

e12 Digital to Analogue Converter

DSD 256 Fs / 12.288 MHz DXD 32bit / 352.8 kHz PCM 32 bit / 384 kHz

Owner's Manual (Mac OS X)

PLEASE READ BEFORE OPERATION



Table of Contents

Safety Information	4
Explanation of Graphical Symbols	4
Important Safety Instructions	4
Precautions	4
Welcome	7
Quick Start	8
Package Contents	8
Proper Device Placement	8
Front Panel Indicators	8
Rear Panel Connectors	8
Driver Setup	9
exaSound Menu Icon	9
Audio-MIDI Setup	9
Features	10
Mac OS X High-Performance Driver	10
Proprietary Mac ASIO Drivers	10
Asynchronous USB Mode	10
Hardware Volume Control and Volume Bypass	10
Connecting and Powering the e12 DAC	11
Connecting the USB Input	11
Connecting the Line Outputs	11
Direct Connection to Analogue Power Amplifier	11
Analogue Interconnect Recommendations	11
Connecting the Power Adapter	12
Surge Protectors	12
Isolating the Cable TV Ground	12
Setup of exaSound e12 Driver and Dashboard for OS X	13
System Requirements	13

Software Installation Step-by-Step Guide	13
Using the e12 DAC	16
Power On/Off	17
Volume Control	17
Volume Bypass	17
Settings Menu	18
Using the exaSound ASIO Drivers for OS X	18
Step-By-Step Player Configuration Instructions	18
Specifications	19
Limited Warranty	21

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Safety Information

Explanation of Graphical Symbols



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the Device.

Important Safety Instructions

- 1. Read these instructions.
- 2. Keep these instructions.
- 3. Heed all warnings.
- 4. Follow all instructions.
- 5. Do not use this apparatus near water.
- 6. Clean only with dry cloth.
- 7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- 8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10. Protect the power cord from being walked on or pinched, particularly at plug, receptacle, and the point where it exits from the apparatus.
- 11. Only use attachments/accessories specified by the manufacturer.
- 12. Refer all servicing to qualified service personnel. Servicing is required when the device has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the device, the device has been exposed to rain or moisture, does not operate normally, or has been dropped.

Precautions

- Before connecting the AC power adapter cord to the device, make sure the voltage designation of the power adapter corresponds to the local electrical supply. If you are unsure of your power supply, contact your local power company. The acceptable power input range is AC ~ 100V-240V, 50/60Hz
- The device is still receiving power from the AC power source as long as it is connected to the wall outlet, even if the device itself has been turned off.

- Unplug the power adapter if you are not going to use the device for an extended period of time. Hold the power adapter when unplugging. Do not pull on the cord.
- The power adapter is used as the mechanism for cutting off power, therefore make sure it is easy to unplug.
- To ensure proper ventilation around this product, do not place this product on a sofa, bed or rug.
- High temperature will lead to abnormal operation of this device. Do not expose this device or batteries to direct sunlight or near other heating objects.
- When moving the device from a cold location to a warm one, or vice versa, moisture may condense
 on components inside the device. Should this occur, the device may not operate properly. In such a
 case please turn the device off for 1-2 hours to facilitate moisture evaporation.

WARNING:



TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS DEVICE TO RAIN OR MOISTURE. DANGEROUS HIGH VOLTAGES MAY BE PRESENT INSIDE THE ENCLOSURE. DO NOT OPEN THE CABINET. REFER SERVICING TO QUALIFIED PERSONNEL ONLY. THE DEVICE SHALL NOT BE EXPOSED TO DRIPPING OR SPLASHING AND THAT NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES SHALL BE PLACED ON THE APPARATUS.

WARNING:



CHANGES OR MODIFICATIONS NOT AUTHORIZED BY THE MANUFACTURER CAN INVALIDATE THE COMPLIANCE TO REGULATIONS AND CAUSE THE UNIT TO BE NO MORE SUITABLE TO USE. THE MANUFACTURER REFUSES EVERY RESPONSIBILITY REGARDING DAMAGES TO PEOPLE OR THINGS DUE TO THE USE OF A UNIT WHICH HAS BEEN SUBJECT TO UNAUTHORIZED MODIFICATIONS OR TO MISUSE OR TO MALFUNCTION OF A UNIT WHICH HAS BEEN SUBJECT TO UNAUTHORIZED MODIFICATIONS.

