



OWNER'S MANUAL

# CAD 120S MKII

Stereo Power Amplifier

NOTE: Before installing your new component, please read this manual carefully as it will inform you of the product specifications, proper installation and correct operating procedures for your unit. Also included in this manual are guidelines on how to service and care for your new Cary Audio Design product.

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# IMPORTANT SAFETY INSTRUCTIONS

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**WARNING:** The triangle with the lightning flash symbol displayed on the unit advises the user of dangerous uninsulated voltage inside the product's enclosure.

**CAUTION:** To reduce the risk of electric shock, do not remove the cover. There are no user-serviceable parts inside; it is recommended that only qualified personnel service this component.

**ALERT:** The triangle with the exclamation point symbol on the component suggests that the owner refer to important operating and maintenance instructions in the owner's manual.

1. **OWNER'S MANUAL:** Before powering up the equipment, read all safety and operating instructions and follow them as instructed. Retain the safety and operating instructions for future reference.
2. **ATTACHMENTS:** Use only those attachments recommended by the unit manufacturer, as others may cause hazards.
3. **ACCESSORIES:** Do not place the unit on an unstable cart, stand, tripod, bracket, or table. The unit may fall, causing injury to a person or damage to the unit. Mount the unit according to the manufacturer's instructions with the suggested mounting accessory.
4. **WALL OR CEILING MOUNTING:** Mount the unit to a wall or ceiling only in the manner recommended by the manufacturer.
5. **WATER AND MOISTURE:** Do not use the unit near water (for example, near a swimming pool, bath tub, wash bowl, kitchen sink, or laundry tub) or in a damp environment (like a basement or outside in the rain).
6. **OBJECT AND LIQUID ENTRY:** Do not push objects of any kind into the unit through openings as they could touch dangerous voltage points and short-out parts, possibly resulting in a fire or electric shock. Avoid spilling liquid of any kind on the unit. If water or any metal object (such as a paper clip, coin, or staple) accidentally falls inside the unit, disconnect it from the AC power source immediately and contact Cary Audio Design for further instructions.
7. **HEAT:** Position the unit away from heat sources such as radiators, heat registers, stoves, or other units (including amplifiers) that produce heat.
8. **VENTILATION:** Slots and openings in the cabinet create ventilation to protect the component from overheating. These openings on the top and bottom panels must remain unobstructed. Allow at least 6 inches (16cm) of clearance above the unit and an opening behind the unit for airflow. Do not place the unit on a bed, sofa, rug, built-in bookcase, or rack without adequate ventilation.
9. **GROUNDING OR POLARIZATION:** As a safety feature, the unit may be equipped with a polarized alternating current line plug in which one blade is wider than the other. This plug will fit into the power outlet only one way. If you cannot insert the plug fully into the outlet, try reversing the plug. If the plug still will not fit, contact a licensed electrician to update your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
10. **POWER SOURCES:** Operate the unit only from the power source indicated on the marking label. If you are unsure of the type of power supplied to your home, consult your unit dealer or local power company.
11. **POWER CORD PROTECTION:** Arrange power supply cords so that they do not suffer from foot traffic or pinching by items placed on or against them. Pay close attention to cords where plug enter the AC outlet and where they exit from the unit.
12. **LIGHTNING:** For added protection during a lightning storm or when is the component is idle for long periods of time, unplug the unit from the wall outlet and disconnect the antenna or cable system. This will help protect the unit from lightning and power line surge damage.
13. **POWER LINES:** Do not locate an outside antenna system in the vicinity of overhead power lines or other electric light or power circuits. When installing an outside antenna system, take extreme care to avoid touching the power lines or circuits; contact with them could be fatal.
14. **OVERLOADING:** Do not overload wall outlets, extension cords, or integral convenience receptacles as this increases the risk of fire or electric shock.

