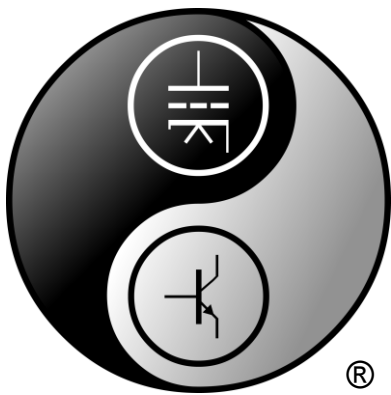


Liquid Glass[®] Headphone Amplifier



cavalli audio

Before You Use Your Liquid Glass® Amplifier

For Your Protection

Dangerous High Voltages: This amplifier uses dangerous and possibly lethal high voltages.

NEVER operate with the cover open. When the amplifier is powered on dangerous high voltages are present on the tube sockets in the tube cage. **NEVER insert fingers, hands, or other objects, particularly conductive objects, into the tube cage area when the amplifier is powered on or at any other time.** See the rest of this manual for procedures to change the tubes.

Children: Along with the presence of high voltages, the tubes in this amplifier, as in many other vacuum tube amplifiers, get hot enough to cause severe burns. In addition the amplifier may contain sharp pieces. **Keep the amplifier out of reach of children at all times.**

Ventilation: In order to improve sound quality, your Liquid Glass® amplifier runs **warm** and thus requires free air circulation of **at least 6" around the top and sides** of the product. Never place the amplifier in an enclosed space with restricted air flow. Never place it near another source of heat. Excessive heat **will** shorten the life of the product and may cause a fire.

Water and moisture: **NEVER** use the Liquid Glass® amplifier near water. **NEVER** handle the amplifier while in contact with water. **NEVER** let the amplifier come into contact with water. **NEVER** spill water or other liquids into the amplifier or on the amplifier.

Power Sources: Make sure that the voltage/frequency stated on the back label of your amplifier is compatible with the line/mains voltage in your location.

Grounding: The electrical ground in this amplifier is an important safety feature. **Do not defeat ground with special plugs, power cords, etc. Doing so will void your warranty and may lead to a dangerous condition.**

Power Cords: If you use your own power cord, use one that meets the standards of your location.

Power and Signal: Cables should never be connected or disconnected with equipment powered up. Failure to heed this warning may damage or destroy equipment.

Servicing: To reduce the risk of electrical shock or other injuries, the user should not attempt to service the device beyond replacing tubes. All other servicing must be referred to **authorized** service personnel.

Congratulations! You're now the owner of the Cavalli Audio Liquid Glass® Headphone Amplifier!

Amplifier Break-In

Most amplifiers, especially amps with tubes, need at least 150 hours of continuous use, playing music, to reach their full sound signatures.

Your Cavalli Audio Amplifier has been playing music for at least _____ hours at near full volume. Confirmed by _____.

Because the Liquid Glass® can operate with many different tube types, the amp can only be broken in using the stock tubes. This break in period will settle the solid state components of the amplifier and the power supplies, but you will have to take care of breaking in each set of tubes that you want to use.

This means that the non-tube sections of the amp should reach their optimum sound quality after about 150-200 hours and then the sound quality will be determined by the condition of the tubes.

Before you judge the sound quality of the amp please be sure that you have let the tubes as well as the solid components fully break in!

Return Policy

If, after delivery, you decide you don't like your Liquid Glass amplifier, returning the amplifier will incur a 30% of the retail price restocking fee and must occur within 30 days of delivery.

Important points to remember about the Cavalli Audio Liquid Glass® headphone amplifier

The Liquid Glass® is a unique hybrid headphone amplifier. The Liquid Glass® can support many different tube types, both octal and noval, so long as they conform to 6SN7 or 12AU7 pinouts and fall with reasonable operating conditions.

The LG is a conventional capacitor coupled hybrid with a tube front end and a solid state buffer. The solid state buffer is designed to be as transparent as possible to the sound of the tubes in use. It has a very high input impedance which means that the tube is barely loaded and this means that the sound of the amplifier is almost exactly the sound of whatever tube is being used. There is no global feedback mechanism so the sound features of the tube are transmitted to the headphones with as little change as possible.