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer or an experienced radio/TV technician for help.

Any unauthorized changes or modifications to this equipment would void the user's authority to operate this device. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE

This unit is compliant with the following CE regulations when an USB cable less than 3m is used: CEI EN 55022:2009 Class B (Radiated Emissions), CEI EN 55024:1999, CEI EN 55024:A2/2003, CEI EN 55024:IS1/2008 (Radio Frequency Electromagnetic Fields, 50Hz Magnetic Field Immunity Test and Electrostatic Discharges – ESD).

	This product, when no longer usable, can't be treated as generic garbage. It must be disposed of at a collection point for recycling of electrical and electronic equipment, in compliance with the WEEE regulation (Waste of Electrical and Electronic Equipment). By making sure that this unit is correctly recycled, you will help preventing potential damage to environment and human health, which could be caused by the incorrect treatment of this product as generic garbage. Materials recycling helps conserving natural resources.
<u>^</u> !\	We use our best efforts to ensure that information in this document is complete, accurate and current, but otherwise we make no representation concerning the same. We reserve the right to change or modify the information any time, without prior advice. It's up to the customer to ensure that the manual being consulted is the latest version.
ASIO	ASIO is a registered trademark of Steinberg Media Technologies GmbH
Trade marks	 Direct Stream Digital (DSD) is a trademark of Sony Corporation. Designed for Windows Media, Microsoft, HDCD, and the HDCD logo are trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries. Apple, Mac and OS X are trademarks or registered trademarks of Apple Inc. All other trademarks are the properties of their respective owners.

Welcome

Thank you for purchasing the exaSound e12 DAC!

The e12, a fourth generation DSD256 DAC offers the highest native digital audio resolution available on the market today. e12 has vanishingly low jitter, distortion and noise levels, and astonishingly clean analog-like sound.

We hope that the e12 DAC will help you to enjoy world-class music experience for years to come. Please take a few minutes to read right through this manual. Investing a little time now is the best way to ensure that you make the most of your investment.

Your satisfaction is our highest priority.

Happy listening,

exaSound Audio Design
www.exaSound.com
CustomerService@exaSound.com

Quick Start

Package Contents

The following items should be in the box:

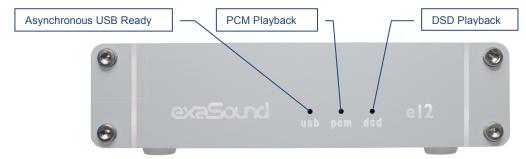
- e12 DAC
- Power supply
- A-B USB cable

Proper Device Placement

Place the device on a stable solid base, far from heat sources. Do not expose the device to direct sunlight. Allow at least 2.5 cm (1") around the device for ventilation. Do not place the device on fabrics, inside enclosed space, or in contact with curtains. Do not place the device on top of power amplifiers or any other equipment that emits heat. Do not expose the unit to smoke, humidity, moisture and water.

Keep the length of analogue interconnects and speaker cables short for optimal sonic performance. Remember that cables act as filters. Shorter cables have less impact on sonic performance. The shorter cables, the more transparent they become.

Front Panel Indicators



Rear Panel Connectors



DC 12V / 1.67A - Power Adapter Connector 5.5mm O.D. by 2.5mm I.D. **USB** - USB connector **RCA Line Outputs -** Left / Right Analogue Outputs

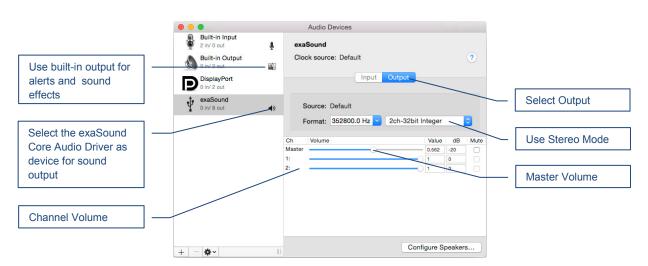
Driver Setup

- 1. Login to http://support.exasound.com. Download and install the latest exaSound-OS-X-Drivers. Step-by-step setup instructions are available on page 13 of this guide.
- 2. When the installation is complete, your Mac will reboot. You will see the exaSound driver in the Audio MIDI Setup.
- Select the exaSound driver in the settings window of your player application. Check the *Guides* section of the exaSound blog for step-by-step player configuration instructions: http://exasound.com/Blog.aspx.
- 4. The e12 DAC has an automatic power-on function and it will turn itself on when playback is detected.

