

Circle Surround® Digital Encoder

U S E R ' S M A N U A L



Model CSE-07D

www.srslabs.com

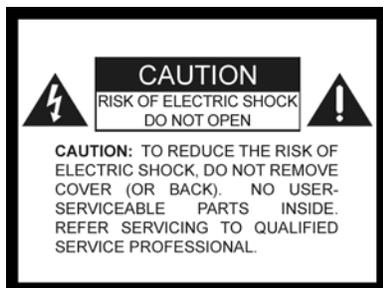
This product is manufactured by SRS Labs, Inc.



P00192 V2.0

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 a dry cloth.
7. Do not block any of the ventilation openings. Install in accordance with the manufacturers 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 are provided for your safety. When 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 plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with a cart, stand, tripod, bracket or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus is damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



The lightning flash with arrowhead symbol 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 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 appliance.

WARNING: This equipment has been tested and found to comply with the limits for Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction's manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at their own expense. The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

It is suggested that the user use only shielded and grounded cables to ensure compliance with FCC Rules.

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Company Information:

SRS Labs is a recognized leader in the advancement of audio and voice technology. The company works with the world's top manufacturers to provide a richer entertainment experience through patented sound techniques. SRS Labs' technologies can be heard through products ranging from televisions, LCD and plasma monitors, cell phones, MP3 players, car audio systems, and notebook and desktop computers. The company also offers hardware and software tools to professionals and consumers for the creation, production and broadcast of content featuring SRS Labs' technologies. Based in Santa Ana, Calif., the company also has licensing representation in Hong Kong, Japan, Europe, and Korea. For more information about SRS Labs, Inc. please visit www.srslabs.com.

Introduction

The SRS CSE-07D Circle Surround[®] Digital Encoder enables audio professionals to encode up to 6.1 channels of discrete program material (Left, Center, Right, Right Surround, Center Surround, Left Surround, LFE). It can be distributed across two-channel carriers such as stereo broadcast television (analog and digital), cable or satellite transmission, VHS videotape, computer and console games, CDs, streaming media and two-channel DVD soundtracks.

Based on an SRS patented advanced matrix system, Circle Surround encoded Lt/Rt material is incredibly robust and suitable for either analog or digital distribution. It supports quality bit rates as low as 40 kbps and delivers compelling home-theater audio performance at compression rates of 96 kbps and above. Circle Surround is also compatible with a variety of codecs and compression schemes. Sound designers, mixers and facilities creating multichannel audio content will find the CSE-07D to be the most flexible and powerful encoding solution available.

Surpassing the limitations of previous matrix encoders, the CSE-07D Circle Surround Encoder supports current multichannel material, accepting up to 6.1 channels of discrete audio input for two-channel Lt/Rt encoding. Circle Surround also provides the unique ability to localize specific broadband audio signals in the Left or Right surround channel as individual sound sources.

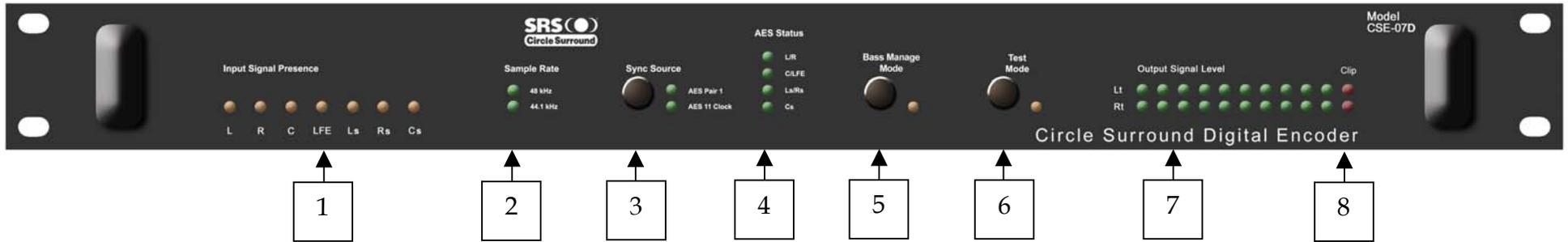
Previous matrix encoders only allow for the encoding of Left, Center, Right and mono, bandwidth limited, surround channels. Circle Surround now provides the capability to encode Left, Center, Right, Right Surround, Center Surround, Left Surround and LFE channels. This major breakthrough in matrix technology raises the potential for audio on all platforms – music, film, television, games and Internet streaming.

