

CAD 88-SEI

OPERATING MANUAL

NOTE:

Before installing your new CAD88-SEI, please read this manual carefully as it will inform you of the CAD 88-SEI's specifications, proper installation procedures and operation procedures. Also included in this manual are guidelines on how to properly service and care for your new CAD 88-SEI.

| |
|---|
| <p style="text-align: center;">CAD88-SEI Single-Ended Stereo Integrated Amplifier</p> |
|---|

INTRODUCTION

Congratulations! You have purchased one of the most exotic vacuum tube audio amplifiers available. Within its power range, the CAD88-SEI integrated amplifier offers the most realistic sound reproduction one could desire for a "high-end" home audio system. Careful design, parts selection and proper circuit topologies contribute to incredible reliability and enjoyment.

For the technically minded, a review of the circuit is in order. Your new CAD88-SEI operates in a class A single-ended mode utilizing fixed negative grid voltage on the KT88 output tube. The input preamplifier section utilizes a 6SN7 dual triode tube. One triode section of this dual tube is used for the left channel and the other triode section is used for the right channel. This circuit is a Class A voltage gain circuit. This is the same basic first stage input circuit utilized in the Cary Audio model SLP-94 preamplifier. The next gain stage in the CAD88-SEI utilizes a 6SN7 dual triode wired in a series constant-current plate-loaded configuration. This stage is duplicated for each channel. The series constant-current configuration then drives the KT88 output stage in single-ended. The output transformers in the CAD88-SEI are the most important components in the amplifier and have been specifically designed by Cary Audio for use in the CAD88-SEI. The output transformer is an air-gap design with a commercial continuous rating of 200% duty cycle. The CAD88-SEI output transformer is an E/I laminate, silicone impregnated, grain oriented steel design. The windings are wax vacuum impregnated and the entire transformer is potted in high temperature wax. The power supply is a full wave center tap configuration running high voltage, high current fast switching diodes rectifiers. The rectified high voltage is fed to a pi-L filter network. The filter capacitors consist of two (2) 1200 MFD and one (1) 100 MFD computer grade electrolytic for a total of over 230 Joules of energy storage. Each electrolytic capacitor is by-passed with a low impedance .22 polystyrene capacitor. The power transformer is also a 200% duty cycle rating on the CAD88-SEI.

ADDITIONAL DESIGN THOUGHTS

A great deal of attention during design of your new CAD88-SEI 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 manufacturers 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 a recovery an amplifier can achieve after overload. With the incredible dynamic range of live and in turn recorded music even 2000 watts of power is not enough power. Most of the music being listened to in an average 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 single ended CAD88-SEI extols its merits in the ability to handle transients and instantaneously recover from brief or even extended overloads. The CAD88-SEI 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 CAD88-SEI to recover quickly when overloaded. If one were to monitor the high voltage rail voltage of a CAD88-SEI during soft and also loud music passages it will be found there is no more than a volt or so change from soft to loud passages.

The most exciting feature of your new CAD88-SEI, aside from how compact and gorgeous it looks, is the delightful, sensual beauty of the music it recreates. The first thing that will strike you about your new CAD88-SEI amplifier is the incredible transparency and resolution of detail in the music. The CAD88-SEI sensual nature is best revealed in the sense of life it displays in female vocalists.

Your new CAD88-SEI integrated stereo amplifier presents music with such presents and directness, you'll be drawn into the music hour after musically satisfying hour. This is a result of single-ended circuit techniques which eliminate any crossover notch at low levels, and also contributes to the freedom from listening fatigue. The CAD88-SEI will draw you in even further as you realize how lucid and utterly uncolored neutrality reveals delicate nuances in the sound stage.

Enjoy the music, and, of course, please read this manual for a complete understanding of trouble free operation.

CAD 88-SEI

INTEGRATED STEREO AMPLIFIER

SPECIFICATIONS

Operating the CAD 88-SEI stereo integrated amplifier is a simple procedure, since each unit is designed for long term stability in virtually any home operating situation. Therefore, if the unit is operated outside the parameters outlined in this owner's manual, damage may result. Please read this manual carefully before putting your new Cary Audio Design CAD 88-SEI in operation. The following definitions are applicable to this manual. These definitions must be followed explicitly.

