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bhi

NES10-2 MK3 NES-5

Noise Eliminating Speakers
Operating Manual



Note:

No user serviceable parts inside. Warranty void if speaker opened. When listening using headphones, care must be taken when switching the noise cancellation off, as high volumes of noise will be present.

Prolonged exposure to high sound levels may lead to hearing damage.

bhi accept no responsibility to damage to hearing through incorrect operation of this equipment.

**WEEE Statement for correct disposal of this product:**

(Applicable in the European Union and other European countries with separate collection systems). This marking shown on the product or its literature, indicates that it should not be disposed of with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources. Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take this item for environmentally safe recycling. Business users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial wastes for disposal.

7. Approvals

European conformity information

- A sample of this product has been tested and found to conform to the following European Directives:

73/23/EEC – Low Voltage (safety) Directive

89/336/EEC – EMC Directive

6. bhi support

Every noise-eliminating speaker comes with a 12 month guarantee against defective materials and workmanship.

If you do have a problem then please refer to the troubleshooting section 4. If you have not resolved your problem then please contact us.

Before you make your call please have the following to hand:

- √ Your serial number if applicable (not on all product. Some speakers may be identified by a coloured sticker)
- √ Details of when and where you purchased the noise eliminating speaker
- √ Your address

Most queries can be sorted out over the telephone, if not we will arrange with you to have your speaker sent back to us for analysis, repair or replacement (if within 12 months from date of purchase, if outside the guarantee period an estimate of the cost of repair will be given).

For contact details please refer to back cover of this manual.

If you have any suggestions for improvements please complete and return the customer feedback form.

Important Information

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Table of Contents

	Page
1 Overview	
1.1 bhi	5
1.2 Introduction	5
1.3 Audio DSP Noise cancellation	6
1.4 Unpacking	7
2 NES10-2 MK3	
2.1 Controls	8
2.2 Description	9
2.3 Specification	11
2.4 Connection	11
2.5 Setup	13
3. NES-5	
3.1 Connections	15
3.2 Description	16
3.3 Specification	17
3.4 Setup	17
4.Troubleshooting	18
5. Accessories	23
6. bhi Support	30
7. Approvals	31

The **bhi DESKTOP** DSP base station speaker is a quality speaker for use in radio communications, especially amateur radio, two-way radio and HF radio. It is suitable for all bands and is easy to set up and control via the microprocessor controlled pushbuttons on the front of the speaker grille. It comes with a mounting bracket that can be left on or removed depending on personal choice. The unit is supplied with a 1.2 metre audio cable with a moulded 3.5mm jack plug and banana plugs plus a 2.1mm fused DC power lead.

Features:

- Stylish quality matt black speaker
- Excellent audio quality
- 4" base driver and a 1" tweeter unit
- 10 Watt amplified DSP noise cancelling unit
- Wide audio input level 50 - 500mW
- Power 12 and 18 Volts (300mA)
- Separate rotary Volume and Filter level controls
- Visual and audio indication of filter level
- Noise reduction 9 – 35dB - Tone reduction 4-65dB
- Excellent reviews in RadCom, CQ and QST radio magazines
- Weight 1.90Kg (packed)
- Dimensions 200(H) x 150(D) x 160(W)mm



Pocket Reference Books

Have all the important information at your finger tips. Available for the following

Yaesu:

FT-817
VX-2R
VX-5R
VX-6R
VX-7R
VX-8R



DSPKR

10 Watt RMS DSP noise cancelling speaker

The **DSPKR** is a new, quality, amplified DSP noise cancelling speaker from bhi that really lets you hear that signal!

Works on all radio bands and is easy to install.



Features:

- 10 Watts RMS audio output power
- Fully Adaptive noise cancelling 9 - 24dB
- 7 user selectable noise cancelling levels
- Simple pushbutton control of DSP functions
- Audio level indicator to optimise filter function
- Separate volume control
- Filter level store function
- Sleep mode to conserve battery power
- Easy to install with adjustable mounting bracket
- 10 – 16Vdc operation
- Auxiliary output socket for headphones or loudspeaker
- Up to 6 Watts input
- Dims: 135(W) x 130(H) x 85 (D)mm
- Weight 0.85Kg
- Supplied with 1030-FPL fused DC power lead and user manual

1. Overview

1.1 bhi

bhi Ltd are specialists in the design, development and manufacture of Digital Signal Processing (DSP) noise cancelling products and other specialist electronics.

