



CAD-300-SE LX-20

OPERATING MANUAL

NOTE:

Before installing your new CAD-300-SE LX-20's, please read this manual carefully. This manual will inform you of the CAD-300-SE LX-20's specifications, proper installation procedures. Also included in this manual are guidelines on how to properly service and care for your new CAD-300-SE LX-20's.

CAD-300SE/LX20
SINGLE-ENDED MONO-BLOCS

The CAD-300SE/LX20 mono-blocs are the result of nine years of refinement to the CAD-300SE's. These are the amplifiers that started the revolution in high-end audio in 1990. These pure class A, triode tube, single-ended mono-blocs are the standard by which all others should be judged.

There are moments when art and technology come together. To make a legend. Among discerning audio lovers, the new CAD-300SE/LX20 is such a legend. Experience the CAD-300SE/LX20's. We believe they will change the way you listen to music. *Forever.*

CAD-300SE/LX20 TECHNICAL DESCRIPTION

For the technically minded, a review of the circuit is in order. The new CAD-300SE/LX20 mono-blocs operate in pure class A single-ended. The output stage features the new KR Enterprises, 300BXLS low-mu audio power triode. The output power is 20 watts class A single-ended triode. The output transformer in the new 300/LX20 is an air gap design with full bias running on a continual basis. The output transformer in the CAD-300SE/LX20 is the most important component in the amplifier and has been specifically designed by Cary Audio Design for use in the 300-SE/LX20's. We have taken the approach in the output transformer design to use oxygen free copper wire. The primary and secondary windings on portions of the output transformer are wound in a bi-filer process with the two inductors interleaving sixteen times. The bi-filer wind (two conductors wound at the same time) will yield the closest balance and coupling of any design currently utilized in vacuum tube output transformers. The E/I laminents used in the special output transformers on the CAD-300SE/LX20 amplifiers are silicone impregnated hipersil steel contributing to the extremely low loss and a seductive midrange. The above process is similar to the single-ended design air-gap transformers found on all the Cary single-ended output transformers.

A great deal of attention during design of the new CAD-300SE/LX20's was concentrated on the "overload recovery" ability of the amplifier. The ability of an amplifier to instantly recover from clipping is much more important than is commonly believed. In the power war of amplifier manufactures the mentality is focused on high and then even higher power output to solve the clipping problem. When in reality the most critical aspect is how fast of a recovery an amplifier can achieve after overload. With the incredible dynamic range of live and in turn recorded music, even 2,000 watts of power is not enough. Most of the music being listened to in an average home listening room is only requiring about 3 watts of power. It is on the transients of loud low frequency program material that tremendous signal voltages will appear at the input of the amplifier. It is in this situation that the overload recovery ability of an amplifier is of critical concern. The CAD-300SE/LX20 extols its merits in the ability to handle transients and instantaneously recover from brief or even extended overloads. The 300SE/LX20's will overload symmetrically at any frequency in the audio bandpass.

The CAD-300SE/LX20 will also yield faithful reproduction of extremely low frequencies at full output levels. Power transformer, power supply regulation and output transformer design and

careful shaping of the overall frequency response curve all play a very important part in the ability of the CAD-300SE/LX20 to recover quickly when over loaded. If one were to monitor the high voltage rail voltage (580 VDC) at the anode of the SV-572-3 output tube during soft and also loud music passages it would be found there is no more than a volt or so change from soft to loud passages.

Another technical feature of the new CAD-300SE/LX20 amplifier is stability. The 300SE/LX20's may be operated with no load (without speaker) without damage to the amplifier, output transformer or tubes.

The CAD-300SE/LX20 mono amplifiers are built on a textured painted steel chassis with anodized aluminum front panels. The amplifiers are built to perform year after year with trouble free operation. The CAD-300SE/LX20's are a classic example of the "CARY" sound.