exaSound Menu Icon



Audio-MIDI Setup



Features

The e12 DAC is based on the ES9018 Sabre³² reference DAC chip. It delivers 32-bit precision capable of resolving the smallest signal details. The chip features patented 32-bit Hyperstream™ architecture and Time Domain Jitter Eliminator. ES9018 delivers the industry's highest performance levels that will satisfy the most demanding audio enthusiasts.

Mac OS X High-Performance Driver

We offer a custom high-performance OS X driver supporting standard PCM sampling rates from 44.1kHz to 384kHz at full 32bit resolution. We support DSD over PCM 1.0 standard, for DSD64 (2.8224 / 3.72 MHz), DSD128 (5.6448 / 6144 MHz) and DSD256 (11.2896 / 12.288 MHz).

Proprietary Mac ASIO Drivers

Using ASIO brings unique advantages that are hard to achieve with the Mac Core Audio system. Our proprietary ASIO implementation is completely independent from the Core Audio sound system and always operates in Integer / Exclusive Mode. ASIO supports native DSD, while Core Audio drivers rely on the DoP workaround (DSD over PCM). ASIO is more efficient and causes a lower CPU load.

Automatic PCM / DSD Switching

Audio data is always streamed in its native format. e12 switches automatically between PCM and DSD modes. DSD streams are processed in their native format without conversion to PCM.

Asynchronous USB Mode

Asynchronous USB mode eliminates jitter caused by the computer and the USB interface. Asynchronous USB is a two-way communication method between a computer and an external USB DAC. In this method, the DAC is running as a master, and the computer is acting as a slave that delivers data only when requested by the master.

In the case of the e12 DAC, sound data is requested by the FPGA core and stored in the device FIFO memory buffer. The FPGA core makes sure that the buffer never gets empty during playback. Data from the buffer is streamed to the DAC chip. The precision of the timing of the output stream is determined only by the DAC oscillators and it is not degraded in any way by the computer clocks or by delays caused by the USB interface.

Hardware Volume Control and Volume Bypass

The e12 DAC volume is controlled by the ES9018 DAC chip. It is completely independent from the Mac software volume control. Audio data is always bitstreamed over the USB interface at full scale 0db/32bit resolution. Volume processing is performed by the DAC chip right at the border between the digital and the analogue domains. This architecture offers signal to noise ratio comparable to the best analogue volume controls an virtually no loss of digital resolution. Setting the volume to 0dB turns all volume processing off and sets the device in volume bypass mode.

Connecting and Powering the e12 DAC



Before connecting, turn off the power to all the components in your system.

Connecting the USB Input

The USB input is galvanically isolated to eliminate ground loop noise. It supports 2 channel PCM up to 32 bit resolution at standard sampling frequencies from 44.1 kHz to 384 kHz, and DSD from 2.8224 MHz to 12.288 MHz. Connect the e12 DAC to your computer using the supplied A-B USB cable. Use high-quality standard A-B USB cables with length up to 6 ft (2m).

Connecting the Line Outputs

- Make sure that your analogue power amplifier is turned off.
- **RCA Line Outputs Left / Right -** Connect the Left and Right RCA line outputs of the e12 DAC to the amplifier line inputs.

Direct Connection to Analogue Power Amplifier

If your music sources are digital, you don't need a preamplifier. The built-in volume control allows analogue power amplifiers to be connected directly to the e12 DAC. Amplification always brings some level of noise and distortion. Eliminating unnecessary amplification helps to achieve higher level of transparency.



Avoid connecting the e12 DAC to receivers and any other sound processing equipment that performs analogue to digital (ADC) conversion. Digitizing the analogue output signals back to the digital domain for processing will undo some of the benefits that e12 brings to you. Remember that your sound system is as good as the weakest link in the sound processing chain.

