

## **Owner's Reference**

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Owner's Reference Humbuster III

#### Instructions for use



#### Humbuster III

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Introduction i

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#### Introduction

Owner's Reference Humbuster III

Important Safety Instructions



Read these instructions Heed all warnings Follow all instructions

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WARNING. TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPARATUS TO TO RAIN OR MOISTURE.

Clean only with a dry cloth.

Do not place flammable material on top of or beneath the component.

All PS Audio components require adequate ventilation at all times during operation. Rack mounting is acceptable where appropriate.

Do not remove or bypass the ground pin on the end of the AC cord unless absolutely necessary to reduce hum from ground loops of connected equipment. This may cause RFI (radio frequency interference) to be induced into your playback setup. Removing or bypassing the ground pin on any electrical component is potentially dangerous and should be avoided for safety reasons. A polarized plug has two blades, one wider than the other. A grounding type plug has two blades and a third grounding prong. All PS products ship with a grounding type plug. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus. Unplug this apparatus during lightning storms or when unused for long periods of time.

When making connections to this or any other component, make sure all components are off. Turn off all systems' power before connecting the PS Audio component to any other component. Make sure all cable terminations are of the highest quality.

There are no fuses inside this product.

THERE ARE NO USER-SERVICEABLE PARTS INSIDE ANY PS AUDIO PRODUCT. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL

Please contact your authorized dealer, distributor, or PS Audio if you have any questions not addressed in this reference manual.

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The lightning flash with arrow head within a triangle is intended to tell the user that parts inside the product are a risk of electric shock to persons.



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Introduction ii

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#### Introduction

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	Thank you for your purchase of the PS Audio Humbuster III.
What will it do?	The Humbuster is designed to block DC voltage on the AC line. DC voltage on the AC line can cause mechanical hum to appear in your equipment. Mechanical hum is described as being that noise generated by the power transformer inside a piece of AV equipment.
	The Humbuster will have little effect on hum and noise heard through the loudspeaker or headphones. In some instances, it is possible that the reduction of mechanical noise in the unit's internal transformer may reduce the magnetic field of the transformer and thereby reduce hum heard through a loudspeaker.
DC Voltages	All AC power lines have a small component of DC (battery type voltage) on the line. Typically this DC is held to a very low level and causes only a few problems. However, many homes AC performance is not "typical" and this DC component can be quite high. In fact, it's high enough to cause an asymmetry that "pushes" the voltage in the transformer in one direction and partially saturates the core of the transformer, causing it to buzz. In addition to buzzing noises, the transformer is also at a performance disadvantage because its core is not working properly.
Transformers	Transformers work best when there is absolutely zero DC presented to them. This is because transformers are AC devices, not DC devices. Transformers need to change the direction of their magnetic fields multiple times per second in order to function properly. When there's DC on the line, it forces the transformer to stay polarized in one direction and this make the transformer a little crazy - and it hums and complains in response.
How it works	The Humbuster removes the DC component from the AC line and either stops or significantly reduces the buzz and vibrations caused by DC. How effective the HB-III is depends on just how much DC there is on the line and what the quality of the transformer inside your unit is.
	Humbusters work by placing a simple network of power rectifiers and power capacitors in an arrangement that removes the direct coupling at the AC's zero crossing point. This blocks the DC from coming through. Then, just a volt or so above and below the zero cross point, we direct couple the AC signal back again. It's simple, yet effective.

