

# Owner's Reference

Owner's Reference NuWave DSD

## Instructions for Use



NuWave DSD



## Introduction

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Important Safety Instructions



Read these instructions Heed all warnings Follow all instructions



WARNING. TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPARATUS 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. 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 user serviceable 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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## Introduction

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Thank You Thank you for your purchase of the NuWave DSD.

The NuWave DSD is a state-of-the-art Digital to Analog Converter (DAC). It can accept any USB, I2S or S/PDIF digital input from a transport, CD player or computer and will output two channel audio. The

input can be selected from the front panel.

ESS Technology The NuWave DSD is based on the ESS family of Sabre 32-bit architecture Hyperstream DACs.

Performance levels better than -116dB are achieved in this fully asynchronous, low jitter design.

The NuWave DSD combines discrete class A architecture with hand selected ICs for its output stage. Hundreds of hours of listening evaluations were employed to select the perfect output topology to achieve the NuWave DSD's open, powerful, spacious and three dimensional presentation of music.

High Current

The NuWave DSD features a large, high current analog power supply for great performance benefits.

Low Jitter Clocks The NuWave DSD features similar low jitter fixed clocks found in the world famous PS Audio

DirectStream DAC for improved sonics and low jitter performance.

Asynchronous USB 192kHz 24 Bit Input

USB performance of the NuWave DSD is state of the art, featuring the XMOS based asynchronous 24

bit 192kHz USB input and its I2S output directly into the D to A converter.

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# Getting Started

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Location Once your new NuWave DSD is unpacked, you'll need to find a convenient place to set it.

There are several ways to mount the NuWave DSD: on a rack shelf, or on a shelf near your preamplifier,

computer and/or transport or CD player.

Cautions If your transport is located a long distance from the preamplifier, it is best to run a long digital

interconnect and place the NuWave DSD close to the preamp. If you are connecting through USB there is a limit to the length of USB cable you can use, typically no greater than 5 meters for USB 2.0

but 2 to 3 meters is safer. The quality of the USB cable matters.

Isolation The NuWave DSD can benefit from aftermarket isolation devices such as a PS Audio PowerBase,

cones, spikes, or Sorbothane pads.

Power Cables Once you have chosen the location for the NuWave DSD 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 AC series cable. While the supplied cable is adequate for the task, it is not going to provide the best performance. Choosing a well regarded high-end power

cable will make a significant performance improvement over the stock power cable.

Conditioners

We recommend the use of power conditioning equipment, such as a PS Audio Power Plant, Dectet or PowerBase from PS Audio. We do not recommend the use of simple AC filter power conditioners not

made by PS Audio as many of these may "bleach" the sound and rob the music of life and dynamics. If you do not use PS Audio power conditioning equipment, choose wisely based on your experience. Power conditioners and the quality of the AC power delivered to the NuWave DSD can make a

significant difference in sound quality.



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Once you have decided on the location and chosen the appropriate power cable, you are ready to install the NuWave DSD.

Power down first

We would recommend you power your entire system down before inserting the NuWave DSD.

Connect the inputs

There are four methods of connecting the digital inputs of the NuWave DSD: S/PDIF, AES/EBU, USB and I²S. S/PDIF and AES/EBU are serial digital interfaces available as either an optical source (TOSLINK), a coaxial source (RCA), or balanced XLR. This is the typical output you would find on a CD player, DVD player, or even a few computer products.

Any type of S/PDIF input is most likely going to be fine for the NuWave DSD. If you are connecting through the TOSLINK optical output of a transport, Sonos, or computer sound card, be advised that optical is typically restricted to 96kHz and



below. We recommend the  $\operatorname{coax}$  input over optical TOSLINK if your situation permits.

i<sup>2</sup>s is a superior format of digital audio and is available on most PS Audio digital sources as well as through other manufacturers who have adopted our I<sup>2</sup>S standard, available through HDMI connectors. Though the connector on the rear panel of the NuWave DSD is an HDMI connector, the DAC will not accept HDMI signals, only I<sup>2</sup>S.

The preferred method to connect a computer is through USB. Connect the NuWave DSD to your computer using a well regarded high-end USB cable that is as short as possible. If you have a Mac the required driver is already installed. If you are using a Windows computer you will need to download and install the driver. If you have questions, refer to the Q and A section for greater details.