The tube front end of the LG is a classic totem pole of two stacked triodes. This arrangement allows the front end to self-adjust to the triodes in use, placing $\frac{1}{2}$ of the plate voltage on each triode. The resistor values have been chosen to handle a wide range of tubes without requiring complicated user adjustments.

Power is controlled by a standby power circuit activated by a custom made Piezo power switch. The LG has the standard Cavalli Audio heater delay circuit to protect the tubes and offset detector to protect your headphones.

Operation

Your Liquid Glass® amplifier has been operated for at least 50 hours for quality control and to give the stock tubes (Electro Harmonix 6SN7) and other parts an opportunity to break in. However, most amplifiers don't fully settle, open up, and "relax" until they are played for at least 100 to 150 hours of operation. The Liquid Glass® also follows this timeline (see page 5). Your new amp will continue to improve with regard to bass impact, more open sound, warmth, and "sweetness," depending on tube type, so we strongly recommend that you accumulate these important hours on your Liquid Glass® headphone amplifier by playing it as much as possible so that you may fully enjoy its performance as soon as possible.

DO NOT

ABSOLUTELY DO NOT:

- 1. CHANGE THE HEATER VOLTAGE
WHEN THE AMP IS ON**
- 2. CHANGE THE PLATE VOLTAGE
WHEN THE AMP IS ON.**
- 3. CHANGE TUBES WHEN THE
AMPLIFIER IS ON.**

**ANY OF THESE ACTIONS MIGHT
DAMAGE THE AMP OR THE TUBES.**

Amplifier Gain

Most amplifiers and preamplifiers have a fixed gain. Some have a small number of fixed gain selections. The Liquid Glass[®], however, because of its design, which highlights the tubes in use, has a gain which is entirely dependent on the tube choice. The gain of a triode is called its mu and is theoretically the maximum voltage gain that a triode can provide. The LG's gain is always half of the mu of the triodes in use. For example, 6SN7s have a mu of 20 so the LG gain with 6SN7s is 10. 12AU7s have a mu of 17-20 so the LG gain is 8.5-10. Etc. Please pay attention to the mu of the triodes so that you know why the amp has the gain it does.

Changing Tubes

The octal and noval tube sockets are arranged to create interference between the two tube types in each channel. This interference makes it impossible to insert both an octal and noval tube into a single channel. This exclusive insertion protects the front end components and the power supply.

You can, obviously, insert one type of tube into one channel and another into the other channel. **Do no put different tube types in separate channels.**

Before changing tubes, be sure that the amp has been **powered off for at least 10 minutes**. Remove the tubes that are in the amp, if there are any, and insert the new tubes.

Before powering the amp on again, make the necessary heater and plate voltage settings. Failure to set these values correctly may damage the tubes, the amplifier, or both.

Selecting Heater and Plate Voltage

Setting heater and plate voltages requires some knowledge of tubes, particularly their heater voltages, heater currents, and maximum plate voltages. If you don't know how to determine these please get help from someone who does.

Before doing anything, check carefully that the amp is off. Both front panel recessed indicator lights should be dark along with the tube heaters, but the power switch light can be on indicating that the amp is in standby mode.

Familiarize yourself with the switches and their labeling so you don't make a mistake.

Heater Setting

There are two small recessed toggle switches on the left side of the amp. The leftmost switch selects the heater voltage, either 6.3V or 12.6V. Set this switch to the heater voltage required by the tubes in use. See the tube datasheet to determine this value. It is not possible to damage 12.6V tubes if you accidentally use the 6.3V setting, but it is possible to damage 6.3V tubes if you use the 12.6V setting. The heater current is limited, but this limiting cannot protect for all possible 6.3V tubes. PLEASE CHECK YOUR HEATER SETTING CAREFULLY BEFORE YOU TURN ON THE AMP.

Plate Voltage Setting

The rightmost switch on the left side of the amp selects the plate voltage. Most of the tubes that will work in the Liquid Glass® can operate at the 300V setting. This includes 6SN7s and 12AU7s and their equivalents.