# IMPORTANT SAFETY INSTRUCTIONS

15. **REPLACEMENT PARTS:** When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or those having the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock or other hazards.
16. **SAFETY CHECK:** Upon completion of any service or repairs to the unit, ask the service technician to perform safety checks to ensure the unit is in proper operating condition.
17. **IMPORTANT SAFETY NOTE:**
  - Before connecting a new product such as the CD 303T to your audio or home theater system, turn off all other equipment (preferably unplugging them from the AC power source). Many audio components feature automatic turn-on circuits that may activate during an installation, potentially causing damage to electronic components and/or speakers. This type of damage is not covered by product warranties, and Cary Audio specifically disclaims responsibility for any such damage.
  - **Power Cord:** The removable power cord provided with your player was specifically designed for use with this product, but other AC cords may be used. Consult your dealer for advice on AC power cords and high quality wire in your system.
  - **AC Fuse:** The fuse is located inside the chassis and is not user serviceable. If the unit does not power up, contact an authorized service representative
  - **Wiring:** Cables running inside walls should have the appropriate markings to indicate compliance and listing by the UL, CSA or other standards required by the UL, CSA, NEC or your local building code. Questions about cables inside of walls should be referred to a qualified custom installer, a licensed electrician, or low-voltage contractor.
18. **RECORDING COPYRIGHT:** Recording of copyrighted material for other than personal use is illegal without permission of the copyright holder.
19. **NOTE TO CATV SYSTEM INSTALLER:** This reminder is provided to call the CATV system installer's attention to article 820-40 of the NEC, ANSI/NFPA 70, which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as practical.
20. **FCC INFORMATION FOR USER:**

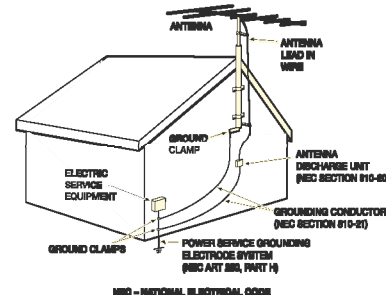


- **CAUTION:** Any changes or modifications not expressly approved by Cary Audio Design could void the user's authority to operate the equipment.
- **NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules.
- These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy, and if not installed and used in accordance with the instructions it 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.
  - Connect the equipment into an outlet on a circuit different from where the receiver is connected.



## 21. OUTDOOR ANTENNA INSTALLATION/SAFE ANTENNA AND CABLE CONNECTION:

- If an outside antenna or cable system is connected to the equipment, be sure the antenna or cable system is grounded in order to provide protection against built-up static charges and voltage surges. Article 810 of the National Electrical Code, ANSI/NFPA 70 (in Canada, Part 1 of the Canadian Electrical Code) provides information regarding proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes and requirements for the grounding electrode.
- outside antenna system should be located well away from power lines, electric light or power circuits and where it will never come into contact with these power sources if it should happen to fall. When installing an outside antenna, extreme care should be taken to avoid touching power lines, circuits or other power sources as this could be fatal. Because of the hazards involved, antenna installation should be left to a professional.



# WELCOME

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## THANK YOU

Thank you for purchasing the CAD 120S MKII Stereo Vacuum Tube Amplifier

The stereo vacuum tube power amplifier has a great history at Cary Audio Design. The previous generation CAD 120S, Rocket 88R, and V 12R power amplifiers garnered fantastic reviews for stable power output, incredible value for the money and sound quality along with 'Best Buy' and 'Class A' ratings from magazines and reviewers worldwide. Building on this storied legacy, we are releasing the next generation CAD 120S MKII stereo vacuum tube power amplifier. This innovative stereo power amplifier is rated at 60 watts per channel in triode mode and 120 watts per channel in ultra linear mode into an 8 ohm speaker load.

Full rated output power is from 17 Hz to 23 kHz with less than 1% total harmonic distortion. The output stage may be switched 'on the fly' from triode mode to ultra linear mode by using a front panel selector button. There are LED lights above the mode selection button to show which mode the power amplifier is working in for visual confirmation. Another nice feature is that the amplifier has an operating mode memory. The CAD 120S MKII will remember either the triode or ultra-linear mode selection when the amplifier is turned to the off position.

The vacuum tubes in each channel consist of one (1) 6SN7 for the input gain, one (1) 6SN7 for the driver stage and four (4) KT 88 output power tubes. The circuit is a balanced design with separate RCA and XLR inputs. A soft start turn on circuit is built-in for long life and easy turn on in large systems. The power supply features 1,120 $\mu$ F of capacitance per channel for ample reserves in demanding usages. The output transformers and the power transformer have a single cover painted to match the chassis.

The backlit front panel meters indicate the bias setting for each channel and visually indicate proper operation for the CAD 120S MKII amplifier.

Congratulations on your fine choice, the Cary Audio Design CAD 120S MKII. We are confident the CAD 120S MKII will bring you many years of musical satisfaction, and we sincerely welcome you to the Cary family.

