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bhi

NES10-2
NES-5

Noise Eliminating Speakers
Operating Manual



7. Approvals

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.

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 (found at the back of the speaker)
- √ 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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Tuneable Counter poise

Order code: TCS

Tuneable counter poise for use with Wonder Wand and other QRP antennas.

Wonder Wand

Order code: WWAND

Rig mounted QRP antenna providing near all band coverage from 40M to 70cm



The Code Cube:

Order code: Code Cube
Mini-Paddle and Code Cube
Keyer = World's smallest Keyer/
Paddle.

Mini-Paddle

Order code: MP-817

Small sized twin paddle to be used with the FT-817 and all other transceivers that have built in keyer circuits.



FT-817 Mounting stand.

Order code: FT-Stand
Simply clicks into position.
Adjustable with non slip feet.

Pocket Reference Books

Have all the important information at your finger tips. Available for the following Yaesu FT-817, VX-5R and VX-7R



Noise Cancelling Headphones (NOT DSP)

Order code:NCH

These active noise reduction (ANR) headphones reduce the ambient background noise to allow you to listen to the program source peacefully.

The headphones employ microphones to monitor the ambient noise. These microphones are wired out of phase and feed a differential amplifier which generates an opposing signal to that of the unwanted noise. This signal then cancels out the unwanted background noise.



The headphones effectively remove noise such as blower noise, ambient noise, jet engine noise or music from another room.



Free aircraft adapter and carry bag



The headphones are supplied with an aircraft adapter, so you can now listen to the film, or CD player without all the jet engine noise.

Features:

- Lightweight, folding design that's ideal for travelling.
- Ambient noise cancelling on/off switch with LED
- Warning sirens and telephone rings remain unaffected.
- Discrete battery holder AAA size. (Battery included)
- 30mm Neodymium drivers
- Supplied with carry pouch
- 1.6M cable terminating in a 3.5mm jack plug plus 2 pin aircraft adapter.

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 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 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 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 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.

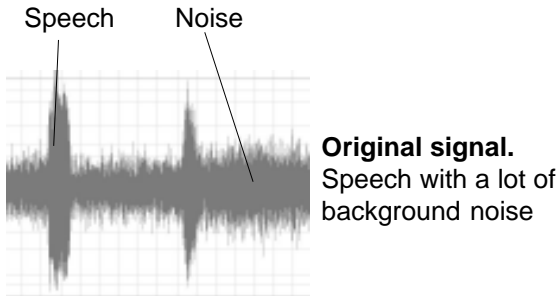


Figure 1. Audio signal before processing.

Yaesu FT817

Complete kit to fit in the Yaesu FT817.

Order code:

NEDSP1061-KBD-FT817

Kenwood TS50

Complete kit to fit in the Kenwood TS50.

Order code:

NEDSP1061-KBD-TS50

Generic

Complete generic kit to fit most applications.

Order code:

NEDSP1061-KBD

New versions available soon. Check our website for the latest, or call for details.

NEDSP1062 Amplified DSP modules.

These are as the NEDSP1061 modules, except they feature an integral 2.5W rms power amplifier. They are ideally suited for fitting in the loudspeaker path of equipment, or indeed into a loudspeaker. They feature single button operation with selectable 4 or 8 levels of noise reduction.

Order code **NEDSP1062-KBD**

Headphones and Earpieces



Stereo Headphones

Order code: 1030-STHDP

Lightweight stereo headphones. Supplied with 3.5mm mono - 3.5mm stereo adapter.



Mono Earpiece

Order code: 1030-MOEP

Mono earpiece fitted with 3.5mm mono plug.

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 modules

The NEDSP1061 modules again feature the bhi noise reduction DSP. Its 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.

The module can be software settable to 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.

Currently there are three versions of the module.



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 Noise eliminating speaker

2 fixing screws

4 self adhesive rubber feet

1 fused power lead

Customer feedback card

Optional extras if ordered (see section 5):