Circle Surround encoded material is backwards compatible with all existing playback formats from mono to 5.1 channel surround sound (i.e. Circle Surround 5.1 and Pro Logic II[®]) decoding. Optimal performance, however, is achieved with a Circle Surround II decoder.

For monitoring purposes, the SRS CSD-07D Circle Surround Digital Decoder is the perfect compliment to the SRS CSE-07D Encoder for professional studio environments. In addition, the CSE-07D has two channels of analog outputs for backwards compatibility with analog decoders such as the CSD-07.

Front Panel

(Quick Reference)



1. Input Signal Presence Indicators

2. Sample Rate LEDs

3. Sync Source Button and LED

4. AES Status LEDs

5. Bass Manage Mode Button and LED

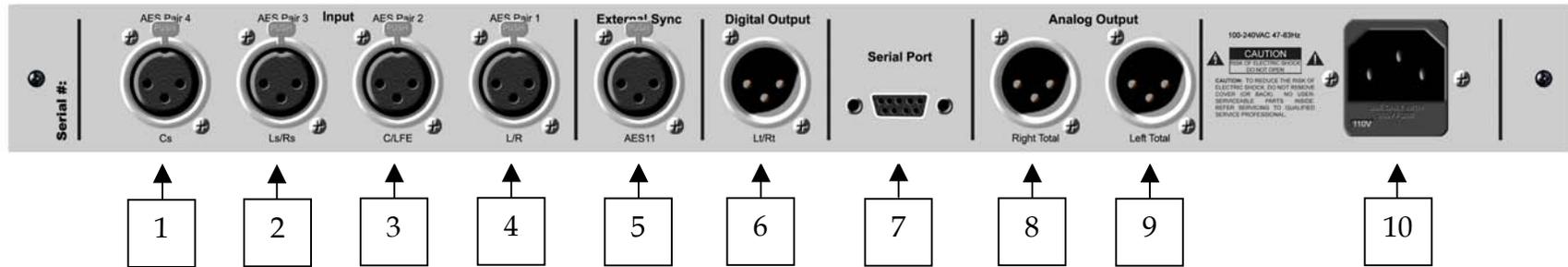
6. Test Mode Button and LED

7. Output Signal Level Meters

8. Output Signal Clip Indicator

Rear Panel

(Quick Reference)



1. Pair 4 (Cs) Input

2. Pair 3 (Ls/Rs) Input

3. Pair 2 (C/LFE) Input

4. Pair 1 (L/R) Input

5. External Sync Input

6. Digital (Lt/Rt) Output

7. Serial port

8. Analog Right Total Output

9. Analog Left Total Output

10. JEDEC Power Connector (Auto-switching 100-240VAC, 47-63 Hz)

CSE-07D Set-up:

Placement and Use:

The CSE-07D encoder is designed to take the stems from your surround mix and pass them onto a recording or broadcast device matrixed into a left total and right total stereo signal.

Install the CSE-07D after your mixing console, and before your monitoring device, recording device or transmission path.

The inputs to the Circle Surround encoder may be used on an as-needed basis. If you are creating an original surround mix, you may feed the CSE-07D encoder from a 7-channel buss, with one of the channels dedicated for low frequency effects. It is not mandatory for all inputs to be used for surround encoding. The CSE-07D will pass through mono or stereo inputs, or a four, five or six-channel mix with an LFE channel. (See diagram on page 7)

If you are re-mastering existing source material with one to 6.1 stems, simply match the outputs of your source to the corresponding channel-inputs on the CSE-07D encoder.

