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## NEIM 1031

### Noise Eliminating In-Line Module



1031-106D  
Issue E

## Important Information

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The NEIM1031 may be connected to audio recording equipment. The user is responsible for complying with any copyrights, or legislation regarding recording of material.

## 9. bhi Support

Every NEIM1031 noise eliminating module comes with a 12 month guarantee against defective materials and workmanship.

If you do have a problem then please refer to the troubleshooting guide (section 6). If you have not resolved your problem then please contact us.

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

- Your serial number (found on the back of the NEIM1031)
- Details of when and where you purchased the module

See our website for FAQs, otherwise most queries can be resolved over the telephone, if not we will arrange with you to have your NEIM1031 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 the back cover of this manual.

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

Note:

Opening the case will void the warranty. No user serviceable parts inside.

### 8.3 Adaptors for connecting NEIM1031 to other 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 mono socket	ADP-P006

### 8.4 Adaptors for connecting earphones/head phones to NEIM1031.

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

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## 1. Introduction.

The NEIM1031 In-line Noise Eliminating Module incorporates DSP technology to remove unwanted background noise and interference from speech.

It has 8 switchable levels of noise cancellation to allow the user to optimise the unit for their level of noise and interference.

The module has connections for high and low level audio signals.

The unit is designed to be easily connected into the audio path of noisy signals where the intelligibility and clarity of speech needs to be improved.

### Note:

The NEIM1031 is not designed to pass music.

## 2. Packing List.

The NEIM1031 is shipped with the following:

<i>Description</i>	<i>bhi Part No.</i>
■ Noise eliminating module	NEIM1031
■ Fused Power Lead	1030-FPL
■ Mono Audio lead 1.2M	ALD-001
■ Operating manual	1031-106D

## 8. Accessories

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 rear cover for contact details).

### 8.1 Power:

1030-UKPA	UK mains power adaptor
1030-EUPA	European power adaptor
1030-VEPL	Vehicle power adaptor
1030-VEPL6	6 metre long vehicle power lead
1030-2WVA	2 Way vehicle power adaptor

### 8.2 Audio:

1030-MOEP	Mono earpiece
1030-STHDP	Stereo headphones
1042	Switch box
LSPKR	20W Extension speaker
ALD-001 1.2m	3.5mm - 3.5mm mono lead
ALD-002 2.5m	3.5mm - 3.5mm mono lead
ALD-003 1.2m	Phono - phono lead mono lead
ALD-004 1.2m	3.5mm Stereo - 2 x phono lead



**LSPKR**  
20 Watt extension speaker for use with the NEIM1031. Fitted with a 3.5mm mono jack plug.



**1031-STA**  
Mounting stand for the NEIM1031. Allows the NEIM1031 to be adjusted for the most comfortable operating position.

DC power:	12-24 VDC 500mA
DC connector:	2.1mm power connector (centre +ve)
Size:	170 x 85 x 34mm
Weight:	265 gms

### 3. Connections.

All audio connections are at the rear of the unit. The headphone connection has been placed at the front of the unit for easy access.

As the audio signals are bypassed when the power is removed there is no need to disconnect the unit when not in use.

The diagram on the following page shows the position of all the connectors.

#### 3.1 Connector Description:

*Line In:* Phono socket.  
Low level audio input.

*Audio In:* 3.5mm mono jack socket.  
Speaker level input (for example an extension speaker socket).