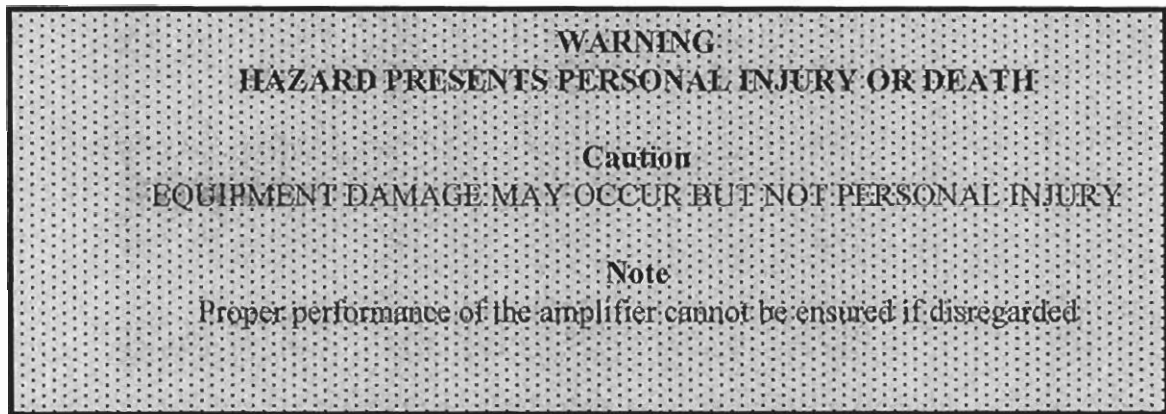
The power supply in the CAD-300SE/LX20 actually consists of four different supplies. The power transformer is designed to operate at a 200% continuous commercial service at the full rated 20 watt output level. The high voltage power supply section is a full wave center tap configuration (not some cheap voltage doubler as used in many competitors amps) to a PI filter choke, capacitor network. This high voltage section feeds the final output KR300BXLS tube through the air gapped output transformer. Another supply feeds a filter choke, PI network medium voltage supply for the input and drive tubes. The input tube is a 6SL7 dual triode configured in a anode current source configuration. This input tube is operating in Class A and the cathode is A.C. by-passed to ground. A drive signal is applied to the control grid of the 300B output tube from the 6BL7 driver tube operating in a cathode current source configuration.

The amplifier operates in full conduction class A, with an input power of 78 watts. Output audio power is 20 watts into 4 or 8 ohms, switch selected. This power is rated at a continuous state with audio peaks of high levels. The average efficiency of the CAD-300-SE/LX20 is 27%.

1.2 Specifications

CAD-300-SE/LX20 Specifications:

The following definitions are applicable to this manual. These definitions must be followed explicitly.



Weight: 30 Lbs.

Dimensions: 7"H x 5.5"W x 19"D

Circuit Type: Single-ended Class A

Power Output: 20 watts

Input Sensitivity: 1 Volt

Noise and Hum: -90 dB

Frequency Response: 15 Hz - 23 Khz +/- 1 dB

Tubes: 1 ea 6SL7 input

1 ea 6BL7 driver

1 ea KR-300BXL5

1 ea 5U4/5R4 rectifier

Power Transformer: EI Laminate 200% duty cycle

Output Transformer: EI Laminate, Bi-Filer, Tri-Filer Wound, 135 mA. Air Gap, 30 watt CCS

Resistors: 1% Metal Film

Capacitors: Oil-Filled Coupling, .22 MFD @ 600 VDC

Filter Chokes: 1 ea High Voltage, 1 ea Medium Voltage

Power Supply Capacitors: 2 ea 1200/450 VDC, 2 ea 100 MFD/450 VDC, 2 ea 47 MFD/ 350 VDC and 2 ea 15,000 MFD/16 VDC

AC Cord: Detachable

AC Power Requirements: 120/240 VAC @ 50/60 Hz

Consumption: 50 Watts Stand-By, 95 Watts Operate

Break-In Time: 100 Hours

Finish: Black Anodized Faceplate, Chrome Plated Stainless Steel Chassis

1.3 Front Panel Features

AC-ON TOGGLE SWITCH: Turns AC power on in the "up" position. Left Blue LED Comes on.