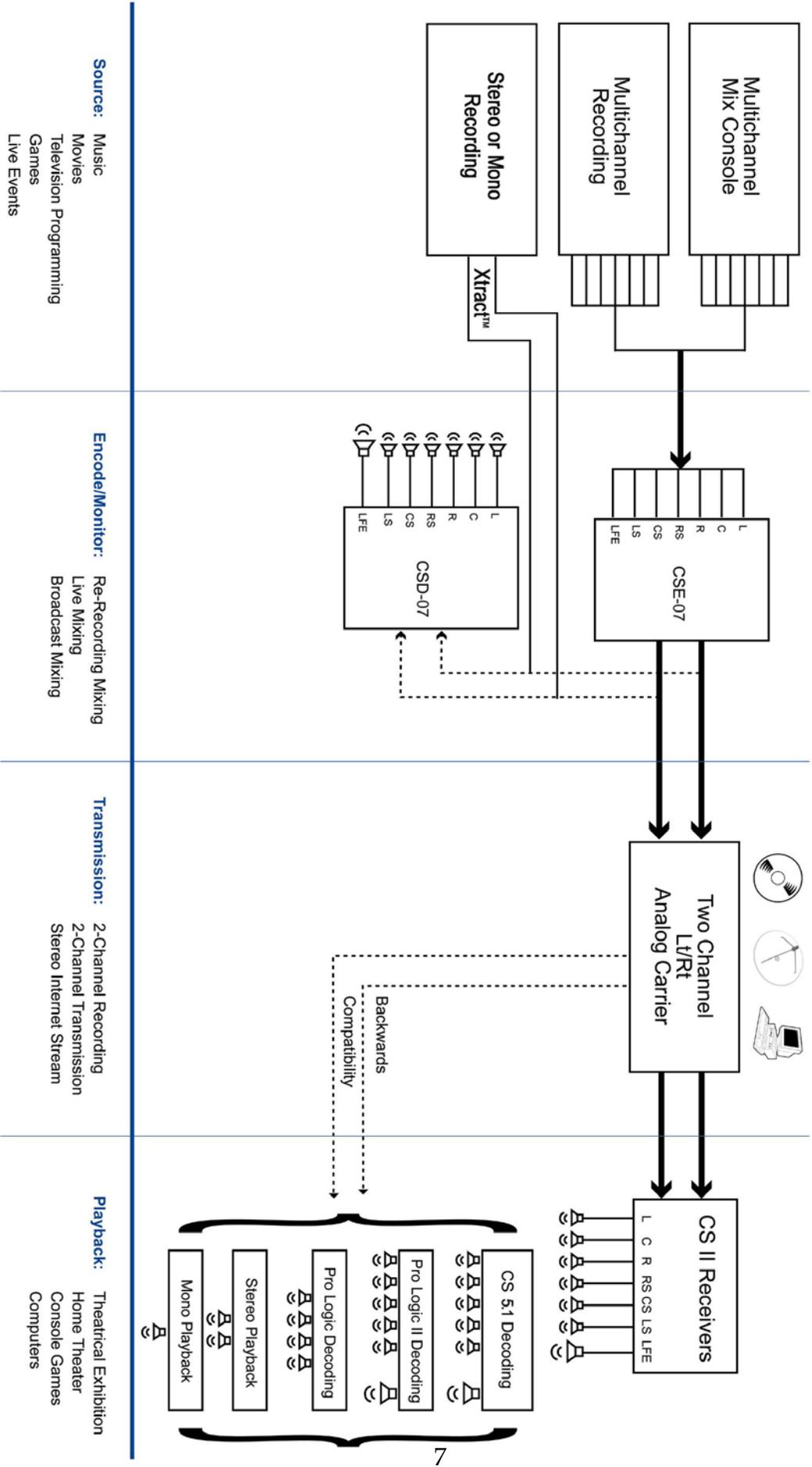
For best results when monitoring the encoding process, use the CSD-07 Circle Surround Decoder or CSD-07D Circle Surround Digital Decoder from SRS Labs.

To ensure accurate monitoring of the Circle Surround mix, it is recommended that a minimum of 5.1 channels be monitored while mixing. Failing to do this may lead to consumers hearing something that was overlooked in the mix process. If necessary, it is possible to place the unit in Phantom Center mode.

Like all matrix encoding systems, it is important to maintain the phase and level relationships between channels. If for any reason symmetry is not maintained, the channel separation will slowly degrade.