However, some tubes like 6922s cannot handle the higher plate voltage. For these tubes select the 200V setting.

Remember that in a totem pole arrangement each triode sees only half the applied plate voltage. This means that at 300V each triode sees 150V and at 200V each triode sees 100V.

To determine which settings to use find the data sheet on the tube type you want to use. Locate the **maximum plate voltage** in the data sheet. If this voltage is 150V or higher use the 300V setting. If this voltage is less than 150V, use the 200V setting.

Setting the plate voltage to 200V for tubes capable of 300V will not harm them, but setting plate voltage to 300V for 200V tubes can cause internal arcing in the triodes and damage both the tubes and the amp. Please be careful with this setting

Heater and plate voltage are the only two settings you need to make in the Liquid Glass. The amp handles the rest. 😊

Maximum Values

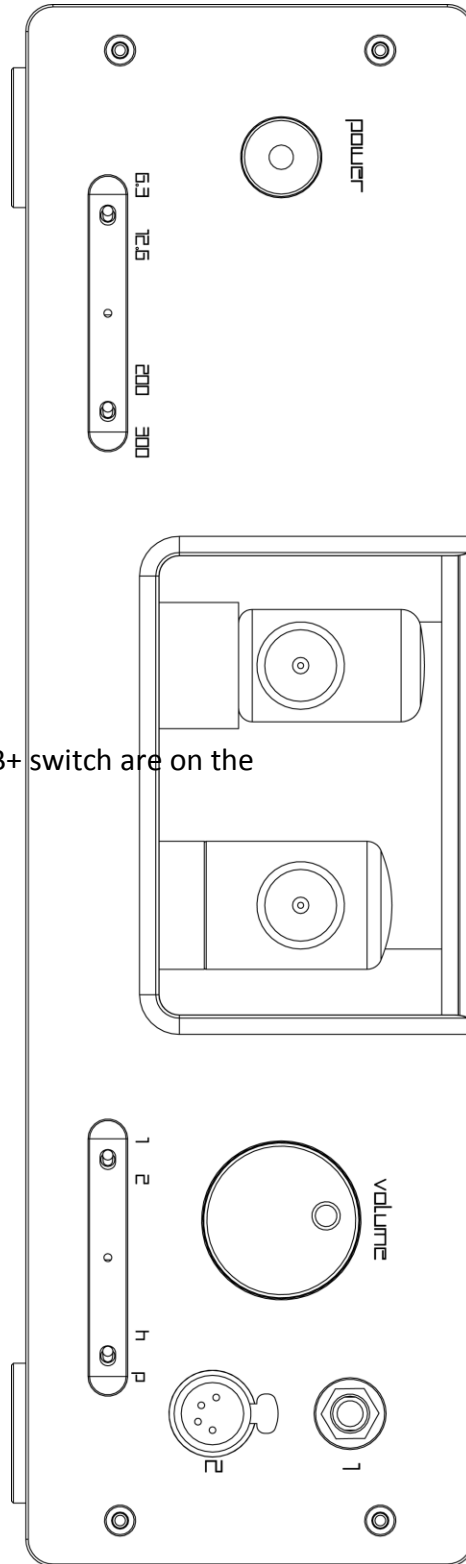
Please pay attention to these maximum values when selecting tubes:

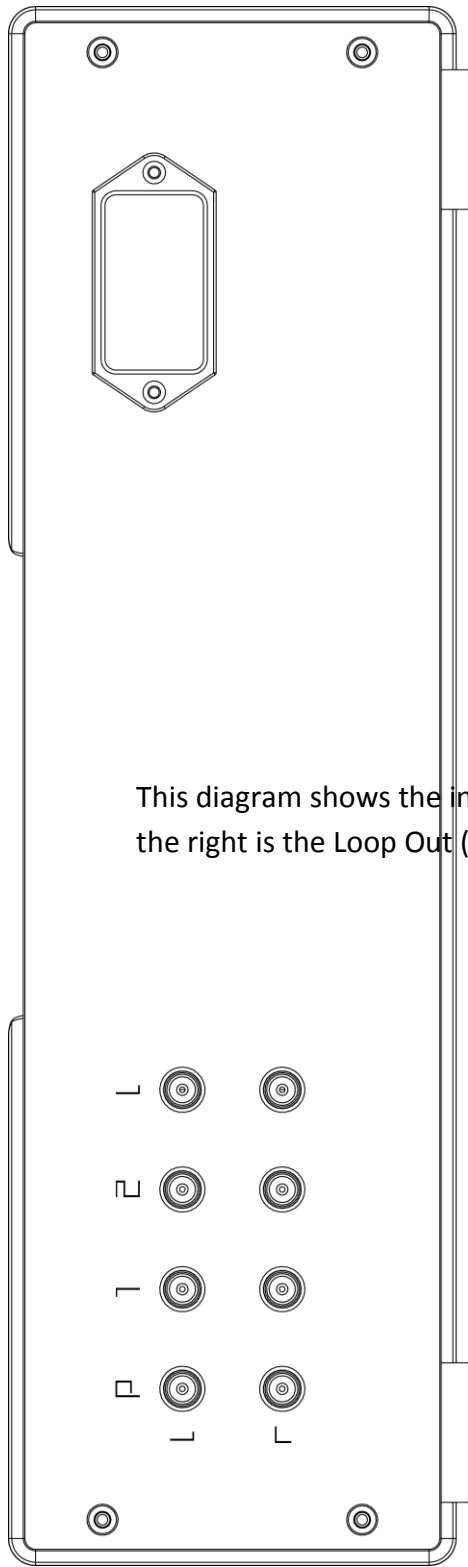
Heater Current – the heater circuit can handle about 1.2A of heater current. This means that 6.3V tubes can have a maximum of 1.2A heater draw, but 12.6V tubes can only have a maximum of 600mA.

Plate Current – the Liquid Glass HV supply can deliver a maximum of about 40mA. The HV supply has an automatic shutdown feature that will turn off the amplifier if this maximum value is exceeded.

Front Panel Controls

Liquid Glass front panel controls. The heater switch and B+ switch are on the upper left and the volume knob and output switch are on the lower right.





Rear Panel Jacks and Power Inlet

This diagram shows the input jack arrangement. The leftmost jack (P) is the preamp output, and the rightmost is the Loop Out (L) for input 1. Then input #1 Jack and then Input #2 jack.

Input/Output Selection

The Liquid Glass® has two single-ended (RCA) inputs, #1 and #2. Input #2 also has a loop out so that you can connect other equipment from the LG. The LG also has two outputs, headphones or preamp. The preamp output is located on the rear along with the input jack (P).

The headphone outputs are located on the right side of the front panel. The top, #1 Jack is a standard TRS jack. The bottom #2 Jack is a 4 pin balanced XLR connector. Although the LG is a single ended amp jack #2 is provided for headphones which are terminated with this type of connector.

The input selector switch is the leftmost switch on the right side of the amp, under the volume control. The left position selects input #1 and right position selects input #2.

The output selector is the rightmost switch under the volume control. The left position selects for headphones. The right position selects for preamp output.

Using Preamp Out

The Liquid Glass® preamp out comes directly from the headphone output and cannot be used at the same time as the headphone out is used. When using preamp out please remember that the Liquid Glass® has an offset detector which disconnects the headphones if significant DC is present at the output for any reason. This “disconnect” can sometimes lead to a loud pop in the headphones. When the LG is used as a preamp this pop will be transmitted to the power amplifier. It is rare for the Liquid Glass® to disconnect the output during normal listening, but it can happen if there is something that goes wrong. **Please be aware of this when connecting the LG to a power amp. Always turn on the LG first and wait for it to completely stabilize before turning on the power amp. Do the reverse when turning the equipment off.**

Cleaning

We recommend removing dust accumulation on the LG with compressed air from a can. Make sure that the amp has been off and is cool before cleaning. For the front panel use canned air and then, if needed, a good microfiber cloth to remove dust and other dirt from the front panel and the inside of the tube cage.

Power Up

Your power inlet has been set for the voltage you specified.