1.2 Introduction

The bhi noise eliminating speakers greatly improve the clarity and intelligibility of speech in radio communications. They are suitable for use in many applications where high background noise and interference mean that you cannot clearly hear what is being said. The NES10-2 MK3 and NES-5 enable the user to listen and concentrate "**stress-free**".

Suitable applications where the speakers will be of great benefit to the user include radio amateur base stations, CB radios, two-way radios, HF radios, marine communications, scanners, taxi base stations and hands-free car kits.

The NES10-2 MK3 and NES-5 are compact and easy to install. They incorporate DSP technology and are fully adaptive to any change in noise levels and interference.

On the NES10-2 MK3 the noise cancelling can be switched on or off and there are 8 user selectable noise cancellation levels, whilst the NES-5 is a plug and go model which has a fixed level of noise cancellation.

The speakers mount like any standard external speaker and are powered by any 12 – 24 vdc unregulated power source. You can use the optional bhi external power supply or in-vehicle adapter.

The NES10-2 MK3 and NES-5 come as standard with a 2m audio lead terminated with a 3.5mm mono jack plug ready for immediate use.

1.3 Audio DSP Noise cancellation.

The bhi DSP processes the incoming audio signal and then differentiates the speech from the noise. The unwanted noise and interference are then attenuated to leave only the speech.

The following diagrams are taken from actual audio signals and illustrate how the audio signal is being processed.

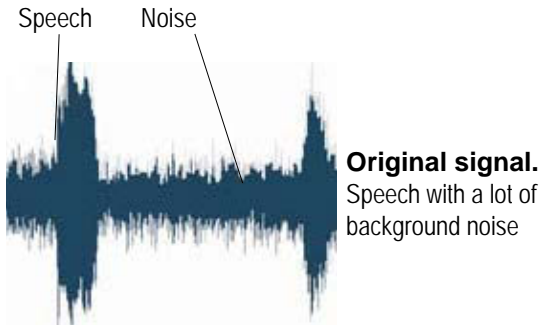


Figure 1. Audio signal before processing.

NEDSP1062 Amplified DSP modules.

Amplified version of the low level audio NEDSP1061 modules, except they feature an integral 2.5W rms power amplifier. They are ideally suited for fitting inside a loudspeaker or older tranceiver. They feature single button operation with selectable 4 or 8 levels of noise reduction.

Order code **NEDSP1062-KBD**



ANEM MKII "Noise Away"

DSP Noise Cancelling as Easy as 1-2-3

- 1 - Plug in Audio
- 2 - Connect Loudspeaker
- 3 - Connect Power

Easy to use amplified in-line DSP noise cancelling module.

Use with a speaker or headphones. Full user guide, audio lead and Fused DC power lead supplied



Radiomate.



The bhi Radio Mate compact keypad for the Yaesu FT817, FT857 and FT897 enables the user to get the best out of their radio. It has been designed to make many of the common functions quick and easy to use. The keypad does this with a number of fast, effective short-cuts. 40 memories and frequency nudge mode included.

Switch Box

Order code: 1042 Switch Box

Need to Connect more than one piece of equipment to your bhi Noise Eliminating Speaker or module?



Switch box front view



Switch box rear view

Features:

- Allows 6 pieces of equipment to be connected to a Noise Eliminating Speaker, In-line Module or existing extension speaker
- 3 Inputs - loaded at 8 ohms
- 3 Un-loaded inputs (for low level signals)

NEDSP1061 low level audio DSP modules

The NEDSP1061 modules again feature the bhi noise reduction DSP. It's small size allows it to be retro fitted into existing equipment, or designed in to new equipment. The module is single button operation. It features visual and audible indication of mode of operation. Fitting guides available for : Yaesu FT817, Kenwood TS50 and Icom 706 MK II G. There are also 3rd party instructions available to download for the Yaesu FT-847, FT-897, FRG100, Realistic DX-394, Alinco DX-77 and the Kenwood TS440.



The module has 4 or 8 levels of noise reduction. Four wires are provided to integrate the module into the equipment. The fitting kit includes a mounting bracket, keyboard label and a detailed installation manual.



Processed speech.

Speech with reduced noise

Figure 2. Audio signal after processing.