For NES10-2 turn to page 8

For NES-5 turn to page 15

2. NES10-2

2.1 Controls

Noise Cancellation Selection Table

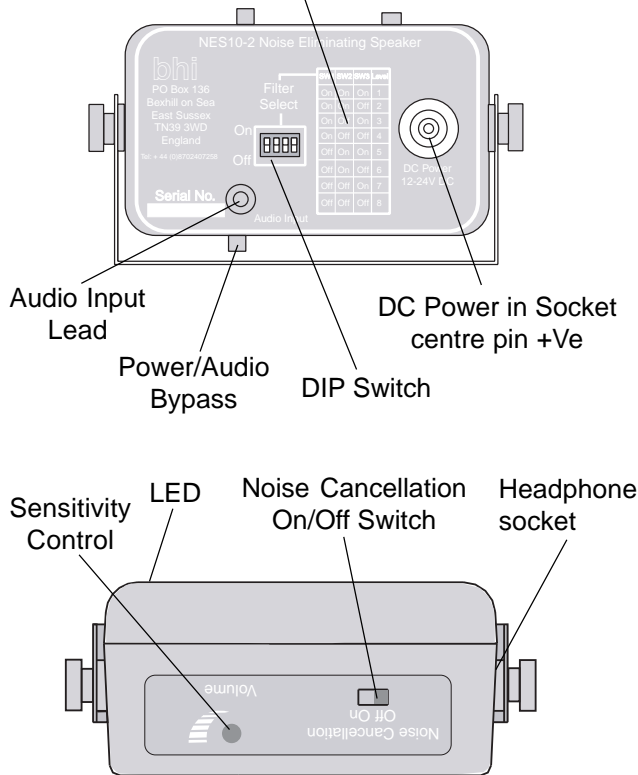


Figure 3. NES10-2 Controls

Other products available from bhi.

In-line module.

Order code: NEIM1031

The NEIM1031 In-line module uses the same DSP technology found in the NES10-2 and NES5 speakers, but has the following additional features:

- 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 Extension speaker

Order code: LSPKR

Terminated with 3.5mm mono plug



NEIM1031 mounting Stand.

Order code: 1031-STA

A fully adjustable stand for the NEIM1031. Holds the module in the optimum position.

Adaptors for connecting NES10-2 to equipment

Radio connector	Adaptor required	Order Number
6.35mm (1/4") mono socket	6.35mm mono plug - 3.5mm mono socket	ADP-P001
6.35mm (1/4") Stereo socket	6.35mm Stereo plug - 3.5mm mono socket	ADP-P002
3.5mm Jack Stereo socket	3.5mm Stereo plug - 3.5mm mono socket	ADP-P003
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
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

Headphone connector	Adaptor 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

1. The noise cancellation level DIP switch allows the user to select one 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. DIP switch settings are shown on the rear of the speaker (sse page 14 for more information).
2. The power-in socket allows the user to connect NES10-2 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, 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, 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 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 is muted.

5. Accessories

Optional Extras

The following items are available from bhi as optional extras. If you 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 at www.bhi-ltd.co.uk.

Power:

1030-UKPA	UK mains power adapter
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.

Audio Adaptors:

See tables on following page for details.

What is the fourth DIP switch for?

Nothing, it is reserved for future expansion.

What adjustments do I need to make during use?

None. Once the NES10-2 is set to your personal settings no further adjustments should be necessary.

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

No. The speakers should be used with linear supplies.

Sometimes I can hear watery noises.

When listening to high levels of noise, on high levels of processing the background may sound a little strange. This is normal operation as the DSP is removing the high levels of noise.

See FAQs on our website for further information.

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	- 2.5W rms max
Audio connection	- 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	- 200gms

2.4 NES10-2 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.

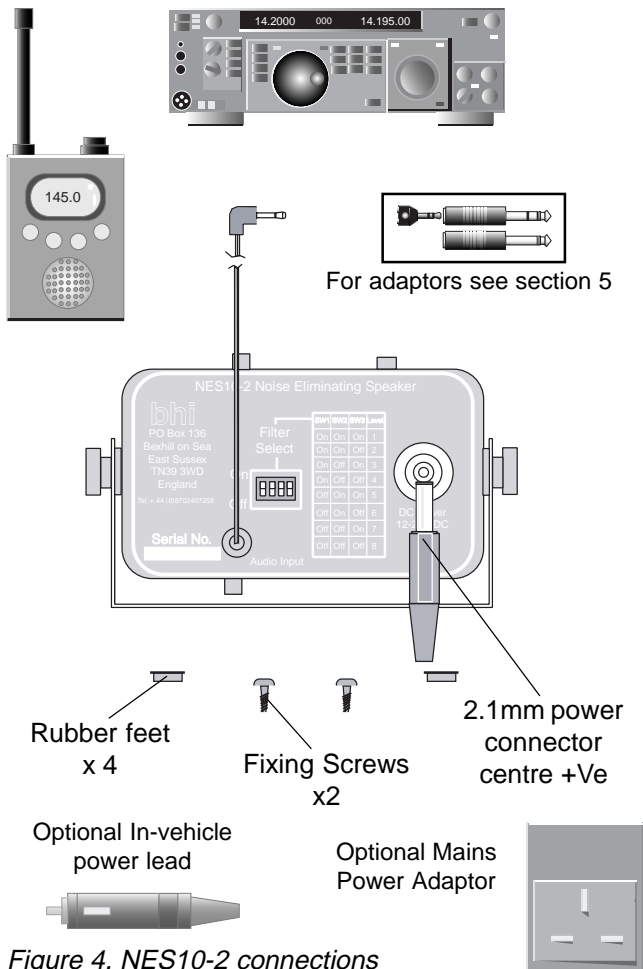


Figure 4. NES10-2 connections

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

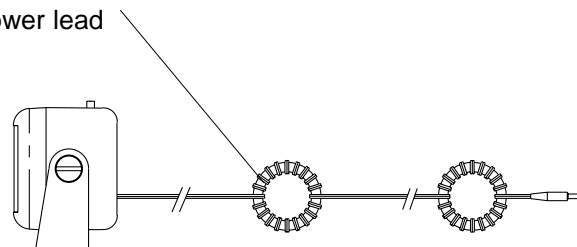


Figure 9. Additional power lead suppression.

