

bhi

bhi DESKTOP

Amplified DSP noise cancelling base station speaker

User Manual



bhi Ltd

DSP noise cancellation products for radio and voice communications

2067 Manual iss D

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1. Packing List

The bhi **DESKTOP** is shipped with the following items:

- **DESKTOP** DSP noise cancelling speaker
- 3.5mm mono plug audio lead terminated with 4mm banana plugs
- Speaker mounting bracket
- Fused DC power lead (1030-FPL with 2.1mm power plug centre +ve)
- User manual
- Customer feedback card

2. Introduction

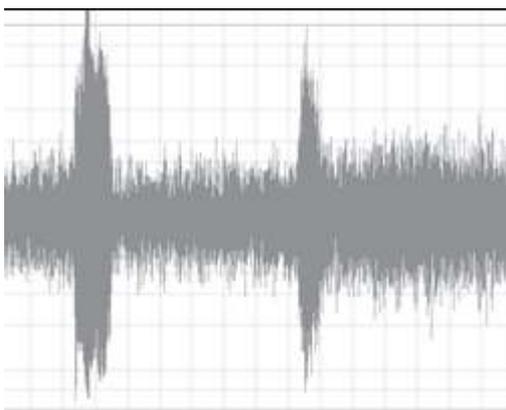
The bhi **DESKTOP** speaker is a microprocessor controlled amplified DSP noise cancelling base station speaker that removes noise and interference to improve the quality of speech in noisy radio and voice communications. It is suitable for use in base station applications where background noise and interference mean that you cannot clearly hear what is being said. The speaker will enable the user to listen and concentrate “**stress-free**”. Suitable applications where the speaker will be of great benefit are: amateur radio, two-way radios, HF radios, marine communications, scanners, taxi base stations etc. The **DESKTOP** speaker incorporates unique Digital Signal Processing technology (DSP) to remove the unwanted background noise and interference. The **DESKTOP** speaker has separate line level and speaker level inputs allowing it to be used with a wide range of radio and audio equipment including SDR radios. There is also a 3.5mm headphone socket on the side of the speaker and either mono or stereo headphones can be used.

The **DESKTOP** speaker comprises a 4” bass driver and a 1” tweeter unit, with an amplified bhi DSP noise cancelling unit capable of producing up to 10Watts audio (peak). The speaker requires an audio input signal of between 160mV and 1.6mV peak-to-peak for line level, and 350mV and 3.5V peak-to-peak for speaker level input, and requires a DC power supply of between 12 and 18 Volts (2.5A peak). The unit is supplied with a quality moulded 3.5mm mono jack plug lead terminated with 4mm banana plugs, a 2.1mm fused DC power lead and a user manual. Accessories are available see section 10.

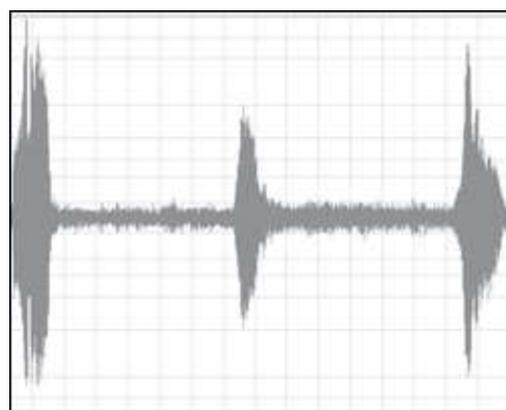
Note: The speaker is mainly designed for speech signals and is not really suitable for music.

3. bhi DSP Noise Cancellation

The bhi DSP processes the incoming signal and differentiates the speech from the noise. The unwanted noise and interference is then attenuated to leave only the speech. The following diagrams are taken from actual audio signals and illustrate how the signal is processed.



Original signal.
Speech with a lot of background noise



Processed speech.
Speech with reduced noise

4. Installation

The speaker is supplied with a mounting bracket that can be left on in case of permanent fixing, or removed altogether depending on personal choice.

Connections to your radio equipment can be made via audio sockets on the rear of the speaker, using either the speaker level terminals (audio lead supplied), or the 3.5mm stereo line level socket (audio lead not supplied).

Set the volume on your radio or audio source to the normal listening level prior to using the **DESKTOP** speaker.

Connect the audio lead to your radio, and then connect the other end to the relevant input connection on the rear of the **DESKTOP** speaker.

Connect the 1030-FPL fused DC power lead supplied to a power supply capable of providing 12 - 18VDC @ 2A (2.5A peak), or connect a suitable DC power supply. The centre pin of the 2.1mm power connector is positive, and the red lead or the black lead with the white stripe is positive.

DESKTOP controls:



5. Speaker Operation

Once installed and connected, switch the power on. The LED behind the grille will illuminate either green or red, and a rising audio tone will be heard. You should hear audio through the speaker now. Turning the “Volume” control clockwise or anticlockwise will increase or decrease the volume level, at the same time you will hear a low frequency audio sound through the speaker when the volume control is turned. The volume of this audio “blip” sound will vary as you rotate the volume level control knob. Subsequent presses of the “Volume” control knob will turn the speaker on and off. When switching back on the speaker will go to the last stored setting when switched off.

Pressing the filter level control knob switches the DSP noise cancelling filter on and off, a red LED indicates filter off, and a green LED filter on. The filter level is simply changed by turning the filter level control knob clockwise or anticlockwise. There are 8 filter levels indicated by 8 different frequency tones. The lowest tone indicates the lowest filter level and the highest tone indicates the maximum filter level. You can easily adjust the filter level to suit your current operating conditions.

Note: If the power is on and the DSP is switched off (red LED), the audio passes through the DSP filter, but without any signal processing.