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# **Getting Started**

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Location	Once your new HB-III is unpacked, you'll need to find a convenient place to set it.
	There are several ways to mount the HB-III, on a rack shelf, on the floor behind an equipment or rack shelf, mounted to a wall or ceiling using the optional wall mount kit.
Heat	The HB-III can generate some heat. This is normal if the HB-III is required to power a large amplifier or projector. Caution should be taken to keep the HB-III in a well ventilated area if it is going to be used on a large current draw piece of equipment such as a power amplifier.
Cautions	If the HB-III is to be placed on the floor or carpet, make sure the unit is not going to come in contact with water or cleaning solvents.
Isolation	The HB-III can benefit from aftermarket isolation devices such as cones, spikes and Sorbothane pads.
Power Cables	Once you have chosen the location for the HB-III you can use the supplied AC power cord to connect it to the AC wall receptacle or you can use an aftermarket power cord and receptacle.
	We strongly recommend the use of a PS Audio xStream AC power cable and a PS Power Port AC receptacle to feed the HB-III power. While the supplied power cable is adequate for the task it is not going to provide the best performance. Choosing any xStream power cable will make a significant performance improvement over the stock PS supplied power cable.
Multiple Units	We recommend one HB-III for each piece of equipment that is producing internal mechanical hum if possible. While it is perfectly acceptable to run multiple pieces of source equipment from a single HB-III it is recommended that larger power draw equipment, such as a power amplifier, be limited to its own HB-III for power.
Using with another power conditioner	If you are using additional power conditioning equipment, such as a PS Audio Duet, it is recommended that the HB-III be placed before the Duet/Quintet.
	If the additional power conditioning products used are a Power Plant, balanced transformer, or multiple outlet surge protectors, it is recommended the HB-III 1 be placed after these devices.
	The exception to this suggestion is if you are trying to lower or eliminate the internal transformer noise of the power conditioning device itself. In this case, you will need a Humbuster before the power conditioner to reduce or eliminate the noise internal to the conditioner.

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Getting Started 1

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## Quick Start Guide

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Turn off	Turn off the unit you are going to power with the HB-III. We recommend turning all equipment in the system off or to standby mode when powering down the unit you wish to power with the HB-III.
Remove the power cord	Remove the power cord that was powering your AV unit from its power source. The power source could be a wall AC receptacle, the output of a power conditioner, surge and spike protector or a Power Plant AC regenerator.
	Plug the HB-III into the power source using the AC power cable you selected. It is advisable to use as short a power cable as possible to the HB-III. We do not recommend plugging the HB-III into an extension strip or plug extender unless it is of the highest quality and heavy duty design, such as the PS Audio Juice Bar or device with similar properties.
Conditioners	Once the HB-III has been connected to the power source, make sure that power source is energized and providing AC power to the HB-III. If you are using a Power Plant Premier, only use the HB-III on the AC input to the Premier; never use the HB-III on the output of the Power Plant Premier.
Avoid switched outlets	If you are using an AC wall receptacle to power the HB-III, make sure the AC receptacle is not a switched outlet. Switched outlets are those outlets that can be turned on/off with the wall switch. It is advisable to leave the HB-III powered at all times.
Connect your equipment	Once the HB-III has been powered, plug your AV equipment into the AC receptacle of the HB-III. Make sure to use a high quality aftermarket AC power cable to power your equipment from the HB-III. It is important to note that the AC power cable is a critical link in the chain and great care should be taken to ensure only the best non-restrictive AC power cable is used to power both the HB-III and your AV equipment.
	Turn your equipment back on. Make sure everything is powered up properly with the HB-III between the AC receptacle and your AV equipment.
	You should notice decreased mechanical internal hum from your powered AV equipment.
Multiple units	We recommend on any use of a power amplifier that only one HB-III be used. Small to medium power amplifiers can share on HB-III, but for larger power amplifiers it is strongly recommended you use separate HB-III's.
Heat generation	HB-III can generate heat. If you are powering a large wattage power amplifier or projector, the HB- III can produce heat and the chassis of the HB-III can get quite warm. This is normal and to be expected under these conditions.
	Very large amplifiers such as tube amps and class A amps can draw a lot of power and the Humbuster may get hot to the touch. This is normal.