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

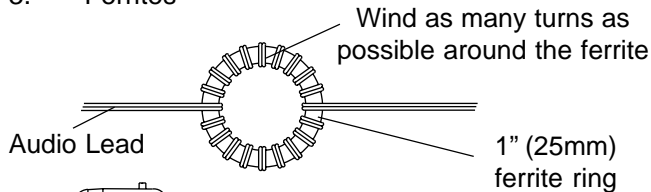


Figure 6. Audio lead

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

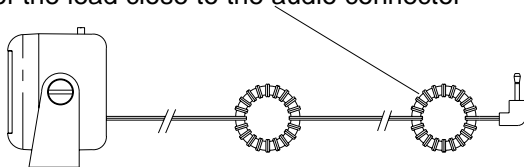


Figure 7. Audio lead

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.

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. (see section 5)

5. Set the noise cancellation level DIP switch to level 6 to start with using the table on the following page or on the label on the rear of the speaker for the correct switch setting. **Note: Switch 4 is NOT used.**

SW1	SW2	SW3	Level	Attenuation
ON	ON	ON	1	9dB
ON	ON	OFF	2	11dB
ON	OFF	ON	3	13dB
ON	OFF	OFF	4	15dB
OFF	ON	ON	5	17dB
OFF	ON	OFF	6	20dB
OFF	OFF	ON	7	24dB
OFF	OFF	OFF	8	35dB

Note:

The switches may be adjusted using a blunt implement such as ballpoint pen.

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 signal.

- With the noise cancellation switch in the off position, make sure that you have the sensitivity control on the NES10-2 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 another product that will work with these levels of signal , the NEIM1031 (Noise eliminating 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.

4. Troubleshooting/FAQs

Speaker doesn't work at all, no sound from the speaker:

- Check that the power connector on your power supply is suitable for the power socket on the speaker (2.1mm, centre positive).
- Check that you have switched your radio communication equipment on and that you have a signal for the speaker to process. To verify this, remove the audio connector from the external speaker socket on your equipment.
- Check that the LED on the front of the speaker is illuminated green, when the noise cancellation is on (NES10-2 only).

The speaker works but the noise cancellation doesn't appear to improve the audio quality of the signal:

- Check that the LED on the front of the NES10-2 changes from red to green when the noise cancellation is switched off and on (NES10-2 only).

Now switch the noise cancellation on, you should clearly hear the difference now.

3. NES-5

3.1 NES-5 Connections

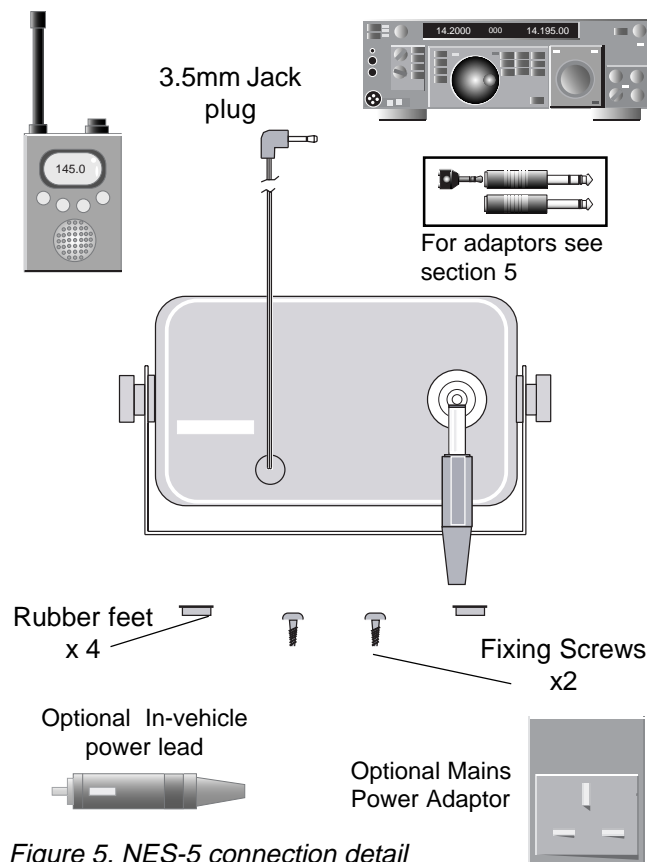


Figure 5. NES-5 connection detail

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.