"Bits ain't bits"

Please note that digital bits aren't just bits. The quality of your digital interconnect cable, HDMI or USB cable can have a major impact on the sonic performance of your NuWave DSD. Make sure you invest some time in choosing the right digital interface cable.

Choose your input

You can connect one or all three inputs at the same time. For instance, you can connect the USB input to your computer and the coax input to your CD player. Then you can simply choose which one to listen to from the front panel button that selects the input. The USB input requires a driver which is already installed on a Mac computer but will need to be installed on a Windows computer. The computer should recognize the new hardware once the proper driver has been installed. The necessary driver can be found on psaudio.com under the resources -> downloads tab.

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Autoscan

Autoscan is the default mode for the input selector. This means that when you power on the NuWave DSD, it will automatically step to the first input with a digital signal and lock onto that input. You can tell when it is locked because the front panel light of the specific input will be illuminated. The device will cycle three times then stop if it finds no input.

If you wish to overide the autoscan feature, manually select the desired input and this will disable Autoscan. To re-enable, scroll to the last input and press and hold the input select button for 3 seconds. This will re-enable the Autoscan feature.

There are two types of audio outputs on the NuWave DSD, balanced (XLR) and unbalanced (RCA).

Balanced

To effectively use the NuWave DSD's balanced outputs requires a preamp or integrated or that has a balanced input.

These outputs are the preferred method of connection as a balanced XLR type of output allows for the lowest noise connection between the NuWave DSD and preamp or integrated, allowing you to take advantage of the high common mode rejection characteristics of balanced. Be sure to use a high quality, well shielded and well regarded interconnect for this critical link.



Unbalanced

RCA or unbalanced inputs will be typical as many preamplifiers, surround processors, receivers and integrated amplifiers

have only this standard type of input. Be sure to use a high quality well shielded and well regarded interconnect for this critical link.

Plug either the RCA or the XLR outputs of the NuWave DSD into a line level input on the preamp, integrated, control amplifier or receiver.



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Use only a high quality shielded power cable

Once everything has been connected, use a high quality AC cable to power the NuWave DSD. DACs in particular are quite sensitive to AC power and produce a bit of line noise themselves. Make sure you have a high quality, shielded power cable to power the NuWave DSD, such as a PS Audio AC Series cable.

Power matters greatly. If you consider that everything we hear and see in our audio and video systems is modulated AC from the wall, you can begin to understand the impact power has on quality. The power supply in the NuWave DSD takes the AC from the home's wall outlet and converts it to DC, like battery voltage. Musical signals are then used to modulate the DC to feed your preamplifier or power amplifier. The quality of the DC power modulated by the musical signal is critical to the sonic success of the system.

Use of high quality power cables and appropriate power conditioning, like PS Audio's AC regenerating Power Plants is essential for great sound.

Playing DSD

The NuWave DSD is capable of playing DSD as its name implies. DSD is a one bit format that many regard as the closest to analog recordings and prize for its naturalness in musical presentation. Few physical discs contain DSD recordings. SACDs, Sony's proprietary Super Audio Compact Discs, are among the few that contain DSD recordings. SACDs are encrypted so the raw DSD cannot typically be extracted for playback via a computer, requiring the use of a SACD player. SACD players typically do not output DSD as doing so can be in violation of Sony copyrights agreements with their artists. Digital outputs on SACD players output PCM from the SACD's Red Book layer and these will not light the DSD indicator on the NuWave's front panel.

Most DSD files available to play through the NuWave DSD will be acquired through downloads from providers that support the format. Thus, most DSD is played from a computer or server over USB.

The NuWave DSD will only accept DSD in DoP format. DoP (DSD over PCM) conversion is available through many popular programs, such as JRiver, DSD Master (Bit Perfect), and other player programs, as well as built into some servers. Use of DoP does not impact sound quality in any way.