Power:

The Circle Surround Encoder comes with an auto-switching power supply and JEDEC Power Connector. It is important that the power supplied is within the appropriate voltage range. Failure to do so could result in damage to the unit.



CSE-07D Operation (see front panel image on page 4)

- 1. Input Signal Presence:** Displays signal presence and clip on corresponding input channels. When the LEDs glow green on the front panel, the corresponding channel is receiving a signal > -44 dBFS at the input. If the LED is not illuminated, a signal > -44 dBFS is not present. The clip indicator LEDs will turn red at 0 dBFS.

* Note that if the signal indicator is not illuminated, it may simply indicate a transitory period where no content is present in the source mix.

- 2. Sample Rate LEDs:** Indicates the sample rate of the Master sync source.
- 3. Sync Source Button:** Selects whether the sync source is AES Pair 1 or the AES 11 clock inserted in the external clock input.
- 4. AES Status LEDs:** There is an AES status Indicator per channel pair. If an LED is not illuminated, then the pair is not locked. If the LED is solidly illuminated, then the Channel pair is locked. If the LED is flashing, then the Channel pair sample rate does not match the master.
- 5. Bass Manage Mode:** This mode is used to enable or disable the Bass Management function. When the box is powered up, it is placed in Bass Manage mode with the LED indicator green. While Bass Management is on, any information that enters the satellite channels (L, R, C, LS, RS, CS) will go through an 80 Hz high-pass filter. Any information that goes through the LFE will go through a corresponding low pass filter. If the switch is pressed and released, then the unit will toggle out of Bass Management mode.
- 6. Test Mode Button:** This button will generate a pink noise test signal to ensure accurate channel routing during transmission. Though the encoder outputs only two channels, a Circle Surround Lt/Rt test signal is generated. Due to the fact that this signal is in the transmission path, a special button sequence is required to avoid accidentally entering test mode during broadcasting or recording.
Entering test mode: press and hold the Test Mode button until it glows red. Once it glows red, release the button. The unit is now in test mode. The LED will only glow red for a few seconds. If the button is released while the LED is not red, the unit will not enter test mode. Once the unit is in test mode, pink noise will cycle through the channels.
Pausing test cycle: press and release the Test Mode button briefly to pause on the desired channel. Press and release the button again to restart the cycle.
Exiting test mode: press and hold the Test Mode button for three seconds, then release.
- 7. Output Signal Level:** Indicates the strength of the outgoing signal.
- 8. Output Signal Clip:** The LED will turn red at 0 dBFS (+24 dBu for the analog output).

Specifications

Frequency Response:	20 Hz – 20 kHz (+/- 1 dB for analog out) (L, R, C, Ls, Rs, Cs, Ls); 20 Hz to 80 Hz (LFE)
Inputs (digital only):	4 balanced XLRs (L/R, C/LFE, Ls/Rs, Cs); input level per AES3 standards
Input Impedance:	110 Ω
Digital Outputs:	1 balanced XLR (Lt/Rt); output level per AES3 standards
Digital Output Impedance:	110 Ω
Analog Outputs:	2 balanced XLR (Lt & Rt) @ +4 dBu nominal output level; +24 dBu maximum output level; pin 2 hot per AES3 standards
Analog Output impedance:	50 Ω
Dynamic Range (Analog out):	>110 dB Typical (A-weighted)
Distortion (THD) (Analog out):	<.005% THD Typical (A-weighted) at maximum level
D-A Conversion:	24 bits
Sample Rates:	44.1 kHz or 48 kHz (locked to input sync source sample frequency)
Encoding Latency:	<8.2 ms
Processing:	SRS – Circle Surround II Encoding algorithm on ADI DSP
Front Panel Indicators/Controls:	<ul style="list-style-type: none">▪ Input signal presence @ -44 dBFS (1 LED per channel); Clip indicator @ 0 dBFS▪ Sync Source Selector – AES Pair 1/AES11 Clock & status LEDs▪ Sample Rate Indicator – 44.1kHz/48kHz status LEDs▪ AES Status Indicator – L/R, C/LFE, Ls/Rs, & Cs status LEDs▪ Bass Manage Mode selector – Bass Manage Mode button & status LED▪ Test Mode Selector – Test Mode button & status LED (Cycles encoded pink noise through all channels at -10dBV to be decoded by the CSD-07 or CSD-07D)▪ Output Signal Level meters (11 LEDs per channel); 3 dB steps with clip indicator @ 0 dBFS (+24 dBu Analog)
Power Requirements:	Auto-switching 100-240VAC, 47-63 Hz
Power Consumption:	8 W
Dimensions:	Rack mount; 1 ru (1.75" x 19" x 12")
Weight:	5 lbs. 10 oz.
Optional Equipment:	SRS CSD-07 or SRS CSD-07D Decoder for monitoring
Recommended Cable:	Double Shielded (Foil/Braid) AES/EBU cable. Nominal impedance 110 Ω (Ex. Belden 1696A)