Analogue Interconnects Recommendations

Over-engineered interconnects made from exotic materials are unnecessary. When selecting cables, the following characteristics are important:

- Reliable electrical contact
- Low resistance
- Robust mechanical design

Remember that cables act as filters. The shorter the cable, the more transparent your system will be.

Connecting the Power Adapter

To minimize ground noise and hum, it is recommended to connect the power cords of all components to a single point - usually a single surge protector with multiple outlets. Connecting all components to a single point, as close as it is practically possible minimizes the differences in ground potentials among the components.

Using an Upgraded Power Supply



The e12 DAC comes with a 12V/1670mA power adapter. This power adapter has been tested to comply with the DAC's power supply and quality requirements and allows for very high performance. A better unit may allow you to release the last bit of performance from the e12 DAC.

If you decide to use another power supply, the specifications marked on the back of the e12 DAC must be observed.

Surge Protectors

We strongly recommend the use of surge protectors for all of your audio and video components.

Isolating the Cable TV Ground

If you have a cable TV connected to your audio system, ensure that the TV cable ground is galvanically isolated from the audio system ground. The TV cable ground, usually connected to the earth outside your home, can have a significantly different potential than the audio ground. This condition can cause audible hum. If you suspect this is the case, use a cable TV ground isolator just before the cable set-top box or at the RF TV input.



When turning on and off your sound system, the power amplifier should be the last component to be turned on and the first component to be turned off. This prevents power on/off transients from being transmitted to the loudspeakers.

Drivers Step-by-step Setup Guide

System Requirements

Operating System	OS X Mavericks OS X Yosemite
Recommended CPU for operating at 352.8 and 384 kHz	2.4GHz dual-core Intel Core i5 or better
Disk Space	10 GB mainly for music files

Software Installation Step-by-Step Guide

- 1. Don't connect the e12 DAC to your Mac until the driver is installed. Don't worry if you've connected the device already. Just disconnect it.
- 2. You should have received an email from us with username and password. Please login on our support website at http://support.exasound.com. Don't use setup packages downloaded from other websites.
- 3. Download the latest version of the exaSound Drivers Installer for OS X:
 - Locate the installation package **exaSound-OS-X-Drivers-5-1-1.pkg** in your *Downloads* folder. (The version number at the end of the file name may be different.)
 - Double-click it and follow the prompts. You just need to accept the defaults on the following screens. At the end of the installation your Mac will reboot.



4. Locate the exaSound Dashboard icon on the menu bar. The red exclamation mark indicates that the USB cable is disconnected:



5. Connect the USB cable of the exaSound DAC. The red exclamation mark should disappear from the exaSound Dashboard icon.



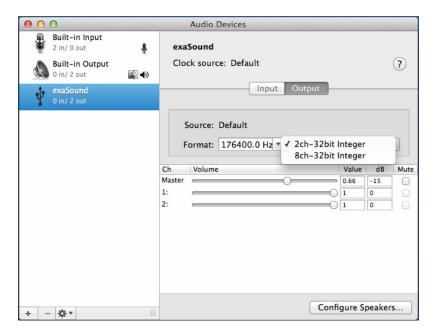
6. Power on the DAC. The red square overlay on the exaSound Dashboard icon indicates that the device is *On* and in *Stop* mode. During playback the red square changed to a green triangle.



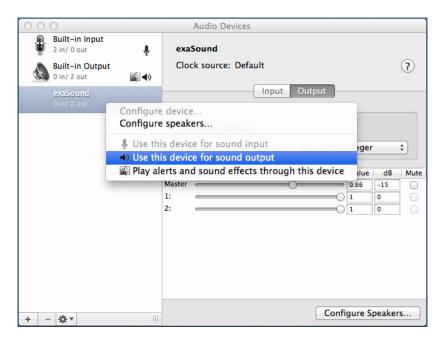
7. Click on the exaSound Dashboard icon and select Core Audio or ASIO. Most players support only Core Audio drivers. ASIO offers better sound fidelity with players that provide ASIO support.



8. Go to *Applications -> Utilities* and open *Audio MIDI Setup*. Select the exaSound driver. By default the driver is set to 2-channel (Stereo) mode.



