



# CAD-50M MkII

## OPERATING MANUAL

**NOTE:**

Before installing your new CAD-50M MkII, please read this manual carefully as it will inform you of the CAD-50M MkII 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-50M MkII*.

# CAD-50M MkII

## PUSH-PULL MONO-BLOCS

The new CAD-50M MkII mono-blocs are the lead products in a new series of amplifiers, preamplifiers, phono stage, DA converter and interconnects. The new 50 series is a complete plug and play vacuum tube based line of products with ease of operation in mind. The new circuit topologies contribute to incredible reliability and enjoyment.

### CAD-50M MkII

For the technically minded, a review of the circuit is in order. The new CAD-50M MkII mono-blocs operate in pure Class A triode or by the flip of a switch, Class A ultra-linear. The output stage features the new Teslovak KT-88 tubes with auto biasing. There is no need to ever worry about biasing the CAD-50's. The triode/ultra-linear switch is located on top of the chassis and may be switched on the fly. In other words while listening to the music. In reality the user will most often listen in the triode mode. In the triode mode, the screen grid of the KT-88 is tied through a 100 ohm 2 watt resistor to the plate to operate as a three element triode. In the ultra-linear mode the screen grid is tied to the 43% ultra-linear taps on the primary of the output transformer. Switched to triode 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 25 watts Class A in triode. In the ultra-linear position the CAD-50M MkII will operate in pure Class A 50 watt output. The output transformer in the new CAD-50M MkII is equipped with ultra-linear screen taps for the 50 watt level. The output transformer in the CAD-50M's is the most important component in the amplifier and has been specifically designed by Cary Audio Design for use in the 50M MkII's. 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 transformer are wound in a 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-50's 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 found on the Cary single-ended output transformers. A small amount (-2dB) of negative feedback is utilized to improve speaker damping. The CAD-50M MkII 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 6SL7 driver tube. The 6SL7 input tube is configured in a very unusual fashion. The input driver tube is simply operating in a Class A gain stage. Each section is identical with one side operating out of phase with the other. The first section of the dual 6SL7 tube output signal in 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 6SL7 is feeding the other KT-88 in a positive phase configuration. With this network the balance is a perfect plus and minus dual drive signal to the final KT-88's.

The power supply in the CAD-50M MkII's actually consists of four different supplies. The power transformer is designed to operate at a 200% continuous commercial service at the full rated 25/50 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 network. This high voltage section feeds the final output KT-88's. Another supply feeds a PI network medium voltage supply for the input and driver 6SL7 tubes. There is an additional DC supply to supply DC to the filaments of the 6SL7 input driver tube. The DC filament supply will prevent AC ripple from capacitively being coupled to the electrodes in the 6SL7 gain stages.

A great deal of attention during design of the new CAD-50M MkII'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-50M MkII extols its merits in the ability to handle transients and instantaneously recover from brief or even extended overloads. The 50's will overload symmetrically at any frequency in the audio bandpass. The 50M MkII 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-50M MkII to recover quickly when over loaded. If one were to monitor the high voltage rail voltage (410 VDC) of a 50M MkII 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-50M MkII amplifier is stability. The 50M MkII's may be operated with no load (without speaker) without damage to the amplifier, output transformer or tubes.

The bias is completely automatic and self biasing on the CAD-50M MkII. Each KT-88 output tube has a separate cathode balancing and bias resistor network. You will never have to check and or set the bias on the new 50's.

Switching from triode Class A to ultra-linear is a simple flip of a switch on the top side of the chassis. This can be done while listening. I am sure you will find that unless you really need to play extremely loud that the triode mode is of course the sweetest and most realistic mode of operation.

The CAD-50M MkII mono amplifiers are built on a stainless steel chrome chassis with champagne gold front panels. The amplifiers are built to perform year after year with trouble free operation. The CAD-50M MkII's are a classic example of the "CARY" sound.

## **SLP-50**

The perfect companion to the CAD-50M MkII mono-bloc amplifiers is the all new SLP-50 line stage preamplifier. The SLP-50 is built on a matching chrome chassis with a champagne gold front panel and matching knobs. The circuit and parts selection contribute to an incredible listening experience.

For the technically minded, a review of the circuit is in order. The new SLP-50 preamplifier is a vacuum tube based line stage with 10 dB of gain. The class of operation is Class A triode featuring a pair of 12AU7 tubes. The most interesting feature about the circuit is that the SLP-50 is the same gain stage used on the single-ended CAD-300SE amplifiers. The 12AU7 tubes operate in an anode current source configuration.

The SLP-50 has three line level input jacks on the rear apron. From the jack the signal is routed to a gold plated selector switch on the front panel. The wiring used is all Teflon coated silver twisted pairs. After the switch the signal is routed to a dual 100K potentiometer. This is the volume control. A gold plated stepped attenuator may be ordered as an option or field installed. Once the audio signal level is set by the volume control it is directly coupled to one of the grids in the dual section triode 12AU7 tube. The cathode of the 12AU7 is biased through a 2 K resistor with a non-polarized 100 MFD capacitor bypassing the signal to ground. The anode of the first section is coupled to the other section of the 12AU7 in an anode source plate supply. This configuration will in essence give the gain stage an infinite resistance load to the power supply. The amplified signal is coupled through a .68 MFD output coupling capacitor to the output jacks on the rear of the SLP-50 preamplifier.

