



SLM-200

OPERATING MANUAL

Note:

Before installing your new SLM-200, please read this manual carefully. This manual will inform you of the SLM-200 specifications, proper installation and operation procedures. Also included in this manual are guidelines on how to properly service and care for your new SLM-200.

INTRODUCTION

Congratulations! You have purchased one of the most exotic audio amplifiers available. Within its power range, the SLM-200 displays the operating characteristics of a true "high-end" amplifier. 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 SLM-200's operate in a class AB1 mode close to class A. In fact most of your listening levels will be in the class A mode. The output state KT-88 tubes are biased with a negative fixed bias voltage for low distortion and maximum output capabilities. As shipped from the factory all SLM-200 are wired in the triode configuration with the screen grid of the KT-88's connected to the plate through a 100 ohm resistor. This configuration places the KT-88's in the triode, low plate impedance (670 ohm) mode. We have found that the triode mode of operation is the most linear and yields the most musically satisfying presentation. The output power is 130 watts in triode. Your dealer will be able to switch the SLM-200's into the 200 watt ultra-linear mode if you believe 130 watts is not adequate for your listening levels. The output transformer in your new SLM-200 is equipped with the ultra-linear screen taps for the 200 watt level. The output transformer in the SLM-200's is the most important component in the amplifier and has been specifically designed by Cary Audio for use in the SLM-200. We have taken the approach in the output transformer design not to dissimilar to the single-ended amplifiers we design and produce. The primary and secondary windings on portions of the output transformers 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 designed currently utilized in vacuum tube output transformers. The E/I laminents used are silicone impregnated hipersil steel contributing to the extremely low loss of the SLM-200 output transformer. The above process is similar to the single-ended design without the air-gap found on the Cary single-ended output transformers. A small amount (-3dB) of negative feedback is utilized to improve speaker damping. The SLM-200 original engineering design was done with zero feedback so you can be assured that the feedback circuit is **not** implemented to correct distortion and transient response. A balanced drive signal is applied to the control grids of the KT-88 output tubes from the 6SN7 driver tube. This tube is configured in a dual differential network that operates in the following manner: The first section of the dual 6SN7 tube is direct coupled to the input pre-driver stage. The drive signal is amplified through this first section in a class A grid driven circuit with the output signal inverted 180 out of phase at the anode and then coupled to one half of the push-pull bank of KT-88's. At the same time the second half of the dual triode 6SN7 is cathode driven in a grounded grid non-inverting class A gain stage is the first 6SN7 dual triode on the SLM-200. This first state is identical to the Cary Audio single-ended amplifiers. This first pre-drive stage is a single-ended class A anode current source gain stage. The input signal from a pre-amplifier or line source is direct coupled to the grid of one section of the 6SN7 input tube. The anode of this section is direct couple to the cathode/grid of the second stage. This second stage takes the place of the conventional dropping/coupling resistor network found in conventional gain stages. This is called the anode current section and offers infinite resistance and the proper current/voltage to operate the gain stage. The amplified signal is then direct coupled to the other 6SN7 which drives the KT-88's in the balanced configuration as described earlier.

The power supply in the SLM-200 actually consists of five different supplies. The power transformer is designed to operate at a 150% continuous commercial service a the full rated 200 watt output level. As the SLM-200's are delivered from the factory in the triode mode the transformer is at the 300% duty service. 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 network with a filter choke. This high voltage section feeds the final output KT-88's. Another full wave center tap supply feeds a PI network filter choke medium voltage supply for the input and drive 6SN7 tubes. Another supply is the negative DC grid bias circuit that once again is a PI network. There is an additional DC supply with two voltage regulators to supply DC to the filaments of the two 6SN7 input driver tubes. These regulated filament supplies will prevent AC ripple from capacitively being coupled tot he electrodes in the 6SN7 gain stages.

A great deal of attention during design of your new SLM-200'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 dynamics 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 SLM-200 extols its merits in the ability to handle transients and instantaneously recover from brief or even extended overloads. The SLM-200 will overload symmetrically at any frequency in the audio bandpass. The SLM-200 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 SLM-200's to recover quickly when over loaded. If one were to monitor the high voltage rail voltage (525 VDC) of an SLM-200 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 your new SLM-200 amplifier is stability. The SLM-200 maybe operated with no load (without speaker) without damage to the amplifier, output transformer or tubes.

SPECIFICATIONS

Operating the SLM-200 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 SLM-200s 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 SLM-200 basic specs. Specifications are subject to change without notice or obligation.