6. Speaker Tone Level Volume Adjustment

There are four volume level settings for the audible speaker tones; off, low, medium and high. To change the tone volume level to your preferred setting, press and hold the volume control until you hear an audible tone and the LED flashes continuously. Release the volume control to select the current level, otherwise press and hold the volume knob again until you hear the next tone. (Note that with the audio tone in position off, only the LED will flash when the volume control is pressed).

7. Sleep Mode

The **DESKTOP** speaker has a built in sleep mode feature whereby it will be put into standby mode when there is no signal present after approx 60 minutes. This is indicated by falling tones. In this mode the speaker only draws a small amount of current (approx 10mA). The speaker will be woken up if a signal is received whilst in sleep mode. This is indicated by rising tones. If the speaker is switched off manually by pressing the volume control knob momentarily with power still applied, the sleep mode is inactive and to wake the speaker up in this instance, press the volume control knob again and the speaker will switch on, with the last known settings restored.

The sleep mode function can be turned off and on by pressing and holding the filter level control knob for approx 4 seconds. Falling tones indicate that the sleep mode is enabled, and rising tones indicate that the sleep mode is disabled.

8. Input Overload

The **DESKTOP** has audio input overload protection for both the line level and speaker level inputs. If the signal peaks go over the limits set out in the specification, the LED will change red and flash 3 times. If the audio level is constantly above the overload

threshold, the red LED will flash continuously. Reducing the audio input level will bring the speaker back in to normal operation.

9. Specification

DC Power

Connector type	2.1mm DC power jack (centre positive)
Input voltage	12 to 18 Volts DC
Input current	10mA standby (typical) 125mA active (no signal) 2.5A peak

Line Level Audio Input

Connector type	3.5mm Mono or Stereo line level
Input voltage range	160mV to 1.6mV pk-pk
Input impedance	10k Ω (\pm 2k Ω) nominal

Speaker Level Audio Input

Connector type	2 x 4mm socket/screw binding posts (mono)
Input voltage range	350mV to 3.5V pk-pk
Input impedance	8 Ω (\pm 2 Ω) nominal
Input power rating	1.5W max

Audio Output

Speaker Output power	10W peak (supply voltage of 18V)
Bandwidth	50Hz to 4.3kHz
Volume levels	16 levels (3dB steps)
Headphone output	3.5mm mono or stereo (8 to 64 Ohms)

DSP Noise Cancellation

Levels	8 levels + off
Noise reduction	9dB to 35dB
Tone reduction	4dB to 65dB

Indications

Status LED	Multicolour LED (red, amber, green).
Audio tones	Power-up, power-down, DSP level, volume and memory store.

Controls

Power/Volume	Digital rotary encoder with push function
DSP level	Digital rotary encoder with push function

Physical

Weight (packed)	1.90kg
Dimensions	200(H) x 150(D) x 160(W) mm

10. Accessories:

PSU12-2A-WW 12V 2A DC world-wide mains plug-in power supply, with centre +ve 2.1mm DC output connector. This power supply is high quality and very reliable. It has built in Short, over voltage & over current and over temperature protection.



Order code ALD-007 3.5mm stereo plug to 3.5mm stereo plug lead 1.2m long, for use with line level input.

Order code ALD-008 3.5mm stereo plug to 3.5mm stereo plug lead 3m long, for use with line level input.

Order code: DESKTOP_FEET - Set of 3 Rubber feet for the DESKTOP speaker (2 x 16mm and 1 x 6mm). 16mm feet fit next to the front plastic feet and the 6mm fits onto the metal bracket.



Order code: A-DESKTOP_ACBL – Replacement audio lead 3.5mm mono plug to 2 x 4mm banana plug 1.2 M long.

Order code: ALD-009 - 3.5mm stereo plug to 3.5mm mono socket (Elecraft stereo to mono audio lead, tip only connected).

11. 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 **DESKTOP** Power LED is on.

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

- Check that the filter is switched on (green or orange LED).
- Increase the filter level to see if this makes a difference.
- Increase the volume on the audio source.

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

- The red and black inputs terminals are designed to work with speaker level signals. Try using the line level input socket using a 3.5mm mono or stereo plug to plug lead (ALD-001 or ALD-007).

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 you the opportunity to check that the DSP is not taking out any detail from the signal.

Sometimes I can hear a processing sound in the speakers when no signal is present:

- This is caused by the DSP processor and is normal. When a signal is applied you should not be able to hear this in the speaker.

I can hear speech/sounds in the speaker when I transmit:

- The DESKTOP has been designed to minimise against the effects of stray RF. If you do hear speech or sounds in the speaker on transmit this is probably due to increased levels of RF in your station or an earth loop issue. Follow best practice and carry out the standard checks on your setup. Check for earth problems and ground loops. Make sure that the audio leads and the fused DC power lead are routed away from sources of electronic interference or RF cables. Using a separate 12V DC power supply usually solves this problem. Fit ferrites to the power cables and audio leads as outlined on the bhi website FAQ page (<http://www.bhi-ltd.com/index.php/support/faq.html>).
- Purchase one of our GroundBreaker audio isolation units. <https://www.bhi-ltd.com/noise-cancelling/accessories/groundbreaker.html>. These small passive units connect to the extension speaker unit of your radio or receiver and your DESKTOP plugs into the Ground Breaker unit. It will isolate the audio and remove any ground loops and should reduce the chance of RFI getting in to the audio path.

12.bhi Support

Every DESKTOP noise eliminating speaker comes with a 12 month guarantee against defective materials and workmanship. If you have a problem please refer to the troubleshooting guide (section 11). If this doesn't resolve your problem contact us. Also see our website FAQs for answers to other common questions, otherwise most queries can be resolved over the telephone. If you have any suggestions for improvements or wish to be informed about new products please complete and return the customer feedback form.

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.

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