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# **Eliminating Noise**

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First determine what type of hum you have	Every audio/video system has some degree of either audible or visual hum or buzz. If your system has some of these noises, and they are at a level that is noticeable or bothersome to you, there are a few things you can do to fix these problems.
	Sometimes hums and buzzes are quite obvious, sometimes not. The 'hum noise' usually comes in two flavors, a low non-irritating drone (50 or 60 Hz) or a slightly higher pitched buzz or raspy/irritating 'angry insect' sound (100 or 120 Hz). Video hum is usually seen as diagonal bars across the TV or screen of a projector.
Electrical or mechanical?	If your system has a bit of hum, is it the transformer or the speakers, or both? How do you determine the source of hum and what can you do about it?
	We first need to divide our search into two categories; mechanical or electrically induced hum.
Mechanical	A mechanically induced hum or buzz is easy to determine. Place your ear very near to each piece of your electrical equipment and listen for hum and buzz. If you hear a hum emanating from within your equipment, we would refer to this as mechanically induced noise (as opposed to an electrically induced noise).
	The HB-III should lower or eliminate this internal mechanical hum.
	To see if it is an electrical problem, make sure your system has been on and warmed up for at least 10 minutes, then simply place your ear near the loudspeaker (with no music playing) and listen to determine if the hum or buzz is coming from your speaker. If it is, then at least one component of your problem is electrical.
Electrical	Electrical noises are usually caused by one of two main problems: proximity or ground loops. Proximity hums can be identified by listening to the speaker for a low humming sound and electrical ground loops can typically be identified by a raspy buzzing sound.
Proximity	Proximity refers to how close one piece of equipment is to another. Since transformers work by generating magnetic fields, these fields can be rather large and if the field gets too close to another audio or video product, noise (hum) can be induced into the product from the transformer. This type of sensitivity is typically restricted to high gain pieces of equipment like phono stages, but even preamplifiers sitting in close proximity to a power amplifier can have hum induced into it.
	Solving proximity problems is relatively easy: simply move the equipment further apart.
Ground loops	Ground loops hums are perhaps the most difficult to track down. Ground loops are a result of differing ground potentials. This means that the ground of one AC source is at a different level than the ground of another AC source. This difference is usually amplified in the form of audible or visible hum. Visible hum is usually seen as diagonal bars across the video screen.

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## **Eliminating Noise**

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Tracking down ground loop hum

Tracking ground loop types of hums down is more difficult and below we have assembled some helpful tips. At the end of the day it may make more sense to speak with your dealer for help. The easiest way to figure out where ground loop problems lie is by the process of elimination. You need to determine where the hum or buzz is coming from within your system. If it's a video hum problem, use a known good source like a DVD player rather than cable or satellite. In video, it's best to always assume that it's either a connection problem or, more likely, a cable problem. Our experience has shown that poorly shielded video cables cause more hum problems than just about anything else.

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Start with the power amplifier or receiver proximity

In an audio environment, the first suspect in the hunt would be the power amp or the receiver that is driving the loudspeaker. To see if the power amp or the receiver is the culprit, turn them off, disconnect its inputs and turn it back on again. Go back to the speaker and place your ear in close proximity to see if the hum is still there. If it is, then you have a problem with your power amp or receiver and you should seek help from its manufacturer.

Move down the chain

Try each input

Cable TV can be

a culprit

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1. If the hum/buzz goes away when you remove the inputs to the power amp, your next step will be to reconnect the amp and move further down the chain. If you have a preamp, processor that is feeding the power amp, your next step would be to disconnect all inputs to the preamplifier or processor. Once these are disconnected, and the preamp or processor is connected only to the power amplifier, turn the system on and again, listen for hum. Should the hum now appear, it is a problem with your preamp or processor or their interaction with the power amp. Before returning the preamp or processor to the manufacturer, try a cheater plug to break a ground loop. Cheater plugs are simple devices that convert a three prong AC plug into a two prong AC plug and in the act of converting three prongs, to two prongs, they disconnect the ground from the wall socket. Try one of these on the preamp, or the power amp, or both. The same is true for a receiver or integrated as they have the preamp built in to the amplifier.

- If you determine that there is still no hum present when the preamp, processor or receiver is connected with no inputs, then selectively begin plugging in your various inputs one at a time. After each connection, check for hum until you discover the humming culprit.
  - 3. VCR's, surround processors, and any device that is connected to a television cable or satellite dish can cause a loud buzz and should always be suspect. If, by the process of elimination described above, you determine it is a component like a VCR that is causing the hum/buzz to occur, and using a cheater plug or removing the ground pin on a PS xStream Power Cable doesn't help matters, it may be necessary to isolate the cable connection (CATV) with an isolation transformer. This inexpensive device is available at most Wal Mart, Radio Shack or department store type outlets and is sometimes called a 'matching transformer'. If you have problems finding one, call your local cable TV company for advice. The matching transformer will be placed between the cable TV input and the VCR, TV or processor.