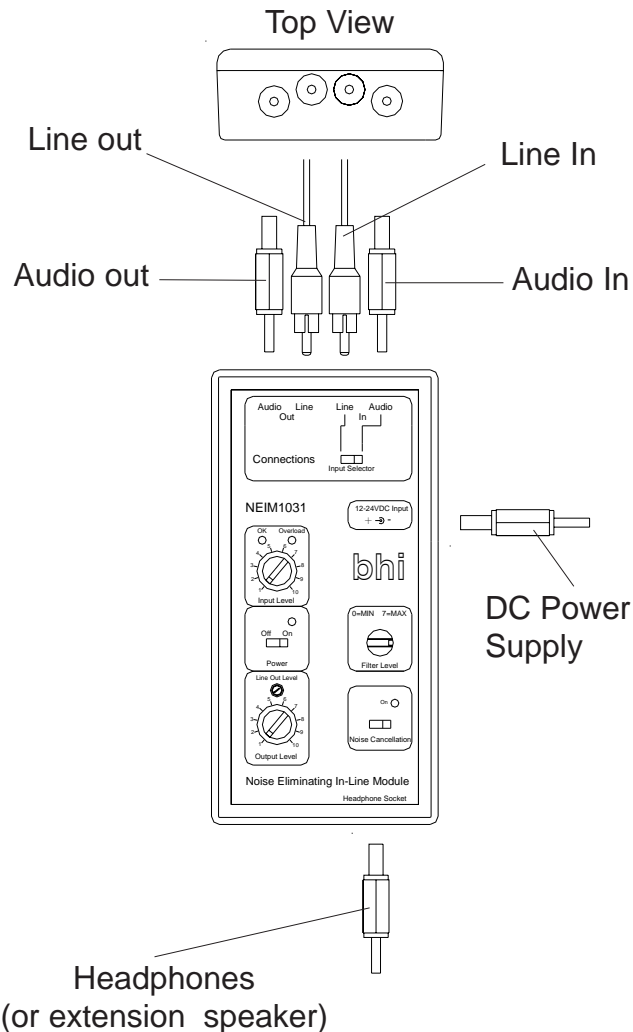
*DC Power:* 2.1mm power connector. Centre +Ve.  
12-24VDC 500mA Input.

*Headphone:* 3.5mm mono jack socket.  
Amplified output. This connection over rides the audio out socket. This socket may also be used to drive an extension speaker.

*Audio out:* 3.5mm mono jack socket  
Amplified output to drive an extension speaker. This socket is disabled when the headphone socket is used.

*Line out:* Phono socket  
 Low level audio out. For connection to an amplifier, recorder, or any other line level device.

### 3.2 Connector Layout.



## 7. Specifications.

Noise attenuation:	9 - 35dB
Noise attenuation levels	8
Level	Attenuation
1	9dB
2	11dB
3	13dB
4	15dB
5	17dB
6	20dB
7	24dB
8	35dB
Tone rejection	65dB max
Audio output power	2.5W RMS max.
Audio bandwidth	50Hz - 4.6KHz (-3dB)
Audio connections:	
Line level in/out	RCA phono
Audio in/out	3.5mm mono jack
Line input impedance	10K
Line output impedance	100R
Line in sensitivity	300mV - 2V rms
Headphone socket	3.5mm mono jack
Headphone power	2.5W rms max.

## 6. Troubleshooting/FAQs

### No audio output from extension speaker.

- Check the input selector switch is set to the correct input.
- Check the input level is correct, ie the green input LED is illuminated.
- Check output level.

### The noise cancellation does not appear to improve the quality of the audio signal.

- Check the noise cancellation is on, the green LED will be illuminated.
- Change the level of noise cancellation.
- Check the green power on/off LED is illuminated.