**CARY**<sup>®</sup>  
*Audio Design*

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# WELCOME

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## UNPACKING AND INSTALLATION

### Unpacking

Your Cary Audio Design product was shipped in a carton particularly designed to protect its contents, and special care has been taken to prevent damage during shipping. Carefully remove your new component from its packing carton and examine it closely for signs of shipping damage. If shipping damage is discovered, document the damage with photographs, contact the transport carrier immediately, and retain the packing as evidence.

We strongly recommend saving all original packing cartons to protect your component for storage or future shipping.

### Included in the Box(es)

When unpacking your CAD 120S MKII, make sure the following is included:

- CAD 120S MKII
- Vacuum Tubes
- Power Cable
- Owner's Manual
- Warranty Card
- Spare Fuses

### Warranty Card

If you are the original purchaser of this unit and you purchased it in the United States, fill out the enclosed warranty registration card and return it to Cary Audio Design within 15 days of your purchase. Warranty restrictions apply. Consult the warranty section of this manual for details. Please keep a copy of the original sales receipt from your Authorized Cary Audio Design dealer to validate the warranty if necessary.

## SPECIFICATIONS

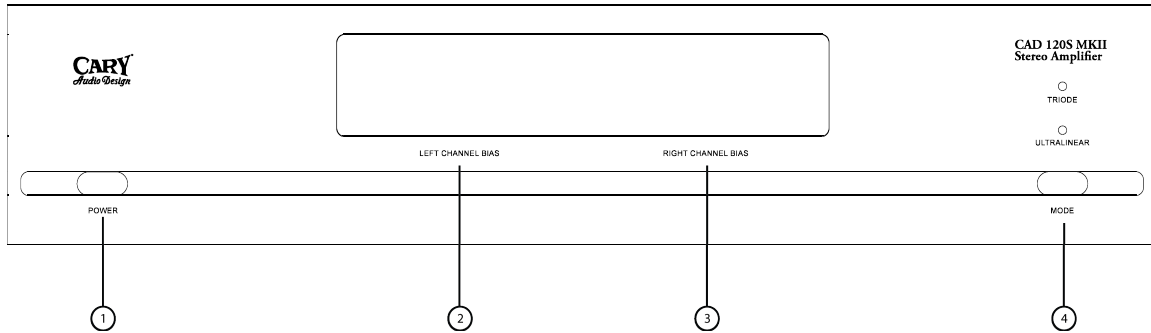
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Operating the CAD 120S MKII is a simple procedure since each unit is designed for long-term stability in virtually any home operating situation. However, if the unit is operated outside the parameters outlined in this owner's manual, damage may occur. Please read this manual carefully before operating your new CAD 120S MKII.

<b>Circuit Type</b>	Class AB, push-pull amplifier, Ultra linear or Triode mode operation with a front panel selector switch
<b>Power Output</b>	Ultra linear - 120 watts per channel Triode - 60 watts per channel
<b>Inputs</b>	XLR balanced or RCA single-ended
<b>Noise and Hum</b>	-80 dB
<b>Input Impedance</b>	100K both RCA and Balanced
<b>Frequency Response</b>	17 Hz - 25 KHz flat @ 1 watt
<b>Gain</b>	28dB
<b>Sensitivity</b>	1.24v
<b>Tubes</b>	2 - 6SN7 input gain stage 2 - 6SN7 driver tubes 8 - KT 88 output tubes
<b>Power Transformer</b>	EI High voltage & bias supply EI laminate
<b>Filament Transformer</b>	2 – EI laminate 6.3 VAC @ 12 amp CCS
<b>Output Transformer(s)</b>	Special bifilar wound 150 watt rating unit in each channel
<b>Power Supply Capacitors</b>	4 x 560 $\mu$ F
<b>Speaker Posts</b>	Cary gold plated copper, 5-way binding
<b>AC Power Requirements</b>	117 VAC @ 50/60 Hz - 234 VAC @ 50/60 Hz
<b>Warm-Up Time</b>	3 minutes
<b>Break-In Time</b>	100 hours of playing time
<b>Finish</b>	Jaguar Anthracite black with clear coat finish, silver anodized aluminum faceplate standard (black optional)
<b>Weight</b>	65 lbs
<b>Dimensions</b>	8" H x 17" W x 14" D

# CONTROLS AND DISPLAYS

## FRONT PANEL



### 1. POWER

- Press once to turn the power ON.
- Press again to turn the power OFF.

### 2. LEFT CHANNEL BIAS

- Indicates a proper DC current of between 130 to 150 ma.