- 1) Insert the power cord.
- 2) Press the **standby switch** on the **power inlet at the rear of the amplifier**. The **power switch on the front panel should light white**. The heater and output LEDs should be completely **off**.
- 3) Pushing the power switch turns the amp on (see notes below about “The Power Switch”). The amplifier will “awaken” and prepare itself for safe operation in the following sequence (refer to enclosed diagram):
 - a) Heaters turn on and the Heater Warm-Up LED glows red -- 20 second delay in process to protect vacuum tubes.
 - b) After 20 seconds:
 - i. Rail voltages are applied.
 - ii. The vacuum tube “heater LED” glows white.
 - iii. The “Headphone Connect LED” glows red. 20 second delay in process to protect your headphones.
 - c) After 20 seconds the output delay LED glows white, announcing that YOUR CAVALLI AUDIO LIQUID GLASS HEADPHONE AMPLIFIER IS NOW READY FOR YOUR ENJOYMENT!

Important notes:

- Due to the extreme levels of resolving capability of the Liquid Glass®, you will likely notice changes in the amp’s performance in the first half-hour or so after turn on, even after considerable break in – this is normal. All audio components are subject to this “wake up” period, though few will demonstrate this phenomenon as acutely as the Liquid Glass®. This is simply another aspect of living with extreme audio performance. Enjoy!
- In order to insure product as well as vacuum tube longevity the power circuitry in your Liquid Glass headphone amplifier will not let you cycle the power on and off rapidly. If you turn off the power, the amp will safely recycle through the entire 40 second start up. This prevents damage that may be caused by sudden changes to and improper cycling of the power ... or in case of unexpected occurrences like power outages, accidental power disconnect, etc.
- If your amplifier does not follow this startup sequence or if the output relay LED never turns yellow, this indicates a problem. Please contact Cavalli Audio customer service at **support@cavalliaudio.com**.

Tube Matching

The gain of each channel in the Liquid Glass® is always ½ the mu of the triodes in use. Most triodes are reasonably consistent in this regard, but some can be very far off. To get the closest match for the gain in both channels, it is helpful to match the mu of all four of the triodes (two per tube) in use.

Extended On Time (Please Read This)

The Liquid Glass® amplifier will benefit from some warm up time, about a half hour to an hour. We do not recommend, however, that you leave the amp on for extended periods of time when not listening. Leaving the amp constantly on will shorten component life, including tube life, and will not (after the initial break-in period) benefit the sonic character of the amp. We do not recommend, for example, turning the amp on Friday evening and turning it off Sunday evening if you plan on listening for only a few hours each day.

The Front Panel Power Switch

Your Liquid Glass® Headphone Amplifier is equipped with a Piezo power switch. Piezo switches virtually never wear out from either mechanical or electrical failure. However, Piezo switches operate differently from mechanical switches and touch switches. The action of a Piezo switch is somewhere in between a touch switch and a mechanical switch.

Touch switches require only a touch to the sensitive surface of the switch to cause it to respond. Touch switches, obviously, are sensitive to nearly any kind of touch and will sometimes activate even when you don't want them to. A mechanical pushbutton switch requires that you cause the switch mechanism to make some amount of travel as you push it.

A Piezo switch is similar to a touch switch in that there is no detectable mechanical travel, but there must be some small deflection of the front face of the switch. Thus, a Piezo switch feels like a touch switch where you must apply some small amount of pressure to activate the switch. This pressure is low, but not zero. Take some time to understand and feel how your Piezo switch works and then it should operate without issues for the life of your amplifier.

What about those tweaky things like cables, power cords, better feet and such that I've heard so much about?

Everyone has an opinion on this one, and we can say without a doubt that at this level of performance *every* change makes a difference. The extent to which this change is an *improvement* is, of course, the subject of much debate. Such is the nature of high-performance audio. We have found that, due to the extreme resolving capability of the Liquid Glass, varying your selection of items such as aftermarket power cords, resonance control products, interconnect cables, and headphone cables will very likely result in changes to the sonic result perceived through your choice of headphones.

One of our closely-held opinions with regard to the entire matter of “What makes ‘better sound’ better?” can be summed up in a few short words – “if the musical result of the change MOVES YOU, then it is worth considering. If not, spend those discretionary funds obtaining more of your favorite music!”