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## **Eliminating Noise**

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Just remember, take the system down to its simplest level of connection. Find a way to hook the system up with as many pieces of the system missing or not connected. Keep it simple and get it to the point where the hum's gone. Then start adding back components one at a time until the hum returns.

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The cables can themselves need to be checked Cables can You might fi piece of gea cables.

Cables can be a big problem. Many audio cables and video cables are not well shielded. You might find that the hum is isolated to a certain piece of gear in the chain, but later discover any piece of gear placed in that input is subject to hum. This can usually be narrowed down to bad cables.

Make sure the cables you use are properly shielded. PS Audio manufacturers an excellent line of audio and video cables that are well shielded and will cause no problems when used in an AV system.

Finding the problem is 9/10th of the work in finding a solution.

Good luck and call us if you need help or use our web site's automated Humbuster section. http://www.psaudio.com

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#### **Questions And Answers**

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Should the unit be on all the time?	The Humbuster III is best left powered on at all times. The current draw is negligible and keeping it powered on will make sure the internal AC capacitors inside the unit stay working properly.
	There is no harm in leaving the unit on at all times as the lifespan of the HB-III will be unaffected by leaving it on.
Are there any internal fuses?	There are no internal fuses or any components on the inside of the HB-III that are user serviceable. The components inside the HB-III have lethal voltages when powered and even when unpowered. Capacitors inside the HB-III can retain an electrical charge after the unit has been powered down. Do not attempt to get inside the unit for any reason. Should the HB-III cease to function, contact your dealer or PS Audio's service center for help.
Is it normal that the unit gets hot?	The Humbuster will generate heat under some conditions. Those conditions are when a lot of power is being passed through the HB-III. The HB-III can handle loads drawing up to 15A on an intermittent basis, like that of a high power amplifier playing music. The voltage drop of the internal diodes causes heat to be dissipated under load. The greater the load the greater the heat. Large power amplifiers, projectors and anything using a lot of power may cause the HB-III to produce heat. This is entirely normal.
Is the AC receptacle important?	The AC receptacle is a critical link in the electrical chain. If you are using a standard AC wall receptacle to power your equipment, we would recommend the use of a Power Port AC receptacle, a hospital grade AC receptacle or at the minimum a high quality spec grade receptacle, like the one on the HB-III itself. The connection between the wall AC receptacle and your equipment can be a critical link in the success of your equipment's performance.
Placement?	Placement of the HB-III is not critical. It may be wall mounted using our optional wall mount plate assembly. Contact your dealer, distributor or PS Audio for details on purchasing the wall or ceiling mount kit.
	Placement with respect to other equipment can be important. In general, place the HB-III between the unit you are powering and the AC source. If you are using a Power Plant Premier, place the HB-III between the AC wall plug and the input of the Premier. Never use the HB-III on the output of the premier.
Isolation?	Isolation through the use of spikes, cones or Sorbothane feet is recommended for the HB-III if space and budget allows. Isolation of any piece of high-end stereo and theater equipment is always recommended wherever practical.
Multiple HB-III?	Using multiple HB-III's in series with each other will increase the level of hum reduction due to DC on the line. However, we do not recommend the use of multiple HB-III devices as DC levels on the AC line high enough to go beyond the 1 volt capability of the HB-III are problematic and should be looked at by an electrician.

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Questions and Answers 6

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#### **Questions And Answers**

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How can I measure the DC voltage on the AC line accurately? it is very difficult to measure the DC offset on the power line. Most meters will not do it accurately. On a typical Fluke meter, the input circuits would have to be set to accomodate the full waveform, so there is no clipping on the input stage. So for 120VAC, the meter would have to be on the 200V scale. (169V peak on the sine wave) Most 3-1/2 digit meters are limited to 0.1V resolution on this scale. Also the meter specs usually say the last digit can always be off by one. So, unless there is more than 200mV of DC, the result you measure is pretty meaningless. If you allow the meter to go to the 200mV DC scale, then the input stages are being driven into clipping most of the time, and again the reading is meaningless. (it doesn't tell you that... it will give you a number) A 4-1/2 digit meter will start to give meaningful data, but it wouldn't be accurate.