### 3. RIGHT CHANNEL BIAS

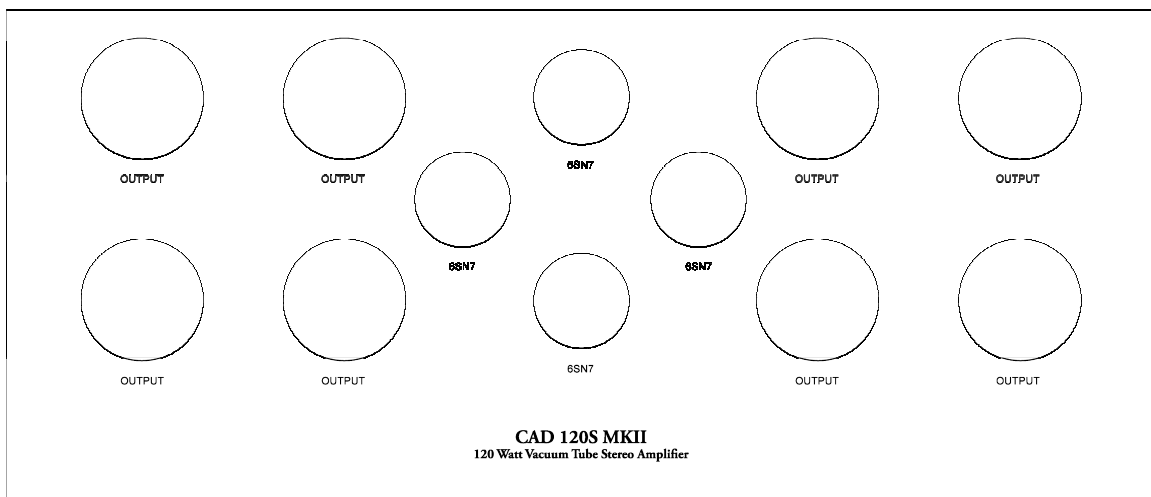
- Indicates a proper DC current of between 130 to 150 ma.

### 4. MODE

- Press this button to change between Triode and Ultralinear modes.

## TOP PANEL

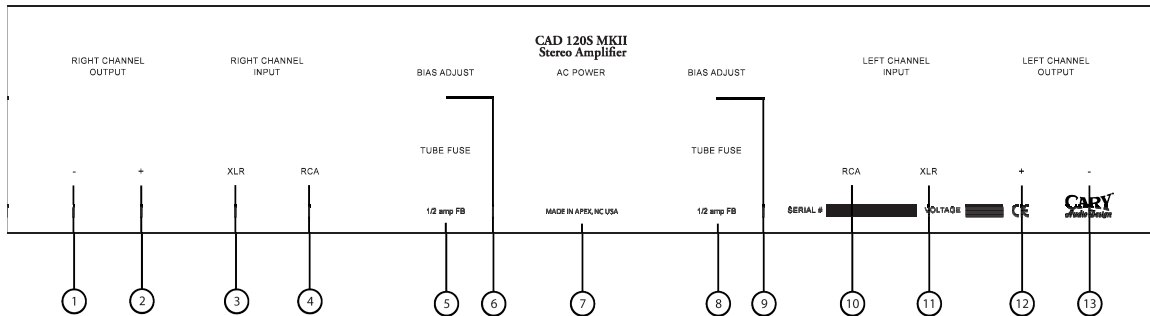
The following illustration shows the tube placements on the CAD 120S MKII.





# CONTROLS AND DISPLAYS

## REAR PANEL



- 1. RIGHT CHANNEL OUTPUT – NEGATIVE LEAD**
- 2. RIGHT CHANNEL OUTPUT – POSITIVE LEAD**
- 3. RIGHT CHANNEL INPUT – XLR INPUT**
- 4. RIGHT CHANNEL INPUT – RCA INPUT**
- 5. TUBE FUSE ½ AMP FAST BLOW RIGHT CHANNEL**
- 6. BIAS ADJUST POTENTIOMETER RIGHT CHANNEL 130 – 150 ma.**
- 7. AC POWER MAIN FUSE 4 AMP SLOW BLOW**
- 8. TUBE FUSE ½ AMP FAST BLOW LEFT CHANNEL**
- 9. BIAS ADJUSTMENT POTENTIOMETER LEFT CHANNEL 130 – 150 ma.**
- 10. LEFT CHANNEL INPUT – RCA INPUT**
- 11. LEFT CHANNEL INPUT – XLR INPUT**
- 12. LEFT CHANNEL OUTPUT – POSITIVE LEAD**
- 13. LEFT CHANNEL OUTPUT – NEGATIVE LEAD**

## OPERATION

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Your new CAD 120S MKII power amplifier is ready for operation after the speaker, interconnect cables and the vacuum tubes have been installed into their proper sockets. Refer to the labeling on the chassis for placement and proper tube installation.