OK, so now comes that time when we require you to read some verbiage written in legalese. If you understand all of it, you're probably an attorney. If you don't understand all of it, you're one of the rest of us who doesn't like reading this any more than we like requiring that you read it....but here it is.....

Warranty

This Cavalli Audio product has a 1-Year warranty for parts and labor. Tubes are warranted for 90 days. Warranty does not include fully insured shipping costs to Cavalli Audio. Warranties are not transferable unless pre-authorized in writing by Cavalli Audio. If the repair is due to customer damage, negligence, bad tubes or tubes not provided for this amplifier by Cavalli Audio, repairs will be charged as parts and labor, which will be quoted before work is performed. **For warranty support please contact support@cavalliaudio.com or, if purchased from one of our authorized retail outlets, please contact the authorized retailer from whom you purchased it. Please include a warranty authorization number with the returned product.**

Any modifications to this product which have not received written Cavalli Audio approval nullify all claims and void the warranty. Should a modified product be returned to Cavalli Audio for repair the owner will be required to pay all necessary charges for the repair in addition to those charges required to return the product to its original configuration.

Removal or alteration of original Cavalli Audio serial numbers voids the factory warranty. **Product with altered or missing serial numbers will be considered counterfeit product.** Cavalli Audio will not repair or in any way indemnify any counterfeit or cloned product.

Standard Warranty Limitations

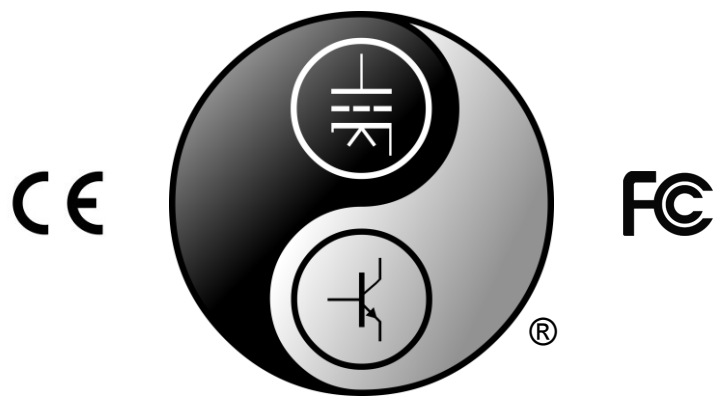
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Now that you've read all that, and we assume that you have, in fact, read the above essential verbiage, we're hoping and trusting that you have found reading this owner's document to have been both useful and entertaining; enhancing your ability to enjoy your Cavalli Audio Liquid Glass headphone amplifier. Now, GET BACK TO ENJOYING YOUR MUSIC!

Limitation of Liability

IN NO EVENT WILL CAVALLI AUDIO OR ITS SUPPLIERS BE LIABLE TO CUSTOMER FOR ANY CONSEQUENTIAL, SPECIAL, PUNITIVE, INCIDENTAL, OR INDIRECT DAMAGES OF ANY KIND ARISING OUT OF THE USE OF OR INABILITY TO USE THE PRODUCT, INCLUDING LOST PROFITS, LOSSES ASSOCIATED WITH BUSINESS INTERRUPTION, LOSS OF USE OF THE PRODUCT, LOSS OF DATA, COSTS OF RE-CREATING LOST DATA, OR COSTS OF PROCUREMENT OF SUBSTITUTE GOODS, EVEN IF CAVALLI AUDIO HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND NOTWITHSTANDING THE FAILURE OF ESSENTIAL PURPOSE OF ANY REMEDY. IN NO EVENT WILL CAVALLI AUDIO'S AGGREGATE LIABILITY FOR ANY CLAIM, WHETHER IN CONTRACT, TORT OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF USE OF THE PRODUCT EXCEED THE TOTAL FEES PAID BY CUSTOMER FOR THE APPLICABLE PRODUCT AND NOTWITHSTANDING THE FAILURE OF ESSENTIAL PURPOSE OF ANY REMEDY.

If you have any questions or comments, please contact us at sales@cavalliaudio.com or at info@cavalliaudio.com. We look forward to hearing from you!



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