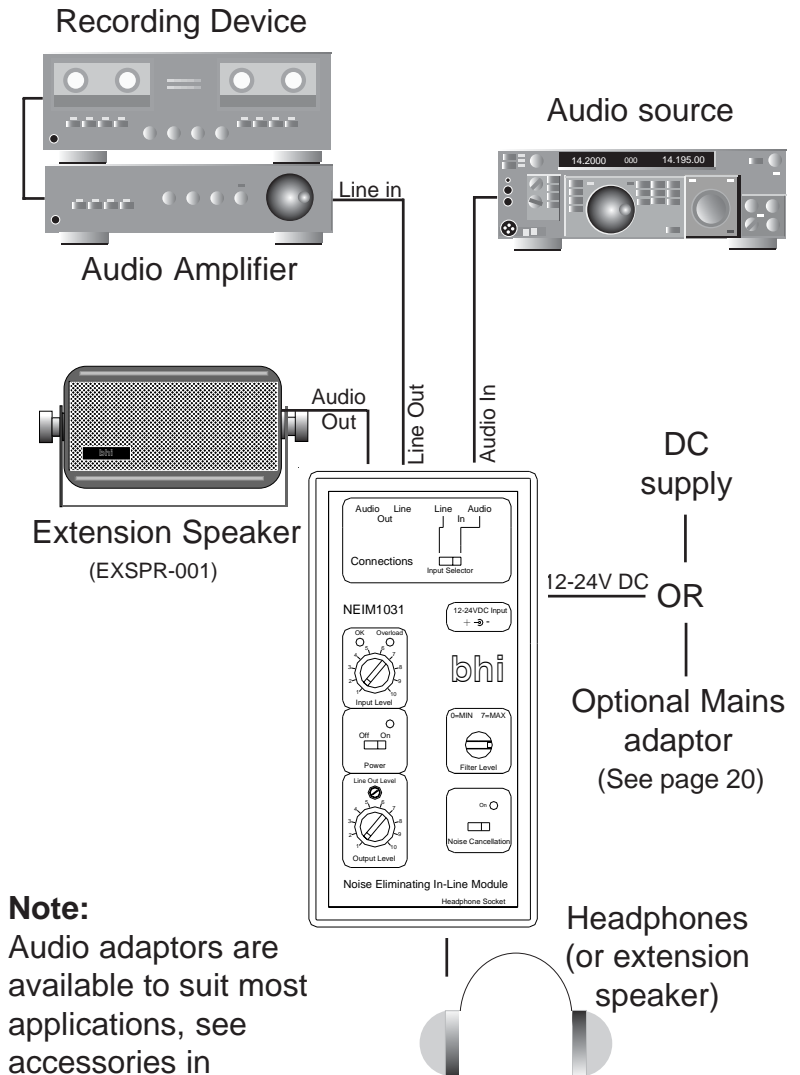
### Sometimes there is a short delay before the noise cancellation is active.

- 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.

### No audio output when the power is switched off.

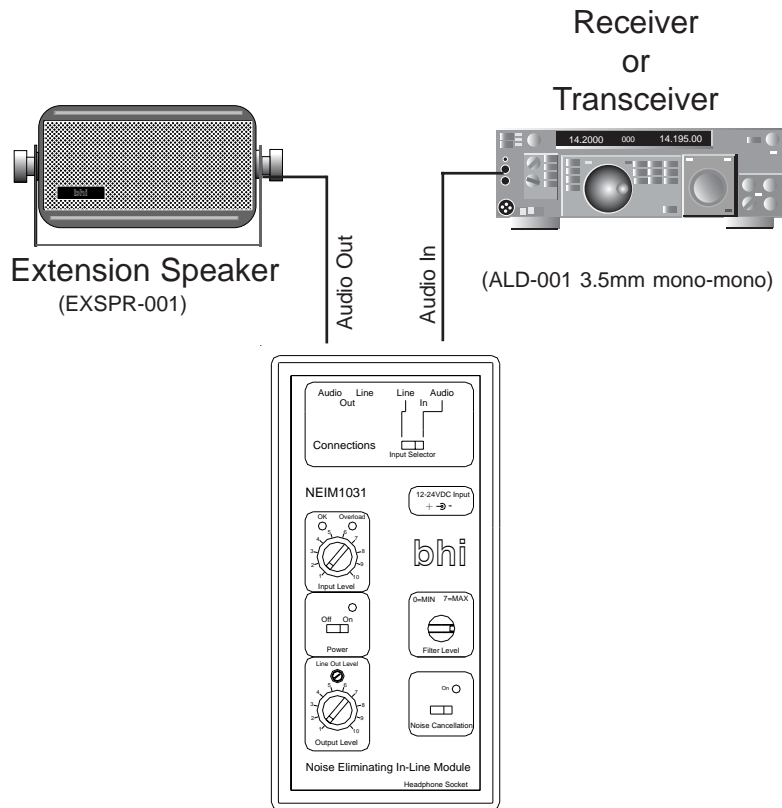
- When the power is removed the line in connects to line out, and audio in to audio out. If the input source is connected to the line input, and the output to the audio out, then no signal path will be present with no power.

## 3.3 Typical Connections.



### 3.4 Radio communications.

The following pages show typical applications and connections to the NEIM1031. For connection of headphones or extension speakers refer to the diagram on page 7. Numbers in brackets indicate bhi part numbers. These are available as optional extras - see accessory section.