STAND-BY/ OPERATE: Turns B+ high voltage on in the "up" position. Right Blue LED comes on.

1.4 Rear Apron Features

INPUT: Signal input connection via shielded interconnect cable

OUTPUT: The 5-way binding posts provide the output to the speaker system. Red = +, Black = -

BIAS POTENTIOMETER: Screwdriver adjustment for 300B bias

BIAS JACK: 1/4" mono jack to measure bias. See instructions.

AC: 3 conductor AC connector

FUSE: AC power fuse. Never replace with any other valve than 2 AMP
SLOW BLOW! 250 VOLT

<p style="text-align: center;">CAUTION EQUIPMENT DAMAGE MAY OCCUR WITH IMPROPER FUSES</p>
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<p style="text-align: center;">CAUTION NEVER REMOVE/INSERT AC LINE CORD WHEN THE UNIT IS ON</p>
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TO INSTALL THE 300B TUBE, REFER TO PAGE 7 OF THIS MANUAL AND READ INSTRUCTIONS CAREFULLY!

INSTALLATION

This section describes the unpacking and installation procedures for the CAD-300-SE LX-20 amplifier.

WARNING

MAKE NO ATTEMPT TO PUT THE CAD-300-SE LX-20 AMPLIFIER IN SERVICE WITHOUT THE BOTTOM PLATE ATTACHED - CONTACT WITH VOLTAGE IN THE CAD-300-SE LX-20 CAN BE FATAL!!!

2.2 Unpacking

All shipping containers have been specifically designed to protect their contents and special care has been taken to prevent damage under normal shipping conditions. Mishandling should be evident upon inspection; take care not to destroy the evidence. If necessary, document the damage with photographs and contact the transport carrier immediately.

Carefully remove your new CAD-300-SE LX-20 amplifier from its packing carton, and examine it closely for signs of shipping damage. It is recommended to save all original packing cartons to protect your amplifier from damage should you wish to store it or ship it for after sales service.

2.3 Warranty Card

Fill out the enclosed warranty registration card and return to Cary Audio Design, Inc. within 10 days of original purchase. Keep your original sales slip with the packing cartons should you ever need it for reference. **Failure to register warranty will limit the warranty to one year.**

2.4 Amplifier Placement

In general, the location of your new CAD-300-SE LX-20 amplifier is not critical. The best placement in your system is near the speaker system with short lengths of speaker cables. Certain precautions must be taken to ensure optimum performance. Avoid extremely hot locations such as near radiators or other heating units. Keep the top of the CAD-300-SE LX-20 clear of books, paper or other equipment to protect against overheating.

2.5 Power Requirements

The CAD-300-SE LX-20 is designed to operate from house current mains. The design voltage is 117VAC at 50/60Hz. (Foreign units 234 VAC at 50/60Hz)

2.6 Cables

The speaker cables from the output posts of the CAD-300-SE LX-20 to the speaker system can be any convenient length your set-up requires. Select speaker cables of sufficient size to preserve the outstanding performance capabilities of your CAD-300-SE LX-20. Heavy gauge #16 wire is suitable for distances up to 10 feet; #12 for 25 feet. Most audio dealers will have proper speaker cable in stock for this purpose.

OPERATION

Signal input connections is made via the input jack on the rear of the CAD-300-SE LX-20 located next to the output binding posts. The interconnect cables from the output of the preamplifier can be any convenient length your set-up requires. The choice of a high quality interconnect cable is important. Once again, your audio dealer will have the proper cables in stock for this purpose.

3.1 Operation

Your new CAD-300-SE LX-20's are ready for operation after the speaker, interconnect cables and the four tubes have been installed. **See page 7 for tube positions.**

3.2 AC On Power Switch

Simply push the AC toggle switch up to the ON position (the BLUE LED will light).