WARNING

HAZARD PRESENTS PERSONAL INJURY OR DEATH

Caution

EQUIPMENT DAMAGE MAY OCCUR BUT NOT PERSONAL INJURY

Note

Proper performance of the amplifier cannot be ensured
if disregarded

1.2 Specifications

The following section describes the CAD 88-SEI basic specifications. Specs are subject to change without notice or obligation.

DIMENSIONS: 8"H x 14"W x 14"D

WEIGHT: 51 lb..

CIRCUIT TYPE: Single-Ended , Class A

POWER OUTPUT: 20 Watts

INPUT SENSITIVITY: .45 volts for full output

INPUT IMPEDANCE: 100,000 ohms

NOISE AND HUM: 82db below rated output

FREQUENCY RESPONSE (at full power output): 19Hz to 23Khz +/- .5db

TUBES: 1- 6SN7 Input Buffer Preamp
2- 6SN7 Pre-Driver/Phase Inverter
2- KT88 Output Tubes

OUTPUT TRANSFORMERS: 2-EI laminated, 200% duty cycle, air gapped
wound with OFC copper wire, and wax impregnated.

POWER TRANSFORMERS: 1-EI laminated , Silicon impregnated.

RESISTORS: 1% metal film

CAPACITORS: polypropylene

POWER SUPPLY CAPACITORS: 2 - 1200 MFD @ 450 volts

AC CORD: 3 conductor shielded detachable

AC POWER REQUIREMENTS: 117/234 volts AC 50/60Hz

POWER CONSUMPTION: 130 watts operate
55 watts in stand-by

WARM-UP TIME: 3 minutes

BREAK-IN PERIOD: 100 hours of music playing time

FINISH: Chrome plated Stainless Steel Chassis

FRONT PANEL: Machined, Black Anodized aluminum

1.3 Front Panel Features

4.2 Tube Replacement

If it becomes necessary to replace the tubes in the CAD88-SEI amplifier, a matched pair set of output tubes of the same brand should be used. A new tube kit is available from Cary Audio Design, Inc. You should get a few years or more from the output tubes with everyday usage and many, many years of use from the 6SN7 input tubes.

4.3 FACTORY SERVICE

Careful consideration has been given to the design of your CAD 88-SEI amplifier to keep maintenance problems to a minimum. However, it is possible that some problems may arise which cannot be cured by tube substitution. At this point we suggest you contact our Customer Service Department phone number 800-421-5456 to describe your problem in detail. DO NOT return the CAD 88-SEI to the factory without a return authorization number from the Customer Service Department

Cary Audio Design, Inc. will assume no responsibility if the transportation company refuses to pay a damage claim due to your improper packing or lack of insurance should the unit be lost or damaged in shipment.

WARNINGS

MAKE NO ATTEMPT TO PUT THE CAD 88-SEI IN SERVICE WITH THE BOTTOM PLATE REMOVED. 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 OF THE AMPLIFIER

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 88-SEI WILL RESULT IN TUBES OVERHEATING AND DAMAGE TO THE AMPLIFIER.

!!OBSERVE DIRECTIONS IN THIS MANUAL!!

INSTALLATION

This section describes the unpacking and installation procedures for the CAD 88-SEI amplifier.

WARNING
MAKE NO ATTEMPT TO PUT THE CAD 88-SEI AMPLIFIER IN
SERVICE WITHOUT THE BOTTOM PLATE ATTACHED - CONTACT WITH
VOLTAGE
IN THE CAD 88-SEI CAN BE FATAL!!!!

2.1 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 of the shipping container. If damage is found after visual 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 CAD88-SEI stereo integrated 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.

2.2 Warranty Card

Fill out the enclosed warranty registration card and return it 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.**

2.3 Amplifier Placement

In general, the location of your new CAD 88-SEI is not critical. 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 88-SEI clear of books, paper or other equipment to protect against overheating!! **DO NOT** place your CAD 88-SEI in a closed book case - overheating will damage the amplifier! Allow 8 to 10 inches above the unit for proper ventilation.

OPERATION

Signal input connection is made via the input jacks on the rear of the CAD 88-SEI located on the rear panel. The interconnect cables from the output of the CD player, tuner, etc. 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 88-SEI is ready for operation after the speaker and interconnect cables have been installed. Refer to the tube outline drawing inserted in this manual for tube placement..