The selected noise cancellation level can be seen in the small cutout on the switch knob.

Starting at level 0 switch the noise cancellation on, listen to a typical noisy signal. Adjust the level of noise cancellation to suit.

**Note:**

The higher levels of noise cancellation will remove virtually all the background noise, but the user will note the following possible effects if high levels of background noise are present.

- Voice has a slightly robotic sound.
- Background noise becomes a watery sound.

Switching off the noise cancellation will restore the audio to its original form.

If there is a lot of noise present on the audio signal it may be necessary to increase the output volume (or line level out) with the noise cancellation on.

**Note:**

Please note that if the volume is increased and the noise cancellation (or power) is switched off the resulting unprocessed signal will be at a higher level. Care must be taken to avoid excessive signal levels, as they may result in damage to hearing or equipment. bhi Ltd does not accept responsibility for damage to equipment or hearing however caused.



## 5. Setup.

### 5.1 Signal Levels.

Turn the input level, output level and line out level controls to the minimum - fully anticlockwise.

Connect to the equipment to suit your application as shown in section 3.

Switch off the NEIM1031, all signals will be connected straight through the unit. Switch on all the other equipment and select a typical audio signal to be processed.

If necessary adjust the output of the audio source to the desired level. If an extension speaker is being used, then set the level to a comfortable listening level.

Ensure noise cancellation is switched off, and the input selector switch set to the input being used.

Adjust the input level control on the NEIM1031 until the red overload LED just illuminates on the peaks of the audio signal. Reduce the input level slightly.

Adjust the output level control, to the desired level.

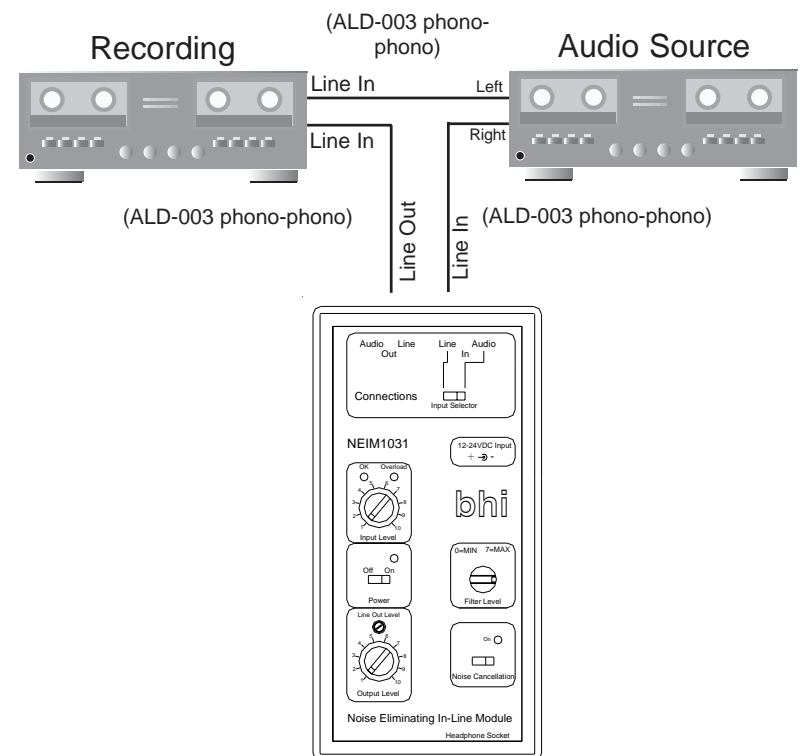
The module should now be transparent to the audio signal. Switching the module on and off, should not significantly alter the signal level.

### 5.2 Noise Cancellation.

The noise cancelling switch has 8 positions, starting at 0 through to 7. Level 0 is the minimum, and 7 the maximum. Switch positions 8 and 9 are not used.