What voltages can I run the HB-III on and how much power will it handle?

Is the HB-III current limiting?

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You can operate the HB-III on any AC line voltage or frequency your country has to offer. The HB-III is rated for a maximum of 2200 watts at any voltage from 90 VAC to 240 VAC.

The HB-III is non-current limiting and may be used with any sized power amplifier, projector or source equipment in you system. It is recommended the HB-III be used separately if the load is a big one, such as a large power amplifier or projector. Multiple source equipment may be connected to a single HB-III if desired.

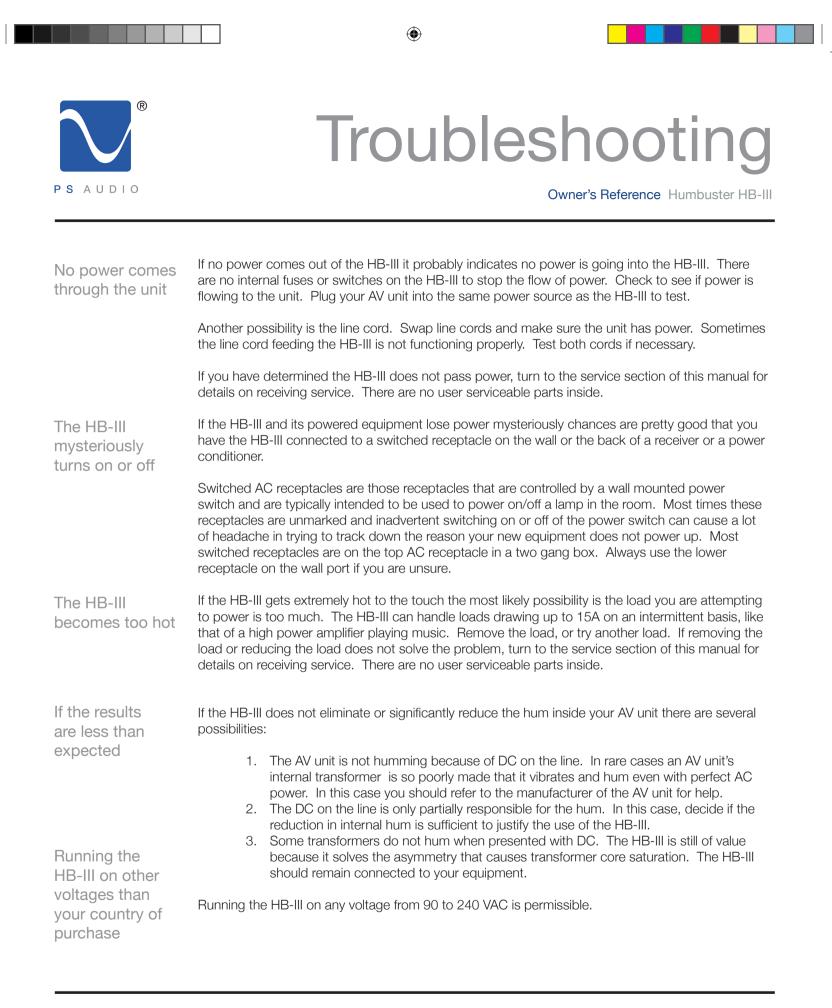
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**Troubleshooting 8** 