3.2 AC On / Power Switch

Simply push the AC rocker switch up to the ON position . Observe that the blue LED lights and all tubes are lit (filaments). A built in 30 second delay is used in the CAD88-SEI to warm up the tubes before the high voltage comes up.This feature will extend the life of the tubes over a long period of time.

3.3 Break-in Period

The tubes , capacitors and output transformers take approximately 100 hours of music playing to fully settle in for peak performance. The CAD88-SEI will 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.

WARNING

**MAKE SURE AMPLIFIER IS UNPLUGGED FROM AC MAINS BEFORE
SERVICING**

SERVICE AND CARE

4.1 CAD 88-SEI Care and Cleaning

The case and front of the CAD 88-SEI may be cleaned with a soft cloth and Windex or a window cleaner. The frequency of cleaning will be governed by how many hours the CAD 88-SEI is operated and by operating environment cleanliness. A very mild chrome polish may be used on the chrome chassis to remove what the window cleaner does not **CAUTION!** Gently apply the polish to the chrome, otherwise you may scratch the chassis.

AC - ON SWITCH: Turns AC power on in the "UP" position.

HEADPHONE: 3- Conductor stereo headphone jack for low impedance headphones.

OUTPUT SELECTOR: Switches amplifier output from speakers to headphones.
When the blue LED lights the headphone jack is activated .
(Located at the top right of the chassis)

VOLUME: Dual precision potentiometer controlling volume of both channels

BALANCE: Dual precision potentiometer to balance between left and right channel

SELECTOR: Selection of line inputs for listening. CD, AUX 1, & AUX 2

1.4 Rear Apron Features

INPUTS CD, AUX., & AUX 2: Signal input connection via shielded interconnect cable

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

AC: 3- conductor shielded power detachable cord to AC power mains.

CAUTION
EQUIPMENT DAMAGE MAY OCCUR WITH IMPROPER FUSES

AC FUSE: This is an over current protection fuse for the CAD 88-SEI.
Never replace with any other fuse than 3 AMP SLOW BLOW!
250 VOLT! (2 AMP SLOW BLOW ON 220 VAC OPERATION)

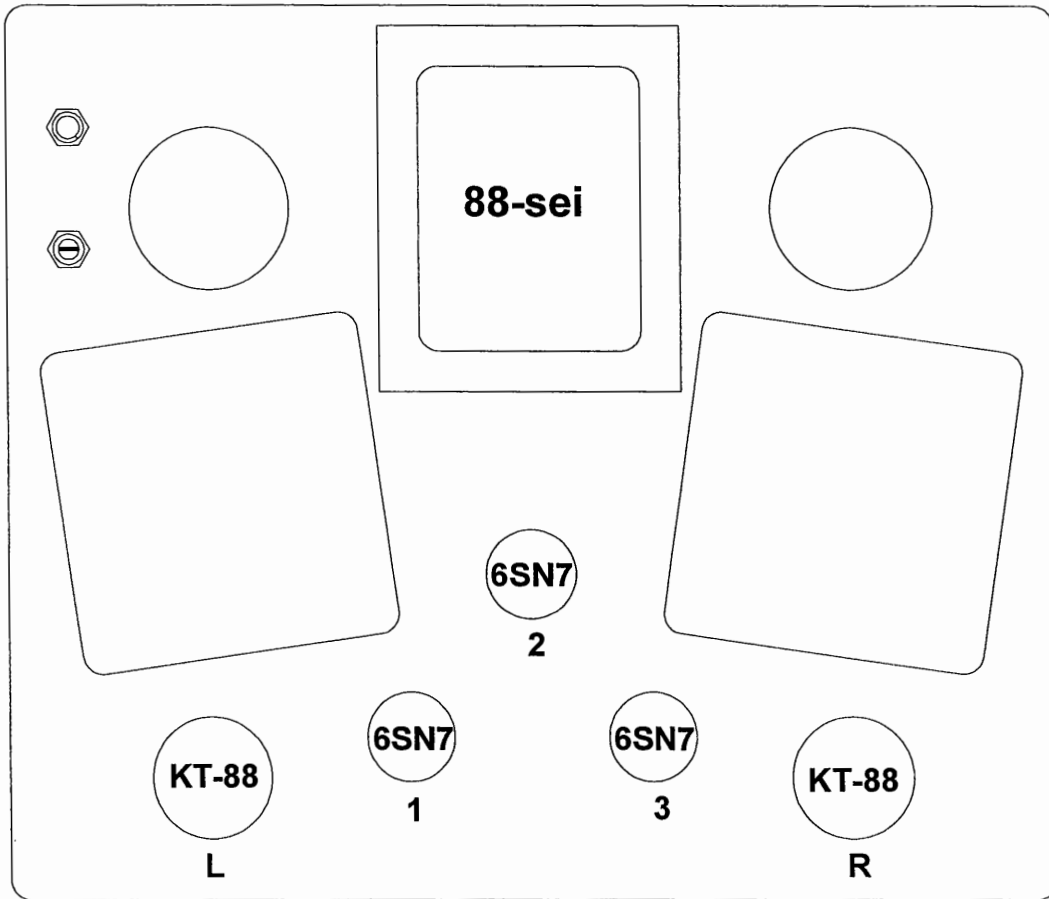
CAUTION
NEVER REMOVE / INSERT AC LINE CORD WHEN THE UNIT IS ON