1.4 Unpacking

Check that the following items are included in the package:

NES-5 Noise eliminating speaker
or

NES10-2 MK3 DSP Noise eliminating speaker

User manual

2 fixing screws

4 self adhesive rubber feet

Grey filter select knob (inside bag with screws and rubber feet). To be press fitted into switch body on rear of speaker.

1 fused power lead

Customer feedback card

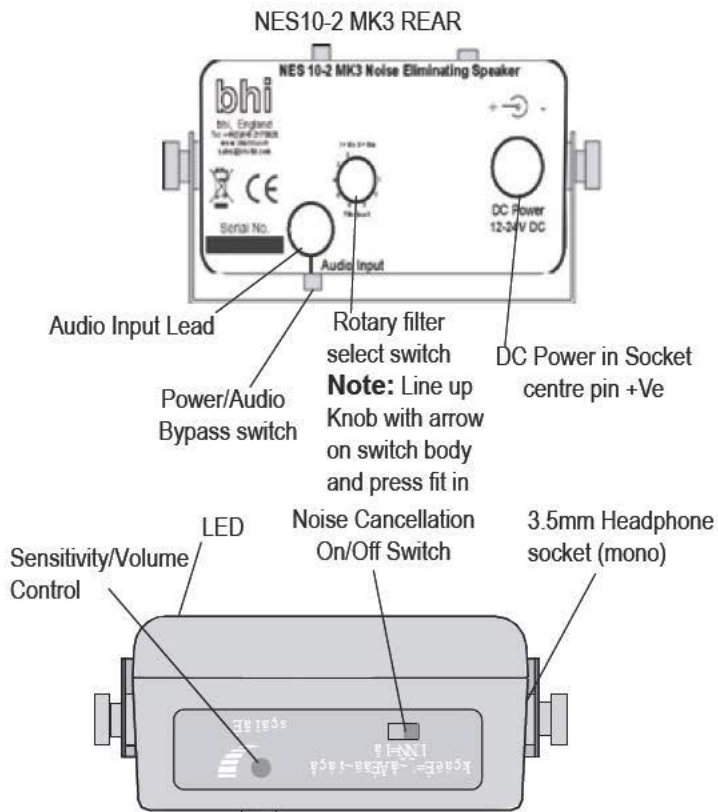
Optional extras if ordered (see section 5):

For NES10-2 MK3 turn to page 8

For NES-5 turn to page 15

2. NES10-2 MK3

2.1 Controls



Other products available from bhi.

NEIM1031 MKII In-line module.

Order code: *NEIM1031 MKII*

The NEIM1031 MKII now comes with 20% more audio and a new filter select knob.

- Noise cancellation 9 - 35dB
- Audio input/output
- Line level input/output
- Output volume control
- Input level control with LED
- Power on/off with LED
- Input selector switch
- Noise cancellation On/off with LED



Accessories for the NEIM1031

Horizontal conversion label

Order code: *1031-108D*

This label changes the orientation of the NEIM1031 to landscape.



20 Watt 4 Ohm Extension speaker

Order code: *LSPKR*

Terminated with 3.5mm mono plug

NEIM1031 mounting Stand.

Order code: *1031-STAND*

A stand for the NEIM1031.

Holds the module in the optimum position.



Audio Adaptors:

See tables below for details.

Adaptors for connecting NES10-2 MK3 to equipment

Radio Connection	Adapter required	Order number
6.35mm (1/4") mono socket	6.35mm mono plg - 3.5mm mono skt	ADP-P001
6.35mm (1/4") stereo socket	6.35mm Stereo plug - 3.5mm mono socket	ADP-P002
3.5mm Jack Mono socket	None	n/a
Phono socket	phono plug - 3.5mm mono socket	ADP-P004
2.5mm mono socket	2.5mm mono plug - 3.5mm mono socket	ADP-P005
3.5mm Jack Stereo socket	3.5mm Stereo plug - 3.5mm mono socket	ADP-P003
2.5mm Stereo socket	2.5mm Stereo plug - 3.5mm stereo socket (use in conjunction with ADP-P003)	ADP-P006

Adaptors for connecting ear/headphones to NES10-2 MK3

Headphone Connector	Adapter required	Order number
3.5mm jack mono plug	None	n/a
3.5mm Jack Stereo plug	3.5mm stereo socket -3.5mm mono plug	ADP-S001
6.35mm (1/4") Mono plug	6.35mm mono socket - 3.5mm mono plug	ADP-S002
6.35mm (1/4") Stereo plug	6.35mm stereo socket -3.5mm mono plug	ADP-S003
2.5mm Stereo plug	2.5mm Stereo socket - 3.5mm mono plug	ADP-S004
2.5mm mono plug	2.5mm mono socket - 3.5mm mono plug	ADP-S005

2.2 Description

Note: Fit grey filter level select knob into switch body making sure that you line up the indent on the top of the knob with the arrow on the switch body.