3.3 Stand-By Switch

This is a most convenient feature on the CAD-300-SE LX-20 amplifier. This switch is located on the front of the amplifier. In the "up" position, the amplifier is ready to operate. In the "down" position (provided the front panel AC switch is in the "on" position), only the tube filaments are operating. You may wish to leave your CAD-300-SE LX-20 amp turned on in the stand-by mode 24 hours a day. When you wish to listen to music, simply flip the stand-by switch in the "up" position. Under these conditions the CAD-300-SE LX-20's are always warmed up and ready for peak performance.

3.4 Break In Period

The tubes, capacitors and output transformers take approximately 100 hours of music playing to fully settle in for peak performance. The CAD-300-SE LX-20's may seem sterile or thin sounding right out of the box. After the first couple of hours you will notice increased depth and tighter bass. This break in period defies all engineering theory, but is true with most audio amplifiers.

SERVICE AND CARE

4.1 CAD-300-SE LX-20 Care and Cleaning

The chassis of the CAD-300-SE LX-20 may be cleaned with a soft rag and Windex (or a similar window cleaner). The frequency of cleaning will be governed by how many hours the CAD-300-SE LX-20 is operated and by operating environmental cleanliness.

4.2 Tube Replacement

If it becomes necessary to replace the tubes in the CAD-300-SE LX-20 amplifier, a matched set of tubes of the same brand should be used. A new tube kit is available from Cary Audio Design, Inc. You should get year's from the 300B output tube with everyday usage and many, many years of use from the input and driver tubes and rectifier tube.

WARNING

Make sure amplifier is unplugged from AC mains

4.3 Factory Service

Careful consideration has been given to the design of your CAD-300-SE LX-20s to keep maintenance problems to a minimum; however, it is possible that some problems may arise which cannot be cured by tube substitution. After reading the Troubleshooting Guide at the end of this manual, we suggest that you contact our Customer Service Department at phone number (919) 481-4494 to describe your problem in detail. **Do not return the CAD-300-SE LX-20 to the factory without a Return Authorization Number from the Customer Service Department.** Cary Audio Design will assume no responsibility if the transportation company refuses to pay damage claim due to your improper packing or lack of insurance should the unit be lost in shipment.

Non-Warranty Repairs

Cary Audio Design will provide repair service for its products charging on a time and expense basis for the repairs.

WARNINGS

**Make no attempt to put the CAD-300-SE LX-20 in service outside of the cabinet -
Contact with high voltages found in the unit can be fatal!!!**

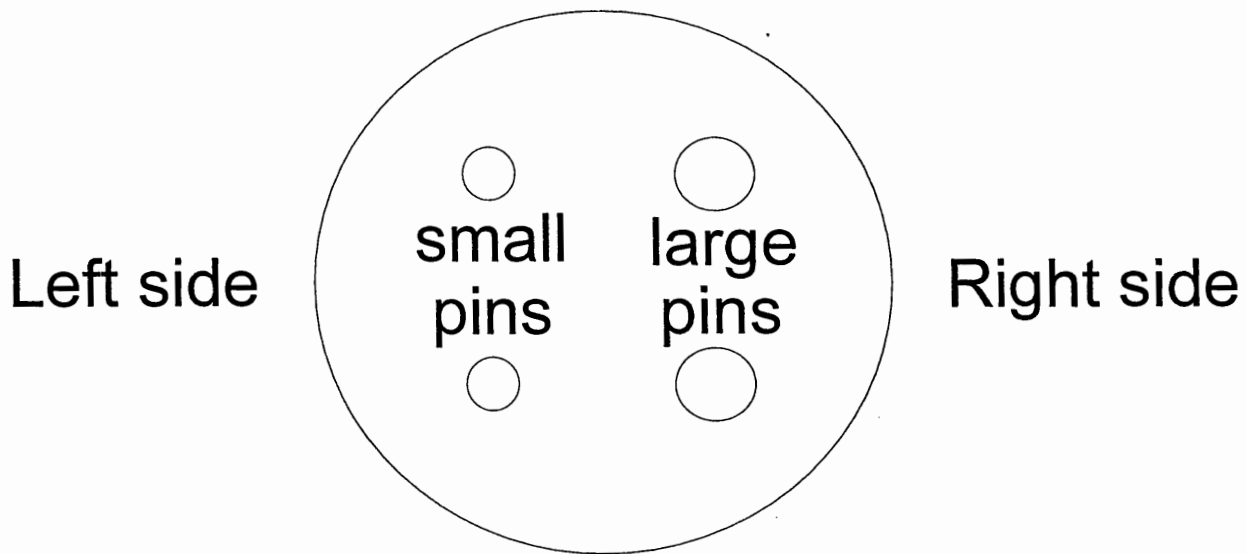
**Completely remove AC power plug from the wall and allow 30 minutes for the high
voltage capacitors to discharge through bleeder resistors before attempting to
change tubes or clean the inside to the preamplifier.**