POWER OUTPUT:	200W
FEEDBACK:	8dB
FREQUENCY RESPONSE:	20 Hz to 20kHz \pm 0dB
NOISE:	-80dB below rated output
SENSITIVITY:	.7V for full output
TUBE COMPLIMENT:	8-KT88 2-6SN7
OUTPUT IMPEDANCE:	2,4 AND 8 ohm
INPUT POWER REQUIREMENTS:	100, 110, 117, 220, 240V / 50-60Hz
POWER CONSUMPTION:	240 Watts - operate 122 Watts - standby
DIMENSIONS:	8 1/2"H x 12 1/4"W x 24" D
NET WEIGHT:	75 lbs.
SHIPPING WEIGHT:	100 lbs.
TRANSFORMERS:	1 - EI laminated core power transformer 1 - Special ultra linear output transformer 150 percent duty cycle on all transformers
CAPACITORS:	oil filled
POWER SUPPLY CAPACITORS:	4-1500 MFD @ 450V
AC CORD:	3 - conductor shielded
WARM-UP TIME:	5 minutes
BREAK-IN PERIOD:	100 hours of music playing time

1.3 Top Panel Features

AC-ON SWITCH:	Turns AC power on
STAND-BY SWITCH:	Turns high voltage on

1.4 Rear Apron Features

OUTPUT: Three 5-way copper binding posts provide outputs for 2 ohm, 4 ohm and 8 ohm.

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

CAUTION
Use of any other protection
fuse can damage unit.

FUSE: AC power fuse. Never replace with any other fuse than 5 amp.
SLOW BLOW! 250 VOLT!

Tube fuse. Never replace with any other fuse than 1 amp.
FAST BLOW! 250 VOLT!

CAUTION
Never remove/insert
AC line cord when the
unit is on

INSTALLATION

This section describes the unpacking and installation procedures for the SLM-200 mono blocks.

WARNING
Make no attempt to put the SLM-200
amplifier in service without the bottom plate
attached - Contact with voltage in the
SLM-200 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 you new SLM-200 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-sale service.

2.3 Warranty Card

Fill out the enclosed warranty registration card and return to Cary Audio Design within 10 days of the 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 SLM-200 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 such as near radiators or other heating units. Keep the top of the SLM-200 clear of books, paper or other equipment to protect against overheating.

2.5 Power Requirements

The SLM-200 is designed to operate from house current mains. The design voltage is 117VAC at 50/60Hz. (Foreign units 220 VAC at 50/60 Hz)

2.6 Cables

The speaker cables from the output posts of the SLM-200 to the speaker system can be any convenient length you set-up requires. Select speaker cables of sufficient size to preserve the outstanding performance capabilities of your new SLM-200. 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.

3.1 Operation

Your new SLM-200 is ready for operation after the speaker, interconnect cables and all the tubes have been installed. See page 8 for tube positions.

3.2 AC On Power Switch

Simply push the AC rocker switch to the "ON" position. Observe that all tube filaments are lit. After about 30 seconds, flip the stand-by switch to the "OPERATE" position. The eye tube will then light.

3.3 Stand-By Switch

This is a most convenient feature on the SLM-200 amplifier. This switch is located on the top of the amplifier. In the rear position, the amplifier is ready to operate. In the front position, only the tube filaments are operating. You may wish to leave your SLM-200 amps turned on in the stand-by mode 24 hours a day. When you wish to listen to music, simply flip the stand-by switch to the "REAR" position. Under these conditions the SLM-200 is always warmed up and ready for peak performance.

3.4 Break In Period

The tubes, capacitors and output transformer take approximately 100 hours of music playing to fully settle in for peak performance. The SLM-200 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.

<p>WARNING Make sure amplifier is unplugged from AC mains for any service or cleaning!</p>
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SERVICE AND CARE

4.1 Care and Cleaning

The chassis of the SLM-200 may be cleaned with a soft towel and Windex (or a similar window cleaner). The frequency of cleaning will be governed by how many hours the SLM-200 is operated and by operating environmental cleanliness.

4.2 Tube Replacement

If it becomes necessary to replace the tubes in the SLM-200 amplifier, a matched set of tubes of the same brand should be used. A new tube kit is available from Cary Audio Design. You should get years of everyday usage from the input and output tubes.