The power supply is very special in the SLP-50. The power transformer is was impregnated in a steel enclosure on the top side of the chrome chassis. The power transformer used is rated at 400% continuous commercial duty cycle for this preamp application. Talk about being built bullet proof! The B+ supply is a center tap full wave DC supply feeding a PI network supply with filter choke soothing. The filaments of the two 12AU7 gain tubes are regulated DC for a quite hum free operation. The filter caps used in the SLP-50 are film and foil. All resistors are 1% metal film and as an option as on the CAD-50M MkII, oil caps can be ordered for the output cap.

Utilizing the input circuitry from the CAD-300SE in the new SLP-50 yields an amazing offering in a Cary Audio Design line stage preamplifier.

## **IC-50-25 & IC-50-3**

We are offering long length interconnects as an incentive to encourage customers to experience mono-bloc preamplifiers. We believe there is some resistance in the market place to purchase mono amplifiers because of the assumed high cost of quality interconnects. We believe that a home audio system will sound much better with long interconnects feeding the amplifiers next to the loudspeakers with very short speaker cables. With the new Cary Audio interconnects all the guess work and fear of high dollar interconnects is eliminated. The IC-50-25 and IC-50-3 are very fine RF type low capacitance OFC copper coaxial cables. The center wire is #13 gauge stranded with a 99% copper shield that is jacketed in a pleasant blue color. The RCA connectors are gold plated and silver soldered.

Please do not misinterpret the offering of Cary cables as an indication that we as a company are in the cable business. The rationale is simply a very fine interconnect that will be compatible with audiophile needs with a pair of Cary CAD-50M MkII mono-bloc amplifiers.

## **FUTURE 50 SERIES PRODUCTS**

In the next few months we will continue to add products to the new Cary **50** line up of vacuum tube electronics. We are moving ahead on the **PH-50MM**, a matching phono preamp for the SLP-50 line stage. In the lab is a chrome chassis vacuum tube D/A HDCD that will be called the **DA-50**.

**PLEASE READ THE OPERATING MANUAL BEFORE  
INSTALLING YOUR NEW CAD-50M MkII AMPLIFIERS  
IN SERVICE.**

## **SPECIFICATIONS**

Operating the CAD-50M MkII mono-bloc 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-50M MkII 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-50M MkII basic specifications. Specs are subject to change without notice or obligation.

**DIMENSIONS:** 7"H x 5.5"W x 19"D

**WEIGHT:** 27 lb..

**CIRCUIT TYPE:** Push-Pull Triode/Ultralinear Amplification in Class A

**POWER OUTPUT:** 25 Watts Triode  
50 Watts Ultra-linear

**INPUT SENSITIVITY:** 1 volts for full output

**INPUT IMPEDANCE:** 150,000 ohms

**NOISE AND HUM:** 80db below rated output

FREQUENCY RESPONSE (at one watt output): 15Hz to 23,000Hz + 0 - 0.75dB

TUBES: 1- 6SL7 input tube, 2-KT-88 output tubes

TRANSFORMERS: 1- EI laminated core power transformer  
1-Special air gap output transformer  
200% duty cycle on all transformers

RESISTORS: 1% metal film

CAPACITORS: Polystyrene and polypropylene (oil filled optional)

POWER SUPPLY CAPACITORS: 2 - 1200 MFD @ 450 volts

AC CORD: 3 conductor 14 gauge

AC POWER REQUIREMENTS: 117 volts AC 50/60Hz  
222 watts operate  
220 volts AC 50/60 Hz  
222 watts operate

WARM-UP TIME: 3 minutes

BREAK-IN PERIOD: 100 hours of music playing time

FINISH: Stainless Steel chrome plated, Aluminum Face Plate

### **1.3 Front Panel Features**

AC-ON ROCKER SWITCH: Turns AC power on in the “up” position

STAND-BY/OPERATE: Turns on B+ plate voltage in the “up” position

### **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=-.

AC: 3- conductor power cord

AC POWER FUSE: Use only 2 amp slow blow

**CAUTION**  
EQUIPMENT DAMAGE MAY OCCUR WITH IMPROPER FUSES

AC FUSE: AC power fuse. Never replace with any fuse than 2 AMP SLOW 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 CAD-50M MkII amplifier.

**WARNING**  
**MAKE NO ATTEMPT TO PUT THE CAD-50M MkII AMPLIFIER IN SERVICE WITHOUT THE BOTTOM PLATE ATTACHED - CONTACT WITH VOLTAGE IN THE CAD-50M MkII 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 CAD-50M MkII 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-50M MkII 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-50M MkII's clear of books, paper or other equipment to protect against overheating!! DO NOT place your CAD-50M MkII in a closed book case - overheating will damage the amplifier! Allow 8 to 10 inches above the unit for proper ventilation.