### SPEAKER BINDING POSTS

The CAD 120S MKII will drive loudspeaker loads from as low as 2 ohms to a high of 16 ohms without any adjustment. Please remember to keep the proper phase on each channel when connecting the loudspeaker cables. Red is positive and black is the negative lead.

### TRIODE OR ULTRA-LINEAR MODE SWITCH

The push button located on the lower right side of the front panel will toggle from triode to ultra-linear modes. There is a blue LED indicator lamp located above the switch. When this blue LED is illuminated the CAD 120S MKII is in the triode mode. Push the button again and the red LED will appear. The CAD 120S MKII is now in the ultra-linear mode. This mode selector system has a memory feature. The amplifier can be powered down (turned off) and the amplifier operating mode will remain in the last position. The absolute default mode is triode if the amplifier is unplugged from the AC wall outlet.

### POWER ON / OFF SWITCH

The front panel push button located to the lower left is a power on power off selector. With the CAD 120S MKII plugged into the wall AC outlet this button will engage the soft-start system and bring the amplifier to the full operate mode. You will notice that the two DC current meters on the front panel will light up blue. The vacuum tubes will light as well. To power down (turn off) simply push the power button once again and the soft start system will remove the main AC power from the power supply in the CAD 120S MKII.

### BIAS MEASUREMENT AND ADJUSTMENT

Setting the operating bias levels on the CAD 120S MKII is a rather simple matter thanks to the built in front panel DC current meters. These two meters indicate the DC current being drawn by each channel. The meter to the left reflects the operating current for the left channel. The corresponding meter to the right indicates the operating bias level of the right channel. From the factory the bias has been set to approximately 140 ma. DC current on each channel. This read out will vary with different AC wall voltages.

## OPERATION

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On the rear panel of the CAD 120S MKII is a bias adjustment potentiometer for each channel. This is a screwdriver slotted shaft control. After the amplifier has been powered up for a few minutes observe the meter readings. The proper reading should be 140 ma. plus or minus 10 ma. To make the bias adjustment insert a flat bladed screwdriver into the rear mounted bias adjustment potentiometer and turn clockwise to raise the bias or counter clockwise to lower the bias reading. There is some interaction between channels. Adjust the right and left channel bias a few times until you have an equal reading (plus or minus a few ma) on each channel. The bias reading level is not critical in respect to a range of a low reading of 125 ma. to a high reading of 170 ma. The preferred reading should be approximately 140 ma. plus or minus 10 ma. The DC bias current value will fluctuate with varying in house AC wall voltage. As air conditioning systems cycle and power loads in the neighborhood change, the bias reading will fluctuate a bit. This is normal and therefore not critical.

Another word about the meter readings. The louder you play the CAD 120S MKII the more current it will draw. Playing loud, especially in the ultra-linear mode will peg the meters at 200 ma. This is normal and there is a protection circuit built into the metering circuit to prevent damage to the analog meters. Pegging the meters is fun!

### **BREAK-IN PERIOD**

The tubes, capacitors and output transformers take approximately 100 hours use to settle in for peak performance. The CAD 120S MKII will sound good right out of the box but it will improve within a short time. After the first 50-100 hours you will notice increased depth and tighter bass. This break-in period is true with quality vacuum tube audio amplifiers.

### **TUBE REPLACEMENT**

If it becomes necessary to replace the tubes in the amplifier, a matched set of output tubes of the same name brand should be used. A new tube kit is available from Cary Audio. You should get years of service from the rugged KT-88 output tubes. The input and driver 6SN7 tubes can last even longer. Other output tubes may be used in the CAD 120S MKII power amplifier; 6L6, 6CA7, KT-66, 6550C, KT-90, KT-99 or EL-34 tubes are all acceptable for use in the output stage of the CAD 120S MKII. Use the same current setting for any of these tubes as described in the bias set up.

## **SERVICE AND CARE**

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### **CARE AND CLEANING**

Unplug the unit from the wall outlet. Clean the cabinet housing and front panel of the CAD 120S MKII with a soft cloth and a glass cleaner. The frequency of cleaning will vary based on the cleanliness of the environment and the number of hours the CAD 120S MKII is operated.