CAUTIONS

**Never remove/insert AC plug when the unit is on or the
AC power switch is in the "ON" position**

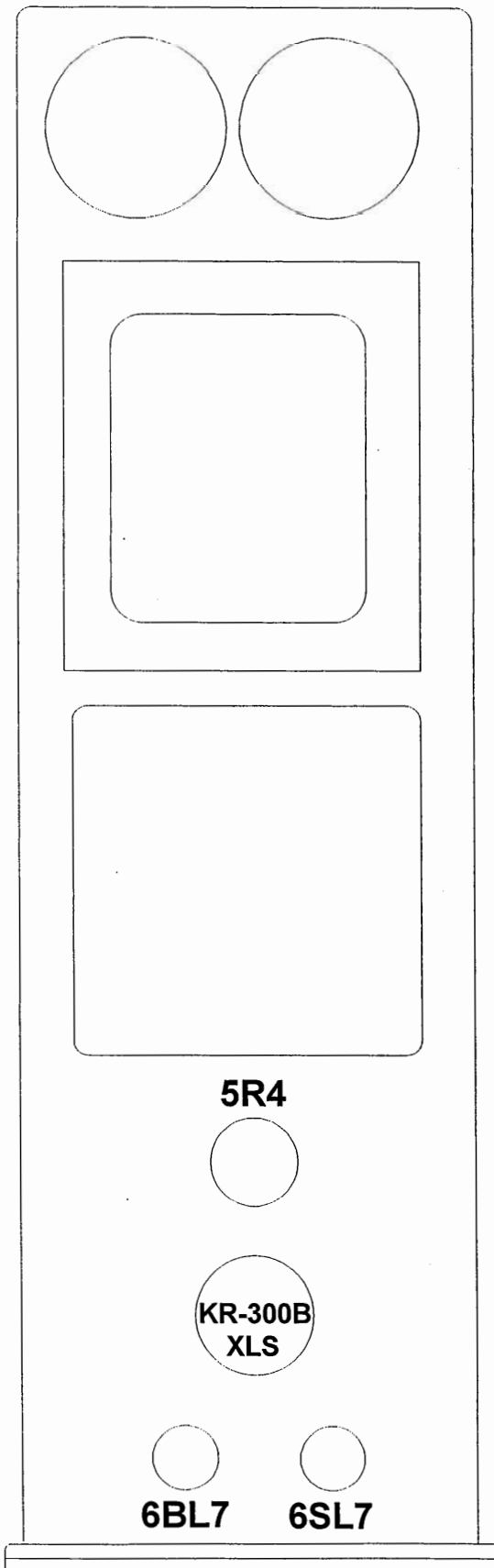
**Obstruction of the top portion of the CAD-300-SE LX-20 will result
in tubes overheating**

Large pins on KR-300B LXS tube **MUST** be inserted into the large holes in the sockets! These pins are on the right side of the amplifier.