4.3 Factory Service

Careful consideration has been given to the design of your SLM-200 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 that you contact our Customer Service Department, phone number (919) 481-4494, to describe your problem in detail. Do not return the SLM-200 to the factory without a return authorization number from the Customer Service Department. Cary Audio Design will not assume responsibility if the transportation company refuses to pay a damage claim due to improper packing or lack of insurance should the unit be lost in shipment.

WARNINGS

Make no attempt to put the SLM-200 in service outside of the cabinet. Contact with high voltages found in the unit can be fatal!!!

Completely remove AC Power Cord 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.

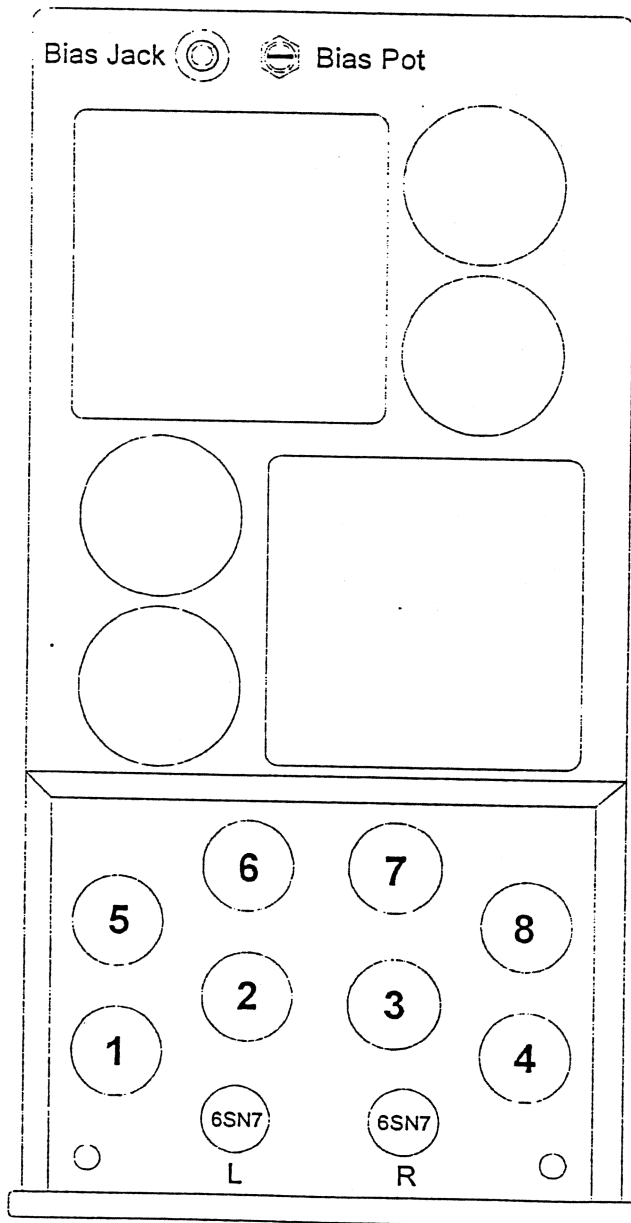
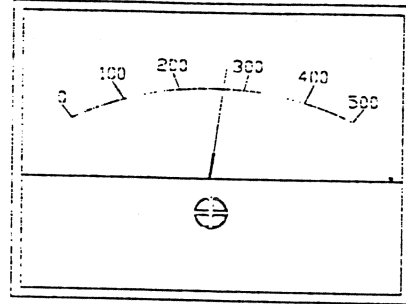
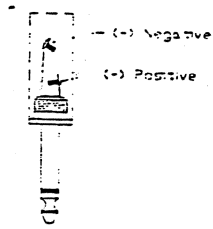
CAUTIONS

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 SLM-200 will result in tubes overheating.

OBSERVE DIRECTIONS IN THIS MANUAL

SLM - 200 Bias Adjustment & Tube Placement



This is a DC Current reading
(not voltage)

Insert meter plug into bias jack.
Adjust for 275mA reading on VOM or DC current meter.
Readjust to 275mA after after SLM - 200 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.

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 date of original purchase.

Amplifiers and Preamplifiers, Three (3) years from the date of the original purchase.

Digital Products, One (1) year from original date of 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:
 - (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 optimum performance from this product. Therefore, carefully read the Operating Manual. This warranty does not apply to any defect that Cary Audio Design, Inc. in its sole discretion determines is due to:

- (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 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, Inc. Under no circumstances is Cary Audio Design, Inc. 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, 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 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 have other rights which vary from state to state.



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