### **FACTORY SERVICE**

Careful consideration has been given to the design of the CAD 120S MKII to minimize maintenance issues. Any problems or requests for service should be referred to the Customer Service Department at 919.355.0010. Do not return the CAD 120S MKII to the factory without a return authorization number (RA). Refer to the next section for details about returning equipment to Cary Audio Design.

Should the unit be lost or damaged in shipment, Cary Audio Design will assume no responsibility if the shipping company refuses to pay for damage due to improper packing or lack of insurance. Please use the original carton for shipping the music server.

### **NON-WARRANTY REPAIRS**

Cary Audio Design will provide repair service for its products charging on a time and expense basis. Please call Cary Audio Design at 919.355.0010 for more information about out-of-warranty service and repair fees.

## **UNITED STATES LIMITED WARRANTY**

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Cary Audio Design warrants to the original United States purchaser for use in the United States that Cary Audio Design vacuum tube or solid-state power amplifiers surround sound processors, preamplifiers, or music servers shall be free from defects in parts or workmanship for three years from the date of the original purchase. Vacuum tubes, if any are used in the component, are offered a 90-day (from purchase date) exchange policy against defects with the exception of the CAVT 300B vacuum tube that has a one-year (from purchase date) exchange policy. Any digital drive design, whether a Cary Audio Design CD or SACD player, Cary Cinema DVD player, or Cary Music Server has a limited one-year parts and labor warranty against defects in manufacturing. This is a limited warranty offered only to the original purchaser and does not transfer.

During the limited warranty period, Cary Audio Design or an authorized Cary Audio Design service facility will provide free of charge both parts and labor necessary to correct any defects in material or workmanship.

To obtain such warranty service, the original purchaser must complete and send in the Warranty Registration Card within 15 days of purchase.

### **WARRANTY DISCLAIMER**

Except for the express warranties stated herein, Cary Audio Design disclaims all other warranties including, without limitation, all implied warranties of merchantability and fitness for a particular purpose. The foregoing constitutes Cary Audio Design's entire obligation with respect to this product, and the original purchaser and any user or owner shall have no other claim for incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation and exclusion may not apply to you. This warranty gives legal rights and you may also have other rights, which vary from state to state.

Proper maintenance, repair and use are important to obtain performance from this product. Therefore, please carefully read the Operating Manual. This warranty does not apply to any defect that Cary Audio Design in its sole discretion determines was caused by any of the following:

- Improper maintenance or repair, including the installation of parts or accessories not conforming to the quality and the specifications of the original parts
- Misuse, abuse, neglect or improper installation
- Accidental or incidental damage

### **EXCLUSIVE REMEDY**

Notwithstanding the foregoing, the purchaser's exclusive remedy for any breach of warranty, express or implied, is limited to the repair or replacement of the defective unit or the refund of the purchase price, at the option of Cary Audio Design. Under no circumstances is Cary Audio Design liable for incidental or consequential damages. Any implied warranties imposed by law terminate one year from the date of purchase.

# UNITED STATES LIMITED WARRANTY

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## INTERNATIONAL PURCHASERS (EXPORT MARKETS)\

Cary Audio Design warrants its merchandise to purchasers within the United States exclusively for use within the United States of America. It provides no other warranties, expressed or implied. If you are living outside the USA, please consult your local dealer or distributor to determine the details of your local warranty.

## SHIPPING INSTRUCTIONS

In the event that the owner needs to return the unit to Cary Audio Design for service or repair of a possible defect, he must follow these steps:

1. Contact Cary Audio Design at 919.355.0010 to obtain a Return Authorization (RA) number prior to shipping; include this number with the package.
2. Submit a copy of the original sales receipt; a blank receipt will not validate the limited warranty for service by Cary Audio Design. The original sales receipt must contain the following information:
  - the authorized Cary Audio Design dealer's name
  - the date of purchase
  - the sales price
  - the buyer's name and address
3. Describe the problem in detail.
4. Note the unit model number and serial number.
5. Deliver by either of these methods:
  - a. With all freight and insurance charges prepaid and in its original packing container or equivalent, ship the component to  
Cary Audio Design  
1020 Goodworth Drive  
Apex, North Carolina 27539
  - b. Hand-deliver the product to Cary Audio Design (address noted above) or the nearest authorized service facility.

**CARY**<sup>®</sup>  
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