9. Make the exaSound driver the default sound output device.



- 10. Make sure that the volume is set to less than -25db.
- 11. At this point you can play some music with iTunes. The e12 DAC has an automatic power-on function and it will turn itself on when playback is detected.

Note: Configuration instructions for Audirvana Plus and JRiver are available in the Guides section of the exaSound Blog: http://exasound.com/Blog.aspx.

Using the e12 DAC

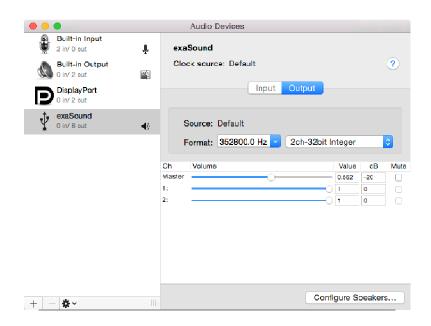
Before turning your amplifiers ON, always check the volume level to make sure that it is below -25dB.



Please follow the safety measures below strictly. It is quite common to set the volume on your Mac to maximum. You should never do this when your e12 DAC is connected to powerful amplifiers and speakers. Playing music or sound effects at maximum level is dangerous for your health and may damage your audio equipment.

Please note that the e12 DAC will match the volume level of your Mac when it is turned on. Higher volume from previous use will result in the e12 volume level rising.

- Make sure that your power amplifier is turned off.
- Make sure that all cables are connected.
- Lower the volume to at least -25 db. The volume on the e12 DAC can be controlled from the Audio MIDI Setup and from the volume icon on the Menu.



Power On/Off

- The e12 DAC has an automatic power-on function and it will turn itself on when playback is detected.
- The e12 DAC automatically turns itself off after a period of inactivity. Use the Power Off Timeout setting to adjust the inactivity time interval before shutdown.

Volume Control

- The e12 volume is controlled by the ES9018 DAC chip. It is independent from the Mac software volume control and it preserves the maximum possible signal to noise ratio.
- The volume level changes in steps of 0.5 dB. At power on, the volume level is set to match the volume level of your Mac.
- Use the volume sliders in the Audio MIDI Setup window to control the volume for individual channels and the master volume.

Volume Bypass

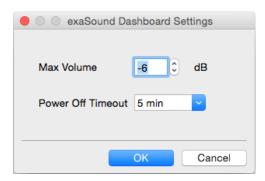
When the volume sliders for the exaSound driver in the Audio MIDI Setup application are set to 0dB, the hardware volume control is turned off and the e12 DAC operates in Volume Bypass Mode.

To activate Volume Bypass:

- Set the master volume slider to 0dB.
- Set the left and right volume sliders to OdB.
- Make sure that your player is not changing the volume level.

Settings Menu

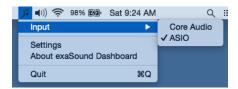
- Click on the exaSound icon on the Menu and select Settings.
- Use the Max Volume setting to prevent accidental playback at volume levels that are too loud.
- The e12 DAC automatically turns itself off after a period of inactivity. Use the *Power Off Timeout* setting to adjust the time interval before shutdown.



Using the exaSound ASIO Drivers for OS X

Make sure that the player is configured for ASIO output. Click on the exaSound Dashboard icon. By default the *Input* is set to *Core Audio*. Select *ASIO*.

Note: When ASIO mode is selected, you won't be able to use the exaSound Core Audio driver.



Step-By-Step Player Configuration Instructions

Check the *Guides* section of the exaSound blog for player step-by-step configuration instructions: http://exasound.com/Blog.aspx.