Playing DoP

There is a common misconception that DoP conversion changes 1-bit DSD to multi-bit PCM, thus destroying the 1-bit advantage. Nothing could be further from the truth. Conversion from DSD to DoP simply breaks the continuous DSD 1-bit signal into discrete blocks of virgin 1-bit data with an added header for ID purposes. Once received over USB, the PS Audio NuWave discards the DoP header data and reassembles pristine 1-bit DSD information back into a continuous stream, places it into a RAM buffer, where it is output as perfect raw DSD to the DAC itself.

Native DSD that has not gone through the DoP process can be played on the NuWave DSD only through the I<sup>2</sup>S input.

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## **Questions And Answers**

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Should the unit be on all the time?

The NuWave DSD is best left powered on at all times. The current draw is negligible and keeping it powered will make sure the internal AC capacitors continue working properly and the sound quality is perfect.

There is no harm in leaving the unit on at all times as the lifespan of the NuWave DSD will be unaffected by doing so.

Are there any internal fuses?

There is an internal fuse in the NuWave DSD which we recommend leaving alone. There may be improvements by replacing the internal fuse with an aftermarket high-end fuse but this should only be attempted if you are comfortable working inside the unit. The components inside the NuWave DSD have lethal voltages when powered. Capacitors inside the NuWave DSD can retain an electrical charge after the unit has been powered down. Do not attempt to get inside the unit for any reason unless power has been removed and you are fully aware of the inherent dangers of doing so. Should the NuWave DSD cease to function, contact your dealer or PS Audio for help.

Supported formats and rates

The NuWave DSD supports both PCM and DSD audio signals. PCM singals of up to 192kHz, 32 bit are supported, as well as double rate DSD in the DoP format. Native DSD can be played over I<sup>2</sup>S.

Isolation?

Isolation through the use of a PS PowerBase, spikes, cones or Sorbothane feet is recommended for the NuWave DSD if space and budget allows. Isolation of any piece of high-end stereo and theater equipment is always recommended wherever practical.

Do cables make a difference?

Yes, cables make a difference. It is important to use the best power cables, digital interconnects and audio interconnects when operating the NuWave DSD.

Power switch

The master power switch is located on the rear panel of the NuWave DSD next to its AC inlet.

How do I manually select an input?

You can easily select any of the three inputs manually or let the Autoscan feature of the NuWave DSD work for you. The default or factory setting is Autoscan and if you only have one input connected to the digital in, we recommend leaving the NuWave DSD in the default Autoscan mode. The Autoscan feature will look for which input has a digital signal and automatically go to that input and lock on it.

You can simply turn your CD player, computer or digital source on or off and Autoscan will figure it out for you and go to the proper input.

If you have multiple sources connected to the digital inputs and you wish to use the front panel input selector manually, simply using it in this manner will disable the Autoscan mode.



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Do I need to install a software driver for the USB?

You do not need to install a driver for the USB connection if you have a Mac but it will be necessary if you have a Windows based machine.

The Windows USB driver is available for download on the PS Audio website www.psaudio.com under our Resources/Download section. Unzip the file and then install the driver. Make sure the NuWave DSD is on and then connect a USB cable between the NuWave DSD and the computer which should indicate it recognizes a new device has been installed and should install the appropriate software drivers to operate it. You can then choose to play music to the PS Audio NuWave DSD. Detailed instructions are available in this manual's Troubleshooting section.

What voltages can the NuWave DSD run on?

The NuWave DSD is specific to your country's voltage. Do not use the NuWave DSD on a voltage higher than it is rated for. For instance, do not take a 120 volt rated NuWave DSD and attempt to use it in a 230 volt country. Failure to observe this cautionary note will void your warranty and may damage the DAC. If you need to operate the NuWave DSD at a voltage other than the voltage it was designed for, contact your dealer, distributor or the factory.





# Troubleshooting

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No sound comes out of the system

If no sound comes out of the system with the NuWave DSD connected, there are several areas to check. Either you are not getting an audio signal into the preamplifier, or you don't have a good digital source feeding the NuWave DSD.

Check the input

First, check to make sure your preamp, integrated, or receiver is switched to the same input the NuWave DSD is connected to. Test the connection and the cables to make sure. Keeping the input selected and using the same cable, connect this input to a known good source like a tuner or the direct analog output of a CD player. If that works, then it is most likely not a connection problem between the NuWave DSD and the preamp, integrated, receiver or control amplifier.