CAD 88-SEI TROUBLESHOOTING GUIDE

| SYMPTOM | CAUSE | REMEDY |
|---|---|--|
| Hum or "Buzzing" through speakers | -Ground Loop | -Install 2-pin adaptor on A.C. cord to float the ground. |
| | -Intermittent or poor connection of interconnect ground | -Replace interconnect. |
| "Popping or Spitting" noise through the speaker | -Noisy tube | -If noise is in one channel, swap one section of tubes at a time until the noise swaps channels. Replace noisy tube. |
| | | -Check bias of output tubes. If high or fluctuating rapidly, replace output tube. (See bias instruction sheet) |
| AC fuse blows | -Line voltage surge | -Replace fuse. |
| | -KT88 shorted. | -Replace KT88 |

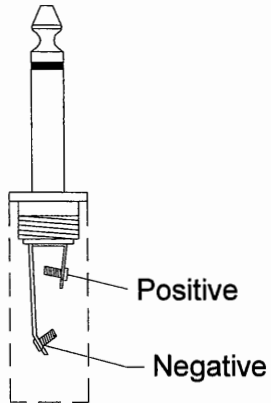
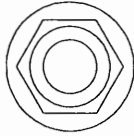
UNITED STATES LIMITED WARRANTY

88-sei Tube Placement sheet

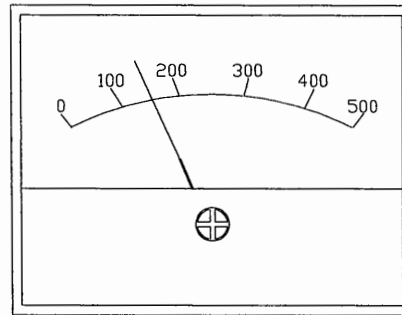
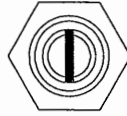


88-sei Bias Adjustment

Bias Meter Jack



Bias Adjust



Insert meter plug into bias jack.
Adjust for 160mA reading on VOM or DC current meter.
Readjust to 160mA after after 88-sei is warmed up for
10 minutes. Remove plug and enjoy the music!

Note: Bias is factory preset; Bias should be reset when installing replacement KT-88 tubes.

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 three (3) years from the date of the original purchase.

During the warranty period, Cary Audio Design, Inc. or an authorized Cary Audio Design, Inc. 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 Design, Inc. as soon as possible after the discovery of a possible defect, of:
 - (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 Design, Inc. 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 performance from this product. Therefore, carefully read the Instruction Manual. This warranty does not apply to any defect that Cary Audio Design, Inc. in its sole discretion determines is due:

- (1) Improper maintenance or repair, including the installation of parts or accessories that does 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, Inc. disclaims all other warranties including, without limitation, all implied warranties of merchant ability 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, Inc. Under no circumstances is Cary Audio Design liable for incidental or consequential damages. Any implied warranties imposed by law terminate (1) year from the date of the original purchase.

FOREIGN PURCHASERS

Cary Audio Design, Inc. 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, Inc.'s entire obligation with respect to this product, and the original purchaser and any user or owner shall have no other claim for individual 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 state to state.



C A R Y • A U D I O • D E S I G N

111-A WOODWINDS INDUSTRIAL COURT, CARY, N.C. 27511 (919) 481-4494 FAX (919) 460-3828