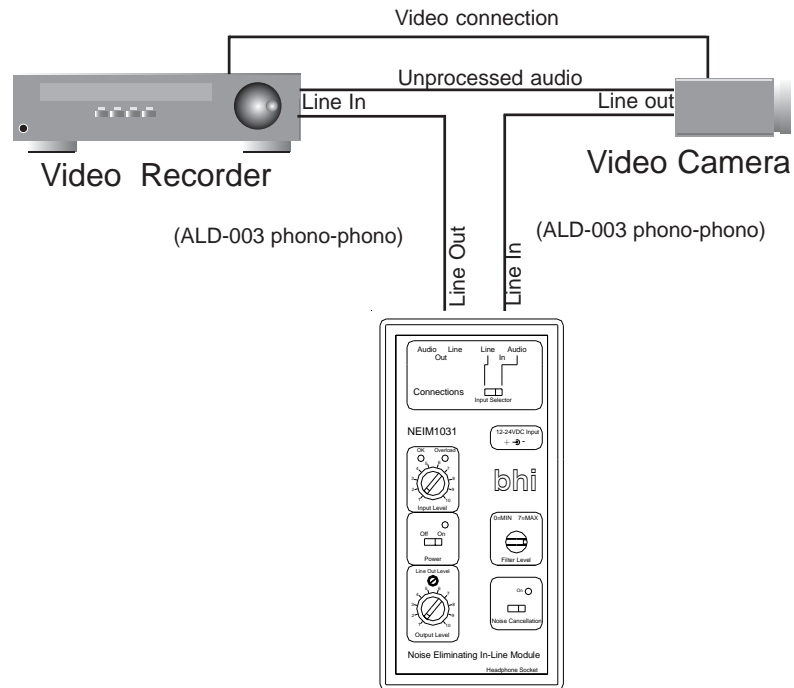
### 3.5 Audio restoration.

Connect the audio source and recording device as shown. If the source is monaural, one channel may be fed directly into the recorder to copy the unprocessed audio for comparison.



### 3.6 Surveillance/CCTV/Video.

Connection to video recording equipment (audio).  
 In this application the NEIM1031 is being used to remove the background noise being recorded from the video camera. Again in this application both the processed and raw audio are being recorded simultaneously.



In applications where the un- altered audio needs to be recorded. The raw signal can be recorded, and the cleaned audio is monitored using headphones, or an extension speaker.  
 This will record a true copy of the CCTV footage. The unit can then be used on playback to remove any noise.

### Power On/Off Switch:

Applies power to the NEIM1031. Switching off removes power to the circuit and connects all inputs to outputs. With the power off the line in connects to line out and audio in connects to audio out - with no amplification. This allows the unit to remain connected in circuit, even when it is not in use. There is no need to disconnect. In the event of a power failure to the NEIM1031, then the inputs and outputs will bypass, allowing continuation of signal.

### Power On/Off LED:

Indicates power on/off.

### Output Volume Control:

Adjusts the volume of the audio signal present at the audio out and headphone sockets. This does not alter the line out level.

### Line Out Level Control:

This preset control allows the line out signal from the NEIM1031 to be matched to the equipment connected to the unit. This level is not altered by the main output volume control.

Changes in either input will affect the line out level.

Irrespective of which input is selected, the noise cancellation is available on both the line and audio outputs (only while the unit is powered).

## 4.2 Control functions:

### *Input Selector Switch:*

Selects between line level input (phono connector) and high level input (jack socket). Both inputs may be connected at the same time. Only the selected input will be passed through the DSP circuit.

### *Filter Level Selector Switch:*

The 8 position rotary switch selects the amount of DSP processing. Level 0 is the minimum, and level 7 the maximum. The selected level can be seen in the small cutout in the switch knob.

### *Noise Cancellation LED:*

Indicates if noise cancellation is on/off.

### *Noise Cancellation On/Off Switch:*

Selects noise cancellation on/off.

### *Input Level Control:*

Sets the input level into the NEIM1031. This adjusts the audio signal level through the DSP for optimum performance.