1. The rotary noise cancellation filter level switch allows the user to select from 1 of 8 different settings, level 1 giving the least amount of noise cancellation, level 8 providing the most. The unit is factory set to level 6. The switch settings are shown on the rear of the speaker (see page 14 for more information).
2. The power-in socket allows the user to connect NES10-2 MK3 to the bhi power supply (optional extra) or any suitable 12 –24V dc power source (min 500mA), with a suitable 2.1mm power connector, centre pin positive (fused at 3A).
3. 2 metre audio input lead terminated with a 3.5mm mono jack plug. This lead connects to the external speaker socket or earphone socket of your equipment.
4. Sensitivity control . This controls the input level to the electronics of the NES10-2 MK3, and is adjusted depending on the input level from the radio communication equipment being used. The optimum level is a combination of the output from the equipment and the sensitivity level of the NES10-2 MK3, so that there is no distortion and the speaker is not being overdriven.

Once set the controls do not normally require any further adjustments.

- 5. LED indicator. The LED illuminates red when power is applied and changes to green when the noise cancellation is active.

LED colour	Off	Red	Green
Description	Power off audio bypassed	Power on noise cancellation off	Power on noise cancellation on

- 6. Noise cancellation ON/OFF switch. This switch turns the noise cancellation on and off, and should be in the "OFF" position prior to using the speaker.
- 7. Power switch/audio bypass. This switch turns the speaker on, or removes the power to the speaker. By turning the power off, the audio bypasses the DSP circuit, and is connected directly to the speaker. The speaker will then act as a normal extension speaker
- 8. Headphone socket. This allows the user to listen in private using a standard mono earpiece or stereo headphones using one of the optional audio adaptors (see section 5). This socket can also drive another loudspeaker. When a connector is inserted into this socket the internal speaker of the NES102 MK3 is muted.

Optional Extras

5. Accessories

would like to order any of these items then please contact us (see the back page of this document for contact details), or order on-line via our secure online shop at www.bhi-ltd-shop.com.

Power:

- | | |
|-----------|------------------------------|
| 1030-UKPA | UK mains power adaptor |
| 1030-EUPA | European mains power adaptor |
| 1030-VEPL | Vehicle power adapter |
| 1030-2WVA | 2 Way vehicle power adaptor |

Audio:

- | | |
|-----------|----------------------------------------------|
| 1030-EXLE | Audio Extension lead (2M) |
| ALD-001 | 3.5mm - 3.5 mm mono audio lead
1.2M long. |
| ALD-002 | 3.5mm - 3.5mm mono audio lead
2.5M long. |
| ALD-003 | Phono - phono lead mono lead
1.2M long. |
| ALD-004 | 3.5mm Stereo - 2 x phono lead
1.2M long. |

What adjustments do I need to make during use?

Apart from changing the filter level to suit the current listening conditions, once the NES10-2 MK3 is set to your personal settings no further adjustments should be necessary.

Can the speakers be used with a switch mode power supply?

We don't recommend this, but some good quality switch mode power supplies do work ok. The speakers should normally be used with linear supplies if possible to avoid possible noise problems caused by poor quality switch mode power supplies.

Sometimes I can hear watery noises.

When listening to high levels of noise where the DSP is trying to differentiate the speech signal from the noise on high filter level settings, the background may sound a little strange and the speech may sound a little watery. This is normal operation as the DSP is removing the high levels of noise.

See FAQs on our website for further information and help.

2.3 Specification

Noise attenuation	- 9 - 35dB
Number of attenuation levels	- 8
Tone reduction	- 4 - 65dB
Audio input power	- 5W rms max
Audio output power	- 2.8W rms max
Audio connection	- Integral 3.5mm mono jack plug, 2m lead.
Headphone connection	-3.5mm mono jack socket
DC power	- 12-24V dc. 500mA
Size	- 110 x 65 x 55mm
Weight	- 300gms

2.4

NES10-2 MK3 basic connection diagram

For use with standard radio communication equipment, follow the diagrams and procedures on page 12. For in vehicle use, fit the speaker in a suitable location using the bracket and fixing screws supplied. Ensure the bracket does not foul the power switch.