Specifications

D/A Converter IC:	ESS Technology ES9018S Sabre32 Reference DAC
PCM Sampling Rates - Asynchronous USB	44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz, 352.8kHz, 384kHz
DSD Sampling Rates - Asynchronous USB	DSD 64 Fs: 2.8224MHz; 3.072MHz DSD 128 Fs: 5.6448MHz; 6.144MHz DSD 256 Fs: 11.2896MHz; 12.288MHz
Total Harmonic Distortion + Noise	0.000205% @ 1KHz, 0dBFS
Intermodulation Distortion	-128dB 0.00004% @ 19KHz + 20KHz 0dBFS 2nd order IMD
Signal-to-Noise Ratio	128dB, A-weighted, 2Vrms
DAC Master Clock Jitter	0.13psec rms
Frequency Response	OHz - 20KHz (-0.15dB) @ 44.1kHz/48kHz sampling rates; OHz - 30KHz (-0.15dB) @ sampling rates >= 88.2kHz;
Phase	Non-inverting
Channel Separation	125dB @ 1KHz
Digital Input	USB 2.0
Number of channels	2
Operating System Requirements	Mac OS X Mavericks, OS X Yosemite Windows 8 x86, Windows 8 x64, Windows Server 2012 R2, Windows 7 x86, Windows 7 x64, Windows XP x86 (ASIO Compatible Player is required for all Windows platforms)
Digital Volume Control Steps	0.5dB
Volume Matching between Channels	Better than 0.1dB

Line Output	Unbalanced (RCA), gold-plated contacts
Line Output Level	2Vrms (unbalanced)
Line Output Impedance	200 Ohms
Line Output Offset	< 5mV
Power Jack Diameter	Internal: 2.5mm External : 5.5mm
Power Consumption	<6W
Dimensions (W x H x D)	5 x 1.5 x 7 inches (125 x 35 x 175 mm)
Weight	1.1 lbs (0.5Kg)

Limited Warranty

exaSound's devices are warranted against defective workmanship or materials for one (1) calendar year from the original date of purchase. This warranty applies only to exaSound brand products manufactured by exaSound and sold to the original consumer by either exaSound or an exaSound authorized reseller. This warranty does not apply to exaSound brand products imported and sold by unauthorized dealers, distributors, or other sellers. exaSound may at its sole discretion, refuse to honour the warranty of any such unauthorized product that may be presented for service.

Warranty service can only be performed by exaSound. Devices which are defective must be shipped prepaid and insured to exaSound for warranty service in accordance with our Return Policy published at http://www.exasound.com/Store/TermsofUse.aspx. For products that we verify to be eligible for warranty service, we will pay the shipping cost to return the Device to you via ground shipment.

If in our assessment the defect is covered by our Warranty, the defective item will, at our sole option, be repaired, replaced with the same item or its functional equivalent, or the purchase price will be refunded. exaSound in its sole and absolute discretion shall be the sole determiner of whether a product is in fact defective.

Replacement parts and products assume the remaining original warranty, or ninety (90) days, whichever is longer.

This limited warranty covers non-commercial use of this product, and shall not apply to the following, including, but not limited to: applications and uses for which this product was not intended; altered product or serial numbers; cosmetic damage or exterior finish; batteries and cable accessories; accidents, abuse, neglect, fire, water, lightning or other acts of nature; incorrect electrical line voltage, fluctuations and surges; failure to follow operating or maintenance instructions. exaSound does not warrant uninterrupted or error-free operation of the product. This limited warranty shall not extend to anyone other than the original purchaser of the product. It is non-transferable and states your exclusive remedy.

exaSound hereby expressly disclaims all liability for product defect or failure, that are due to normal wear, product misuse, physical tampering, abuse, product modification, improper product selection, non-compliance with any codes, misappropriation or the failure of the Device while being used for purposes for which it was not intended.

THE FOREGOING WARRANTY IS THE ONLY WARRANTY WITH RESPECT TO THE DEVICES AND WE MAKE NO OTHER WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, REGARDING THE DEVICES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL EXASOUND, OR ITS AUTHORIZED RESELLERS BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, EVEN IF SUCH DAMAGES RESULT FROM NEGLIGENCE OR OTHER FAULT.

TO OBTAIN WARRANTY SERVICE, please follow these instructions:

- Contact exaSound customer service via email at <u>CustomerService@exaSound.com</u> with details of the defect claimed, product model, serial number, date and place of the original purchase.
- If it is determined that your product needs service, a Return Merchandise Authorization (RMA) number will be issued to you along with return instructions and address of an exaSound service center.
- Pack the product securely in the original packaging, with your assigned RMA number marked clearly on the outside of the package. Send the package pre-paid and insured to the exaSound to obtain warranty service.
- All returns must comply with our Return Policy displayed at http://www.exasound.com/Store/TermsofUse.aspx.