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## Warranty

Owner's Reference Humbuster HB-III

TERMS AND CONDITIONS	PS Audio warrants the product designated herein to be free of manufacturing defects in material and workmanship, subject to the following conditions, for a period of three (3) years from the date of purchase by the original purchaser or date of shipment to the authorized PS Audio dealer, whichever comes first.
Conditions	This Warranty is subject to the following conditions and limitations: the Warranty is void and inapplicable if the product has been used or handled other than in accordance with the instructions in the owner's manual, abused, or misused, damaged by accident or neglect or in being transported, or the defect is due to the product being repaired or tampered with by anyone other than PS Audio or an authorized PS Audio repair center.
	a. The product must be packaged and returned to PS Audio or an authorized PS Audio repair center by the customer at his or her sole expense in the original packing material. PS Audio will pay return freight of its choice for original purchasers.
	b. Return Authorization Number (RA Number) is required before any product is returned to our factory for any reason. This number must be visible on the exterior of the shipping container for PS Audio to accept the return. Units shipped to us without a Return Authorization Number or without a visible RA Number on the exterior of the shipping container will be returned to the sender, freight collect.
	c. RETURNED PRODUCT MUST BE ACCOMPANIED BY A WRITTEN DESCRIPTION OF THE DEFECT.
	PS Audio reserves the right to modify the design of any product without obligation to purchasers of previously manufactured products and to change the prices or specifications of any product without notice or obligation to any person.
Remedy	In the event the product fails to meet this Warranty and the above conditions have been met, the purchaser's sole remedy under this Limited Warranty shall be to return the product to PS Audio or an authorized PS Audio repair center where the defect will be repaired without charge for parts or labor.
Transfer of Warranty	This Warranty is for the benefit of the original purchaser of the covered product and may be transferred to a subsequent purchaser of the product.

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**Owner's Reference** Humbuster HB-III

Miscellaneous This warranty does not cover the cost of custom installation, customer instruction, setup adjustments or signal reception problems. This warranty does not cover cosmetic damage or any damage due to accident, misuse, abuse, negligence or modification of, or to any part of the Product, without initial express consent from PS Audio. This warranty does not cover damage due to improper operation or maintenance, connection to improper voltage supply, or attempted repair by anyone other than a facility authorized by PS Audio to service the Product. This warranty is invalid if the factory applied serial number has been altered or removed from the Product. To locate the servicer or dealer nearest you, or for service assistance or resolution of a service problem, or for product information or operation, call or email PS Audio. ANY IMPLIED WARRANTIES RELATING TO THE ABOVE PRODUCT SHALL BE LIMITED TO THE DURATION OF THIS WARRANTY. THE WARRANTY DOES NOT EXTEND TO ANY INCIDENTAL OR CONSEQUENTIAL COSTS OR DAMAGES TO THE PURCHASER. Some states do not allow limitations on how long an implied warranty lasts or an exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights that vary from state to state. Inquiries regarding the above Limited Warranty may be sent to the following address: PS Audio International, Inc., 4826 Sterling Drive, Boulder, Colorado 80301 ATTN: Customer Service; Email: customerservice@psaudio.com; Voice 720-406-8946; FAX: 720-406-8967. Outside the US PS Audio has authorized distribution in many countries of the world. In each country, the authorized importing retailer or distributor has accepted the responsibility for warranty of products sold by that retailer or distributor. Warranty service should normally be obtained from the importing retailer or distributor from whom you purchased your product. In the unlikely event of service required beyond the capability of the importer, PS Audio will fulfill the conditions of the warranty. Such product must be returned at the owner's expense to the PS Audio factory, together with a photocopy of the bill of sale for that product, a detailed description of the problem, and any information necessary for return shipment.