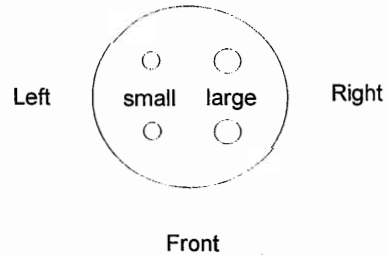


Front of amplifier

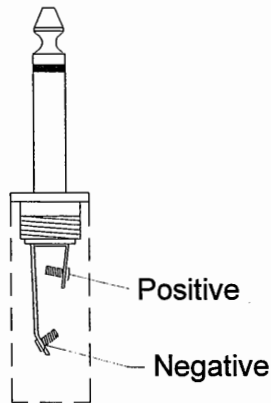
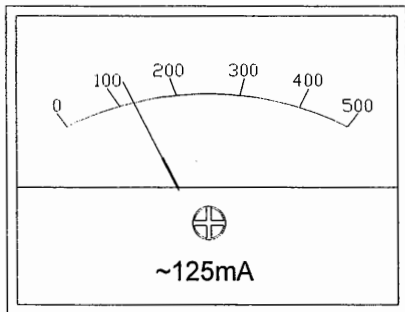
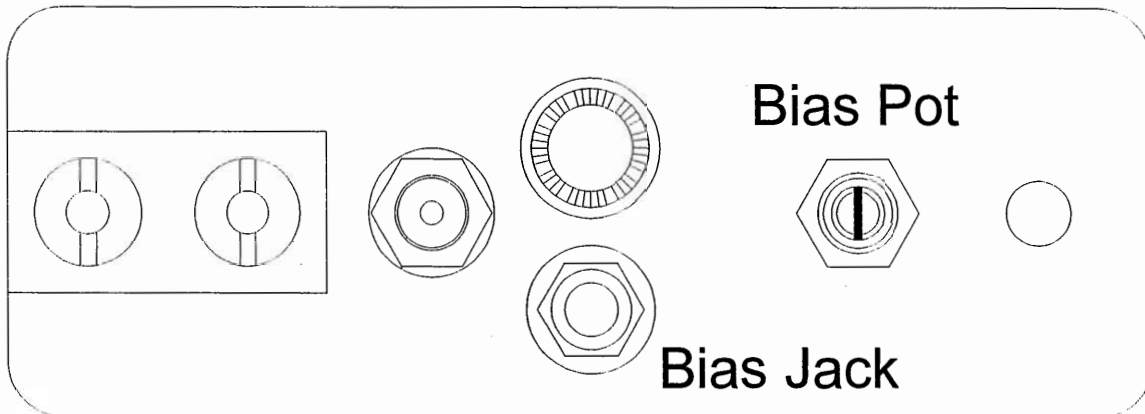
300-SE LX-20 Tube Placement



Large pins on KR-300B tube **MUST** be inserted into the large holes in the sockets! These pins are on the right side of the amplifier.