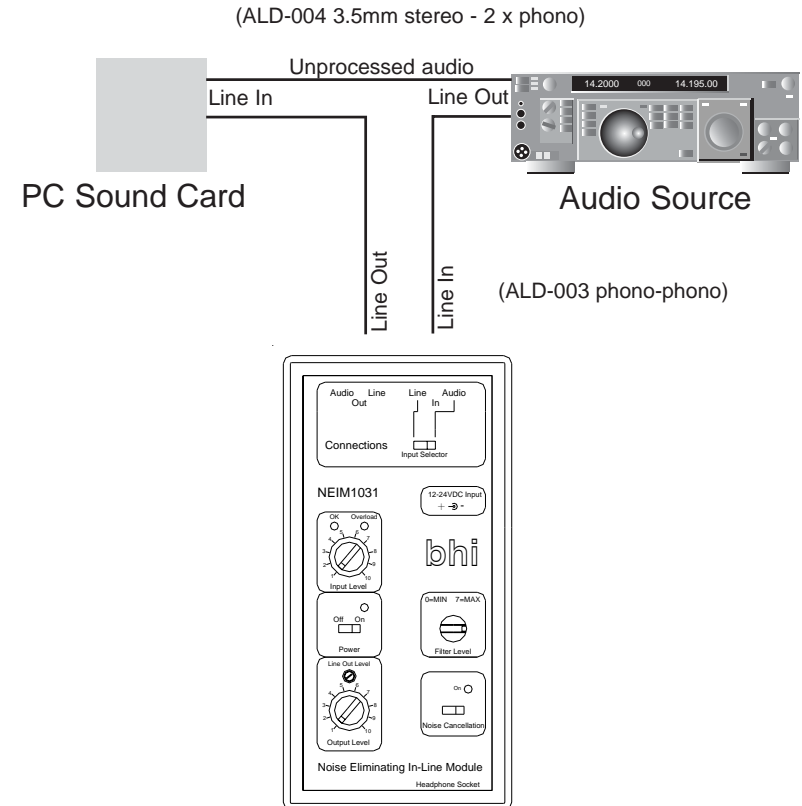
### *Input Level LEDs:*

These give a visual indication of the input signal level.

- No LED: Signal level too low
- Green LED: Signal level correct
- Red LED: Signal too high

## 3.7 Recording using a PC sound card.

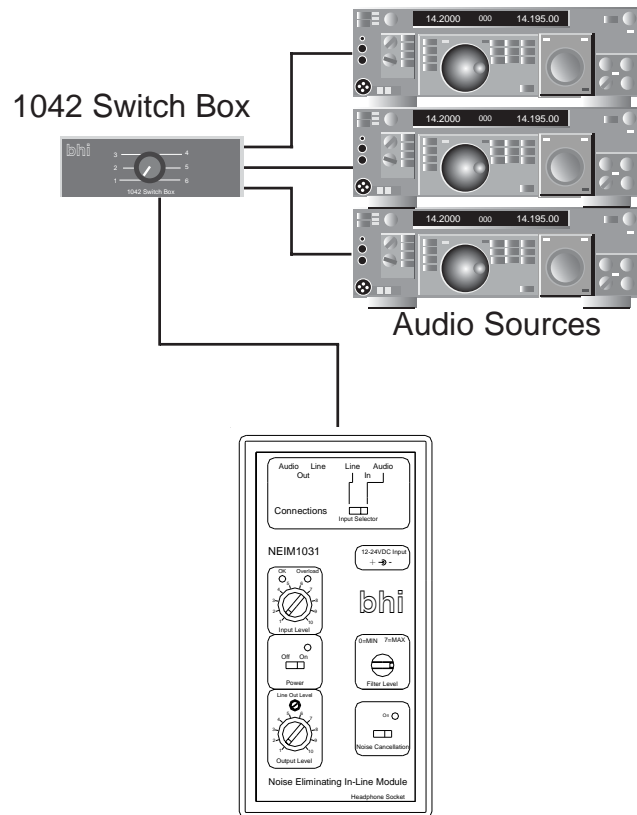
The sound capturing capability of the PC sound card may be used to record (or playback) audio signals.



For more detail on connection, setup and recording please refer to your PC/sound card manual.

### 3.8 Connecting several audio sources.

Using the bhi 1042 Switch Box it is possible to connect up to six separate audio sources to one NEIM1031. The 1042 switch box has 3 loaded inputs (for an extension speaker socket) and 3 unloaded for headphone socket connections. Please contact bhi for more information. Contact details can be found on the back cover of this booklet.



## 4. Controls.

### 4.1 Control layout.

The NEIM1031 Controls are identified in the following diagram and described on the following page.