### **2.4 Power Requirements**

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

### **2.5 Cables**

The speaker cables from the output posts of the CAD-50M MkII 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-50M MkII. 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 connection is made via the input jacks on the rear of the CAD-50M MkII 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-50M MkII is ready for operation after the speaker, interconnect cables and the three tubes have been installed. Tube positions are listed on the sheet in the front of this manual.

### **3.2 AC On Power Switch**

Simply flip the AC rocker switch up to the "on" position (the green LED will light). Observe that all tubes are lit (filaments).

### **3.3 Stand-By Operate Switch**

In the down position the plate voltage will be in stand-by. Turning the switch to the “up” position will bring up the operating B+ voltage on the plates of the vacuum tubes. The RED LED will light when the unit is ready.

### **3.4 Triode-Ultra/Linear Switch**

On the top of the chassis in-between the KT-88 output tubes is located a chrome handle switch. With the handle pushed to the rear of the amplifier the mode of operation is Triode. In the forward position the mode will be in Ultra-Linear. Usually the Triode position will provide plenty of power. The Triode position is the most preferred position by most audiophiles (and the designer of the CAD-50's).

### **3.5 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-50M MkII 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.

## **SERVICE AND CARE**

<p style="text-align: center;"><b>WARNING</b> <b>MAKE SURE AMPLIFIER IS UNPLUGGED FROM AC MAINS BEFORE</b> <b>SERVICING</b></p>
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### **4.1 CAD-50M MkII Care and Cleaning**

The chassis of the CAD-50M MkII may be cleaned with a soft cloth and Windex® (or a similar window cleaner). The frequency of cleaning will be governed by how many hours the CAD-50M MkII is operated and by operating environment cleanliness.

### **4.2 Tube Replacement**

If it becomes necessary to replace the tubes in the CAD-50M MkII amplifier, a matched 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 years from the output tubes with everyday usage and many, many years of use from the 6SL7 input tubes.

### 4.3 FACTORY SERVICE

Careful consideration has been given to the design of your CAD-50M MkII 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 (919)481-4494 to describe your problem in detail. DO NOT return the CAD-50M MkII 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 a damage claim due to improper packing or lack of insurance should the unit be lost in shipment.

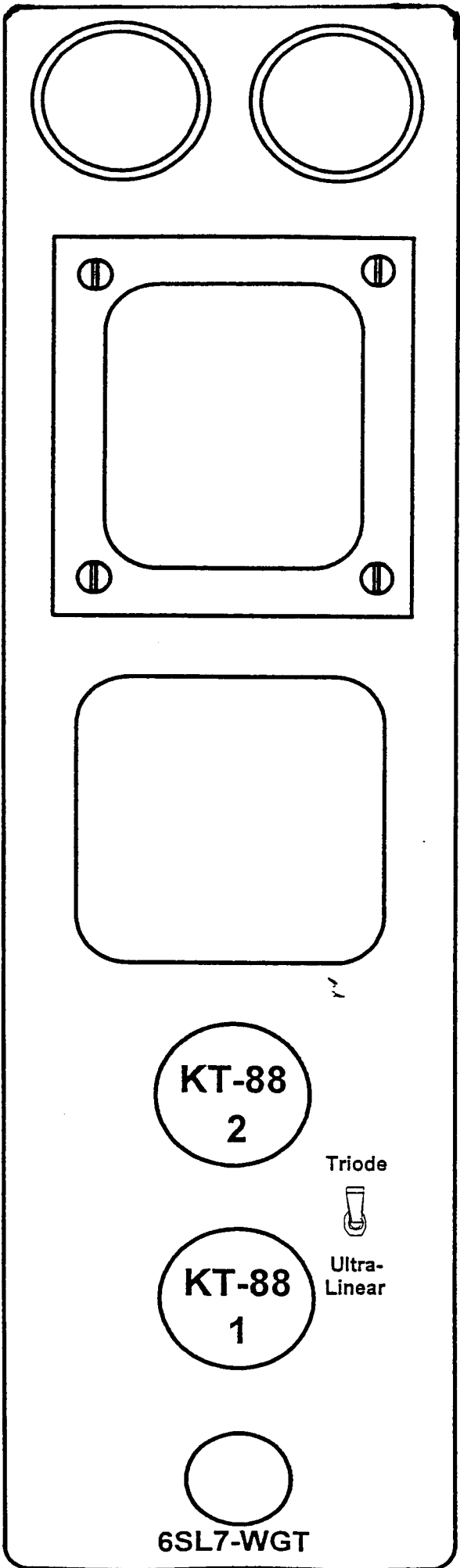
#### **WARNINGS**

**MAKE NO ATTEMPT TO PUT THE CAD-50M MkII 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 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-50M MkII WILL RESULT IN TUBES OVERHEATING AND DAMAGE TO THE AMPLIFIER.**

**\*\*\*OBSERVE DIRECTIONS IN THIS MANUAL\*\*\***



# 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:

Amplifiers and Preamplifiers, Three (3) years from the date of the original purchase.  
Digital Products, One (1) year from the date of 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:
  - (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 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, 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.