Try another source

Next step is to check and see if the digital input is properly connected. Look on the front panel of the NuWave DSD to see if the PCM light is illuminated. If it is not, this is most likely the problem. You can troubleshoot this by making sure the NuWave DSD is on the proper input and that you have connected the input correctly. If this fails, try replacing the digital interconnect or try using another type. For instance, if you are using a coax connection, try using the CD player's optical output instead or try replacing the cable.

If you suspect a USB problem or need help installing the Windows driver If you are using a USB connection, it is necessary for the computer to recognize the NuWave DSD as a connected device through a driver. if you are using a Mac the driver is already installed and if you're using a Windows computer you will need to install the driver (see below). If you have the driver installed and cannot play using USB, check in the computer's control panel under USB devices and see if the NuWave DSD is recognized (it will be called PS Audio USB 2.0). If not, with both the NuWave DSD and your computer powered up, remove the USB cable from the computer and then re-insert it. Watch the computer monitor for an indication it has found the hardware.

If you need to install the driver

If you are running on a Mac, this driver is already built in. Just plug the USB from the Mac into the NuWave DSD and you should be fine although you will have to go to System Preferences->Sound and select the PS Audio device to play to it. The NuWave DSD uses the PS Audio USB 2.0 driver and thus the computer recognizes it as such.

For Windows users, you can get detailed installation instructions by going to www.psaudio.com. At the top of the page, go to Resources->How to->Install USB driver

A few things to consider regarding this driver:

- This driver is designed to work with your NuWave DSD as well as other PS DACs.
- This driver is designed to work on all Windows XP, Vista and Windows 7 computers.
- If you have a Mac running OS X Snow Leopard 10.6.3 or later, your computer already has this driver built in, and you're good to go. 10.6.3 was released in March of 2010.

Please note that this walk-through is only for computers running Windows 7.

1) Download the PS Audio USB Audio 2.0 Driver file located at www.psaudio.com/support/downloads/



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- Note that this driver will download as a zipped (compressed) folder that contains 15 individual files.
- 2) Once downloaded, unzip the folder. This is done by right-clicking the folder and selecting 'extract all' from the list of options.
- This will create a new folder containing the uncompressed files you will need.
- 3) Open the new folder you just created and double-click the file called 'Setup'. This will begin the installation process.
- There are two files named 'Setup'. The one that needs to be clicked has an icon that looks like a computer with a black screen. It is the only file with this appearance.
- 4) After a couple of minutes, you will be prompted to connect the device you want to install. At this time, connect your NuWave DSD to your computer. Shortly after, your USB driver installation will finish.
- 5) To complete the entire process and begin listening to music, click Start > Control Panel > Sound. Select the speaker icon that says 'PS Audio USB 2.0' as its description. Now click 'Set Default' and check 'Default Device'. Click OK. This driver was developed for PS Audio DACs and the USB input on the NuWave DSD is identical to the DirectStream DAC.
- 6) Next and while still in the Control Panel click on-> Speaker Properties so the window appears, click the Advanced tab and select the highest resolution you will be playing over the USB connection and click OK.

If you have hum or buzz

If you experience a hum through the speakers this can be caused by several things. The first is the source. If there is an excessive amount of buzz or noise from the loudspeaker, it may be caused by a ground loop, a light dimmer in the home, poor AC power, or any number of causes. The quickest way to determine where to start your search is to simply turn the preamplifier, integrated, or receiver off, disconnect the audio cables between it and the NuWave DSD, and see if the hum goes away when you turn the preamplifier, integrated, or receiver back on. If it does, it's most likely a ground loop or buzz from a dimmer.

If this doesn't solve the problem, reconnect the NuWave DSD and follow these easy humbusting tips.

Process of elimination

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 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 were working with a receiver or an integrated amplifier, you will need to jump to step 4. If you have a preamp, or 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



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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.

Finding a ground loop

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.

It could be the cable TV

VCRs, 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 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 cord and the VCR, TV or processor.

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.