Note: 0 dBu = 0.775 Vrms

(Specifications subject to change without notice)



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For questions regarding use and operation of the Circle Surround Encoder please call or e-mail: prosupport@srslabs.com

For business and pricing inquiries please call or e-mail: prosales@srslabs.com.

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This product is covered under U.S. Patent Numbers 5,319,713; 5,333,201; 5,638,452; 5,771,295; 6,198,827 and other U.S. and International patents pending.

SRS Labs, Inc. hereby warrants to the original purchaser of this product that it is free of manufacturing defects in material workmanship.

- a. **Parts:** For **ONE-YEAR** from date of original purchase at retail, we will repair or replace, at our option, any defective part without charge for the part. Parts used for replacement are warranted for the remainder of the original warranty.
- b. **Labor:** For **ONE-YEAR** from the date of original purchase at retail, SRS Labs, Inc. will provide the labor for warranty repair without charge at the SRS Labs, Inc. corporate office or at any SRS Labs, Inc. authorized Service Center.

1. This warranty is void if the unit's serial number has been altered or removed. This warranty does not cover defects or damage caused by:

- a. Abuse, modification, mishandling, accident, alteration repair or service by anyone other than an authorized SRS Labs, Inc. Service Center.
- b. Physical abuse to or misuse of the unit.
- c. Operation in a manner contrary to the instructions, which accompany the unit.
- d. Freight damage, improper installation or application, the malfunction of another component or device with which the product interfaces or any damage caused by acts of God such as lightning or fluctuations in electrical power.

2. Any express warranty not provided herein, and any other which, but for this provision, might arise by implication or operation of law, is hereby excluded and disclaimed. There are no other warranties, expressed or implied, including the implied warranty of fitness for a particular purpose. If applicable law does not permit SRS Labs, Inc. to disclaim implied warranties, any warranties implied by law are limited to the ONE-YEAR term of the express warranty given herein.

3. The sole and exclusive remedy under this warranty is repair or replacement at SRS Labs, Inc.'s option of any product that proves to be defective in manufacture or material within **ONE-YEAR** warranty period. To the fullest extent allowed by law, SRS Labs, Inc. disclaims all liability for other direct, incidental or consequential damages alleged to be caused by a defective product; that is, SRS Labs, Inc. will not be responsible for any personal injury, property damage (other than the cost of replacing the product) or any other monetary damage such as lost wages or profits caused by any use, attempted use or inability to use the product.

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

5. To obtain warranty service, contact the SRS Labs, Inc. Corporate Office at 800-2HEAR3D or at www.SRSLABS.com or your nearest authorized SRS Labs, Inc. Service Center to obtain a return authorization number. All shipping charges must be prepaid. If the requested repair or service (including parts replacement) is within the terms of this warranty, SRS Labs, Inc. will pay return shipping charges only within the United States and Canada. Present your sales receipt or other document, which establishes proof and date of purchase. Returned products must be accompanied by written description of the reason for the return and the circumstances under which the defect became apparent. The return of the owner registration card is not a condition of warranty coverage.

6. **BEFORE REQUESTING SERVICE**, please review the instruction manual to insure proper installation and correct customer control adjustment. If the problem persists, contact your nearest SRS Labs, Inc. dealer for the name(s) of authorized SRS Labs, Inc. Service Center(s). If you are unable to obtain this information, please call 1-800-2HEAR3D (800-243-2733).

7. The warranty for your product can be registered online at www.srslabs.com/warranty.asp