300-SE LX-20 Bias Adjustment

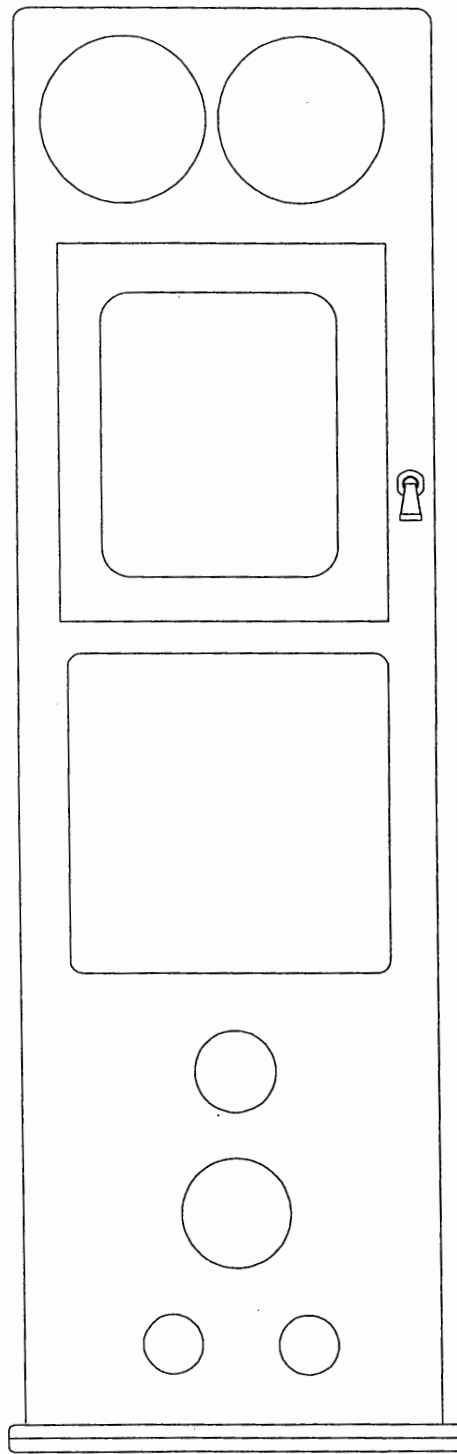


Insert meter plug into bias jack.
Adjust for ~125mA reading on VOM or DC current meter.
Readjust to after after CAD-300-SE LX-20 is warmed up for
10 minutes. Remove plug and enjoy the music!

Note: Bias is factory preset; Bias should be reset when installing replacement KR-300B XLS tubes.

***** Warning:** This amplifier was designed to operate with the KR-300B XLS tube. Using any other 300B tube will result in serious damage to the tube and the amplifier. ***

4Ω / 8Ω Selector switch



8Ω
Front

Rear
4Ω

NOTES:

UNITED STATES LIMITED WARRANTY

Cary Audio Design, Inc. warrants to the original United States purchaser for use in the United States, that this product shall be free from defects in material (except tubes and AF output transistors) or workmanship for:

Models CAD-211M, SLM-200 and the CAD-805, Five (5) years from the date of the original purchase.
Amplifiers and Preamplifiers, Three (3) years from the date of the original purchase.
Digital, One (1) year from date of original purchase.

During the warranty period, Cary Audio Design or an authorized Cary Audio Design service facility will provide free of charge both parts (except tubes and AF output transistors) and labor necessary to correct defects in material or workmanship.

To obtain such warranty service, the original purchaser must:

- (1) Complete and send in the warranty Registration Card.
- (2) Notify Cary Audio Designs as soon as possible after the discovery of a possible defect:
 - (a) The model number and serial number;
 - (b) The identity of the seller and the approximate date of purchase;
 - (c) A detailed description of the problem, including details on the electrical connection in the associated equipment and the list of such equipment.
- (3) Deliver the product to Cary Audio Designs or the nearest authorized service facility, or ship the same in its original container or equivalent, fully insured and the shipping charges prepaid.

Correct maintenance, repair and use are important to obtain optimum performance from this product. Therefore, carefully read the Operating Manual. This warranty does not apply to any defect that Cary Audio Design in its sole discretion determines is due to:

- (1) Improper maintenance or repair, including the installation of parts or accessories that do not conform to the quality and the specifications of the original parts.
- (2) Misuse, abuse, neglect or improper installation.
- (3) Accidental or incidental damage.

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.

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 (1) year from the date of purchase.

FOREIGN PURCHASERS

Cary Audio Design warrants its merchandise to purchasers in the United States for use in the United States. It provides no other warranties. If you are a foreign purchaser, consult with your dealer to determine whether your dealer provides any warranty.

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.