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





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## **Limited Three Year Warranty**

## Should I Register My Product?

- Registering your product validates the warranty start date.
- If you do not register your product within 30 days of service, a copy of your purchase receipt from an authorized PS Audio dealer may be used as a proof of purchase to establish the warranty start date.
- If no proof of purchase from an authorized PS Audio dealer or registration is provided, the production date of the product will be used to determine the warranty start date.
- Registration can be completed online, by phone, by mail, or by email.
- You may wish to sign up for PS Audio's monthly newsletters, specials, product updates, and/or Paul's Daily Posts.

### What Does this Warranty Cover?

This warranty covers defects in material and workmanship for products purchased from PS Audio or its authorized dealers and agents.

### What Will PS Audio Do to Correct the Problem?

In the event your product fails your sole remedy under this limited warranty shall be to return the product to PS Audio or an authorized PS Audio repair center. The product will be repaired without charge for parts or labor, replaced, or the purchase price refunded through the original point of purchase, at the option of PS Audio.

#### What is the Period of Coverage?

This limited warranty is in effect for 3 years from the date the unit was first purchased from PS Audio or its dealers and agents.

### Who Pays for Shipping?

You are responsible to pay for the safe and proper shipment of the warrantied product to PS Audio or its authorized repair center.

PS Audio or it's authorized repair center will pay the cost of returning the repaired or replacement product to you under this warranty.

### What Does this Warranty Not Cover?

- This warranty does not cover damage due to: Accidents, carelessness, improper transportation, misuse, neglect, or abuse
- Failure to follow the operating instructions that are provided by PS Audio in the owner's manuals (available for download at psaudio.com)
- Use in any manner inconsistent with PS Audio's operating instructions (available for download at psaudio.com)
- Lack of routine maintenance
- Connection to an improper voltage supply

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- Alterations or modifications to the unit
- Improper or unauthorized repair, including repairs not authorized by PS Audio or a PS Audio authorized repair center
- Fire, lightning, flood, "acts of God," or other contingencies beyond the control of PS Audio
- Products purchased through an unauthorized source (if you have questions as to whether or not a dealer is authorized, please contact customer support at psaudio.com)
- Products with a factory-applied serial number that has in any way been altered, defaced, or removed

### Limitations on PS Audio's Obligations Under this Warranty

- In no event will PS Audio's liability to you exceed the original purchase price of the unit.
- This warranty does not cover the cost of custom installation, customer instruction, setup adjustments, or signal reception problems.
- This warranty does not cover consequential and incidental damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.
- In the event your warrantied product cannot be repaired, PS Audio will replace or refund the unit. We reserve the right to replace any out-of-stock, discontinued, or limited edition products with a comparable product. Discontinued products may not be available for warranty replacement.

## How Can the Warranty be Transferred?

This warranty is for the benefit of the original purchaser of the product. The warranty may be transferred to a subsequent purchaser during the 3 year warranty period. To do this, you must contact PS Audio directly to set up transfer of registration.

### How Do I Get Warranty Service?

To locate an authorized PS Audio repair center, for service assistance, or for help with the operation of a product or just for information, please contact PS Audio customer support.

### Warranty Service Within the US

- You must first obtain a Return Merchandise Authorization Number (RMA#) to receive warranty service and prior to returning any item. Contact PS Audio or an authorized PS Audio repair center to receive an RMA#.
- You must put the RMA# on all returns. If it is not clearly marked, PS Audio will return the package back to you, freight collect.
- You should include a description of the problem, along with the RMA# inside the packaging.
- Original packaging should be used for the safe transit of your PS Audio unit to the repair center. If you do not have the original packing, PS Audio can sell and ship to you replacement packaging.
- You are responsible for the cost of shipping the product to a PS Audio authorized repair center. You should insure the product for its full retail cost in the event it gets lost or damaged in transit. PS Audio is not responsible for damage incurred in products sent to us.
- Shipping your product in non-PS Audio packaging may void this warranty. PS Audio reserves the right to charge you for new factory packaging to return your product after a repair.

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How State Law Applies

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Warranty Service Outside of the US

PS Audio has authorized distribution in many countries of the world. In each country, the authorized importing distributor has accepted the responsibility for warranty of products sold by that distributor. Warranty service should be obtained where the product was purchased.

Changes to Our Products

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 products without notice or obligation to any person.

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