Note: It is recommended that this is carried out by a qualified vehicle technician.

Also supplied are four rubber feet. These can be attached to the bottom of the mounting plate to prevent it from marking surfaces.

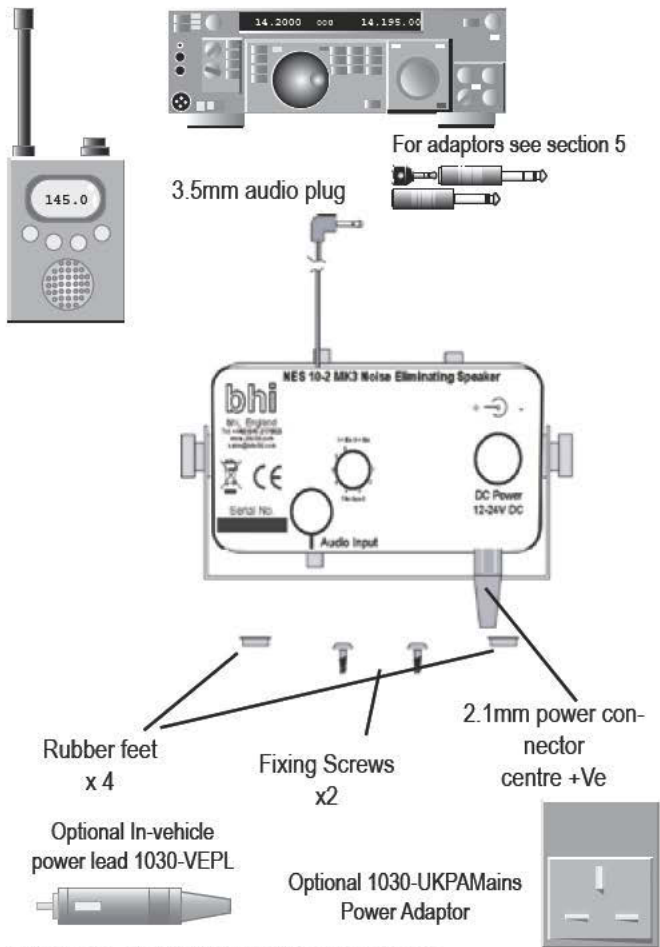


Figure 4. NES10-2 MK3 connections

Try transmitting again. If the problem persists , then move onto the next step.

If the problem is cured, try removing the first ferrite.



Figure 8. Power lead suppression.

Try transmitting again. If the problem persists , then move to the next step.

If the problem is cured, try removing the previous ferrite(s). Shortening the power lead may also improve the situation.

Fit another ferrite at the other end of the power lead

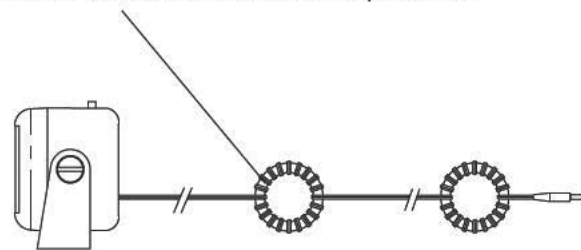


Figure 9. Additional power lead suppression.

Try transmitting again, if the problem is cured, try removing the previous ferrite(s).

Operators voice can be heard when transmitting.

All bhi products operate correctly under normal working conditions. However if problems with feedback are experienced during transmission then the following measures may help.

1. Reduce the sensitivity control (NES10-2 only)
2. Connect the speaker to a separate power supply (available from bhi - see section 5).
3. Ferrites

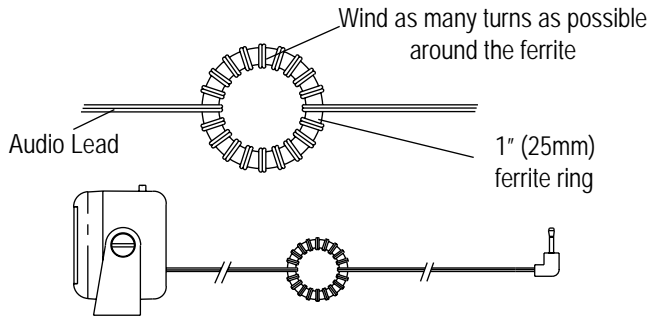


Figure 6. Audio lead

If problem persists then fit another ferrite at the other end of the lead close to the audio connector