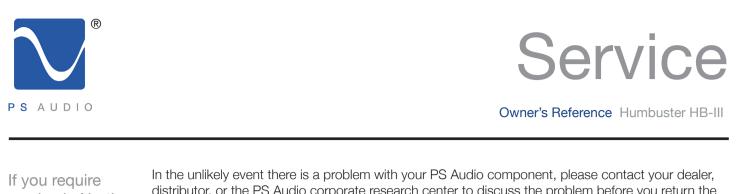
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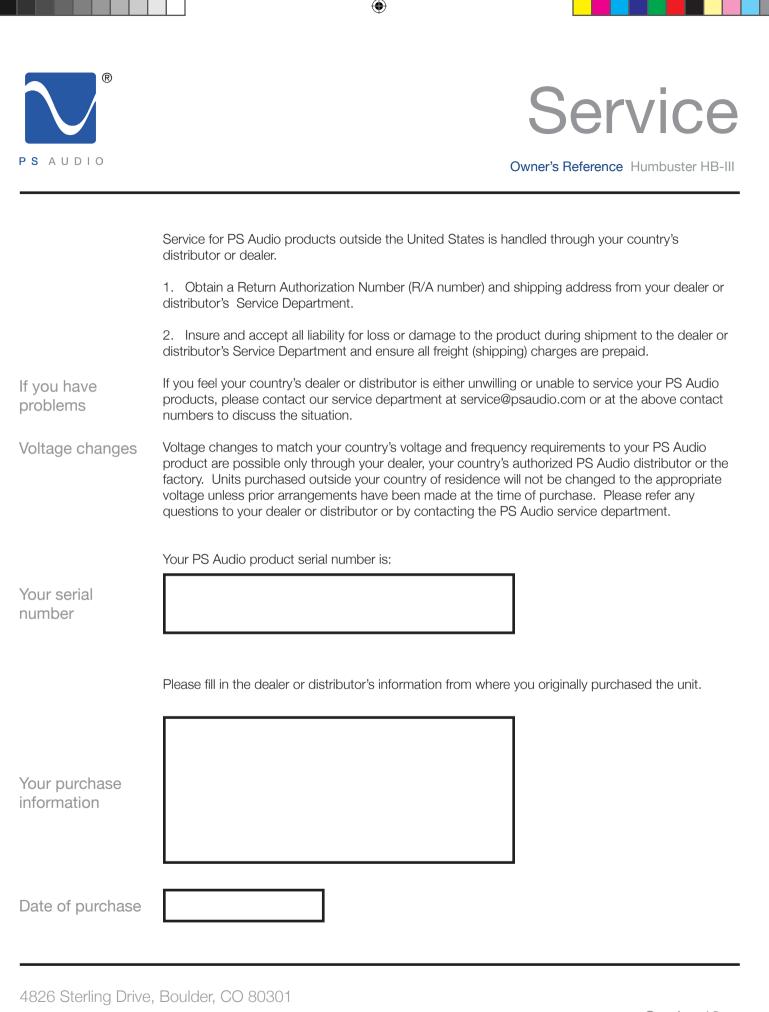
service in North America	component to our California manufacturing facilities for repair. Products shipped to either the factory or the corporate research facilities will be refused and returned freight collect if not accompanied by a PS Audio Service Department issued return authorization number (RA Number).	
Obtain an RA number	Return authorization numbers must be prominently displayed on the outside of the box and an accompanying letter describing the problem and re-listing the RA number must be inside the box to qualify for service.	
	If you are transferring your warranty, you must first contact PS Audio or your dealer or distributor for details.	
	To contact the PS Audio Service Department:	
Contact information	TELEPHONE720-406-8946HOURS Monday-Friday, 9:00 am to 5:00 pm MSTFAX720-406-8967E-MAILservice@psaudio.comWEBSITEhttp://www.psaudio.com	
If you are in the	If you are in the United States use the following procedure:	
United States	1. Obtain a Return Authorization Number (R/A number) and shipping address from the PS Audio Service Department.	
	2. Insure and accept all liability for loss or damage to the product during shipment to the PS Audio factory and ensure all freight (shipping) charges are prepaid.	
	The product may also be hand delivered to the Colorado facilities if arrangements with the Service Department have been made in advance. Proof of purchase will be required for warranty validation at the time of hand delivery.	
Use original packing	Use the original packaging to ensure the safe transit of the product to the factory, dealer, or distributor. PS Audio may, at its discretion, return a product in new packaging and bill the owner for such packaging if the product received by PS Audio was boxed in nonstandard packaging or if the original packaging was so damaged to the point it was unusable. If PS Audio determines that new packaging is required, the owner will be notified before the product is returned.	
	To purchase additional packaging, please contact your authorized PS Audio dealer, distributor, or the PS Audio Service Department for assistance.	
lf you are outside the US	If you are outside the United States and require service you must contact your country's dealer or distributor for instructions. PS Audio warranties its products (see warranty section) worldwide.	

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