1	13dB
2	26dB

Table 1

bhi noise and tone reduction settings

Level	Noise reduction	Tone reduction
1	9dB	4dB
2	11dB	5dB
3	13dB	6dB
4	15dB	8dB
5	17dB	16dB
6	20dB	21dB
7	24dB	25dB
8	35dB	65dB

The SGC ADSP2 Mk2

This speaker is also housed in a sturdy two-piece black plastic case. The corners are angled, the speaker grille extending part way across the angles. Above the grille are three LEDs – a red one to indicate power and two green ones to indicate the level of noise reduction selected. On the top are two press buttons, a black one to cycle through the filter (bandwidth) settings (see **Table 2**) and a red one to cycle through the noise reduction settings (see **Table 3**). On the back there is a 3.5mm headphone socket and a grommet through which the 1m-long power cable and 1.67m-long audio input cable emerge.

Inside, there are two printed circuit boards. These are mainly populated with surface mount devices and are fixed to the case with self-adhesive pads.

OPERATION

The bhi NES 10-2 Mk2

The 32-page instruction booklet for the bhi is good. It explains the operation, how to adjust the settings and even how to add ferrite rings onto the leads if you suffer breakthrough from a transmitter. It also contains a list of accessories and other products from bhi.

I have long enough fingernails to be able to slide the DIP switches back and forth that set the noise cancellation level (they are spaced 1/10in apart), but nail biters would have to resort to using a small screwdriver or the tip of a pen. I tried a number of different settings on various modes.

With this speaker, the less aggressive settings are certainly more appropriate for data modes (CW and RTTY), because on the more aggressive settings it felt as though the tones were being sucked away. This was particularly pronounced on the maximum setting (level 8). On phone modes, however (AM, FM and SSB) I was pleasantly surprised just how natural sounding the bhi speaker was. When a strong signal was being received, it really didn't sound as though the audio had

SPECIFICATION

	bhi NES 10-2 Mk2	SGC ADSP2 Mk2
Size	110 x 65 x 55mm	112 x 67 x 55mm
Basic weight *	230g (8oz)	175g (6oz)
DC power	12-24V DC, 500mA	12V DC, 500mA
Audio input	5W max.	100mV-5V rms
Audio power output	2.5W	5W
Noise reduction steps	8	2
Noise reduction levels	9dB-35dB	13dB, 26dB
Selectable bandwidths	None	Full, 1.8kHz, 500Hz, 100Hz
Fused power lead	Yes	No
Headphone socket	3.5mm	3.5mm
Supplied with	Mounting bracket, self tapping screws, stick-on rubber feet,	Mounting bracket, self tapping screws, speed nuts
List price	£99.95	£109.95

* Excluding cables and mounting bracket

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been processed at all. There was hardly a hint of robotic sound, even on more aggressive settings. Except when there were high levels of noise, even weak signals sounded quite natural. The speaker adapted rapidly to new conditions. For example, when opening the squelch of an FM receiver on an unoccupied frequency, the noise was reduced to its final level in about one second. The only real irritation was that at the most aggressive level of noise cancellation (level 8), an open FM channel was silenced to a faint tinkling sound. Reducing this to level 7 resulted in slightly more noise coming through, but the tinkling all but disappeared.

The SGC ADSP2 Mk2

The SGC has far fewer noise reduction levels, but it is easy to cycle through them, and it indicates the current setting on the front panel. In the instruction leaflet, SGC says: "There is no LED indication for the filter level, which can be determined by sound." This is true enough, but the speaker provides an indication for noise reduction and you can also tell this by the sound.

On data modes, the SGC performed extremely well. CW and RTTY did not seem adversely affected by even the most aggressive level of noise reduction and pressing the filter button to reduce the bandwidth helped even more. There was no hint of ringing when CW was passed through even the narrowest bandwidth filter. On telephony modes, the 13dB setting produced a good level of noise reduction without making the audio sound unduly robotic. The 26dB setting did make voices sound unnatural though, and at this setting some audio break-up was noted when interference levels were high. The SGC's ability to remove heterodynes was excellent on both the 13dB and



26dB settings, irrespective of the mode being received.

Adapting to new conditions, eg when opening the squelch on an unoccupied FM channel, was relatively slow. Although the noise was reduced promptly, it often took up to ten seconds before the final level was reached.

I was pleased to note that SGC has added a headphone socket to the ADSP2 Mk2, a useful facility that the original ADSP2 didn't have. The front panel legend is also removable, in case you want to re-fit it the other way up. The reason you might want to do this is that if you hang the speaker under the mounting bracket, you need to mount it upside down because without doing so you can't reach the buttons.

SHORTCOMINGS

The bhi NES 10-2 Mk2

The first shortcoming I identified with the bhi is that the controls and connections are spread across too many surfaces. Consequently, if you want to be able to access all the controls easily, this speaker is best used in its mounting bracket and tilted to an appropriate angle.

The second is that the high quality loudspeaker incorporates a strong magnet that is unshielded. Place it too close to a CRT display and it will cause the CRT problems.

Thirdly, the headphone socket rubs against the mounting bracket when you rotate the speaker in the bracket. Slightly thicker spacers would resolve this problem.

Finally, although this speaker can remove heterodynes, it only does so effectively when the maximum noise cancellation setting is selected. On other settings, heterodynes are reduced by varying degrees, but not removed.

Above
The SGC ADSP2 Mk2.

Above left
Inside the SGC there are two PCBs.

The SGC ADSP2 Mk2

The level of audio input that the SGC requires is quite high. Consequently, it needs to be plugged into the extension speaker socket of a receiver, because the audio level available from the headphone sockets of most commercial equipment is not sufficient.

Three of the shortcomings I mentioned in my review of the ADSP2 Mk1 (see *RadCom* November 2003) are still valid: there is no fuse in the power lead; the unit needs to be permanently powered; and it defaults to no noise reduction when powered on.

In addition, the controls and indicators are not labelled, the speaker lacks bass response, which makes the audio sound thin, especially when listening to music, and the only comment I can make about the instructions is that they could be much better.

CONCLUSIONS

After extensive testing, although the bhi scored higher than the SGC, I came to the conclusion that it is a 'horses for courses' situation. If you are specifically interested in data modes, the SGC would definitely be the right choice because it has selectable bandwidths and handles Morse and RTTY extremely well. For telephony modes (SSB, AM and FM), the bhi offers much better audio quality. It adapted much faster to new conditions and even at high levels of noise reduction the audio didn't sound robotic. I would like to thank bhi for the loan of the NES 10-2 and Waters & Stanton for the loan of the SGC ADSP2. ♦

THE VERDICT		
	bhi NES 10-2 Mk2	SGC ADSP2 Mk2
Quality of construction	****	***
Sound quality (DSP off)	*****	**
DSP performance		
datamodes (CW, RTTY)	***	*****
telephony (FM, AM, SSB)	*****	***
Heterodyne reduction	***	*****
Time to adapt to new conditions	****	**
Instructions	****	*
Facilities	****	****
Magnetic emission	*	*****
Ease of use	**	****
Overall approval rating	72%	66%

* = Bad, ** = Poor, *** = Fair, **** = Good, ***** = Excellent