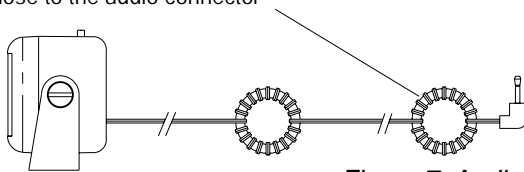


Figure 7. Audio lead

2.5 NES10-2 basic set-up procedure and operation

1. Connect the bhi power supply or a suitable 12 to 24 Vdc power supply to the power socket at the back of the NES10-2 MK3.

Note: Make sure the centre pole of your power supply connector is connected to positive (+ve). Switch the power switch on.

2. Switch the noise-cancelling switch off. The front panel LED should be illuminated red.
3. Turn the sensitivity control fully anticlockwise, and then back a quarter of a turn.
4. Connect the audio lead to your external speaker socket using the 2m audio lead with 3.5mm jack plug. If your external speaker socket is not a 3.5mm jack socket, then audio lead adapters are available from bhi. A 2 metre audio extension lead is available if your equipment is more than 2m away from the NES10-2 MK3. (see section 5)
5. Set the rotary noise cancellation filter level switch to level 6 to start with.

Filter Level	Attenuation
1	9dB
2	11dB
3	13dB
4	15dB
5	17dB
6	20dB
7	24dB
8	35dB

Note:

Remove the small grey filter select knob from the small red plastic accessories bag inside the NES10-2 MK3, and press fit into the switch body at the rear, making sure to line up the mark on the knob with the arrow on the switch.

6. Turn the radio equipment on and set the audio volume to your own personal taste, making sure that you are not over driving the speaker and causing distortion. Adjust the sensitivity control knob on the top of the speaker if required to obtain your optimum setting.
7. Tune into the station or channel you require.
8. Turn the noise cancelling on, the front panel LED changes from red to green indicating the noise cancellation is active.
9. Adjust the filter level setting if required to remove higher levels of noise and improve the intelligibility and clarity of the speech signal.

- With the noise cancellation switch in the off position, make sure that you have the sensitivity control on the NES10-2 MK3 fully counter clockwise or thereabouts. Now tune your radio communications equipment until you have a good clear signal with good volume.

The volume from the speaker is low and cannot be increased:

- The speakers are designed to work with the external speaker sockets of radio communications equipment, and although it will work with some earphone and headphone sockets, there may be occasions where the signal output from these types of output sockets is not enough for the speakers electronics to process the signal effectively. bhi have other products that will work with these levels of signal ,the NEIM1031 MKII (Noise eliminating In-line Module) and ANEM MKII compact in-line module. Please contact bhi for more information. See end of operating manual for contact information.

Sometimes there is a short delay before the noise cancellation is active.

- This is due to the time the DSP takes to start processing the signals. This gives the opportunity to check that the DSP is not taking out any detail from the signal.

3.2 Description

1. The power-in socket allows the user to switch on the NES-5 by using the bhi power supply (optional extra) or a suitable 12 –24V dc power source (min 500mA), with a suitable 2.1mm power connector, centre pin positive (fused at 3A).
2. 2 metre audio input lead terminated with a 3.5mm mono jack plug. This lead connects to the external speaker socket or earphone socket of your equipment.

3.3 Specification

Noise attenuation	- 20 dB
Tone reduction	- 20 dB
Audio input power	- 5W rms max
Audio output power	- 2.5W rms max
Audio connection	- 3.5mm mono jack plug, 2m lead.
DC power	- 12-24V dc. 500mA
Size	- 110 x 65 x 55mm
Weight	- 200gms

3.4 NES-5 basic set-up procedure and operation

1. Connect the supplied in vehicle power lead, bhi power supply or a suitable power adaptor to the power socket at the back of the NES-5.

Note: Make sure the centre pole of your power supply connector is connected to the positive rail (+ve).

2. Connect the audio lead to your external speaker socket using the 2m audio lead with 3.5mm jack plug. If your external speaker socket is not a 3.5mm jack socket, then audio lead adapters are available from bhi (see section 4). A 2 metre audio extension lead is available, If your equipment is more than 2m away from the NES-5 (see section 5).
3. Switch on and the NES5 will automatically remove unwanted noise and interference.