OWNERS MANUAL

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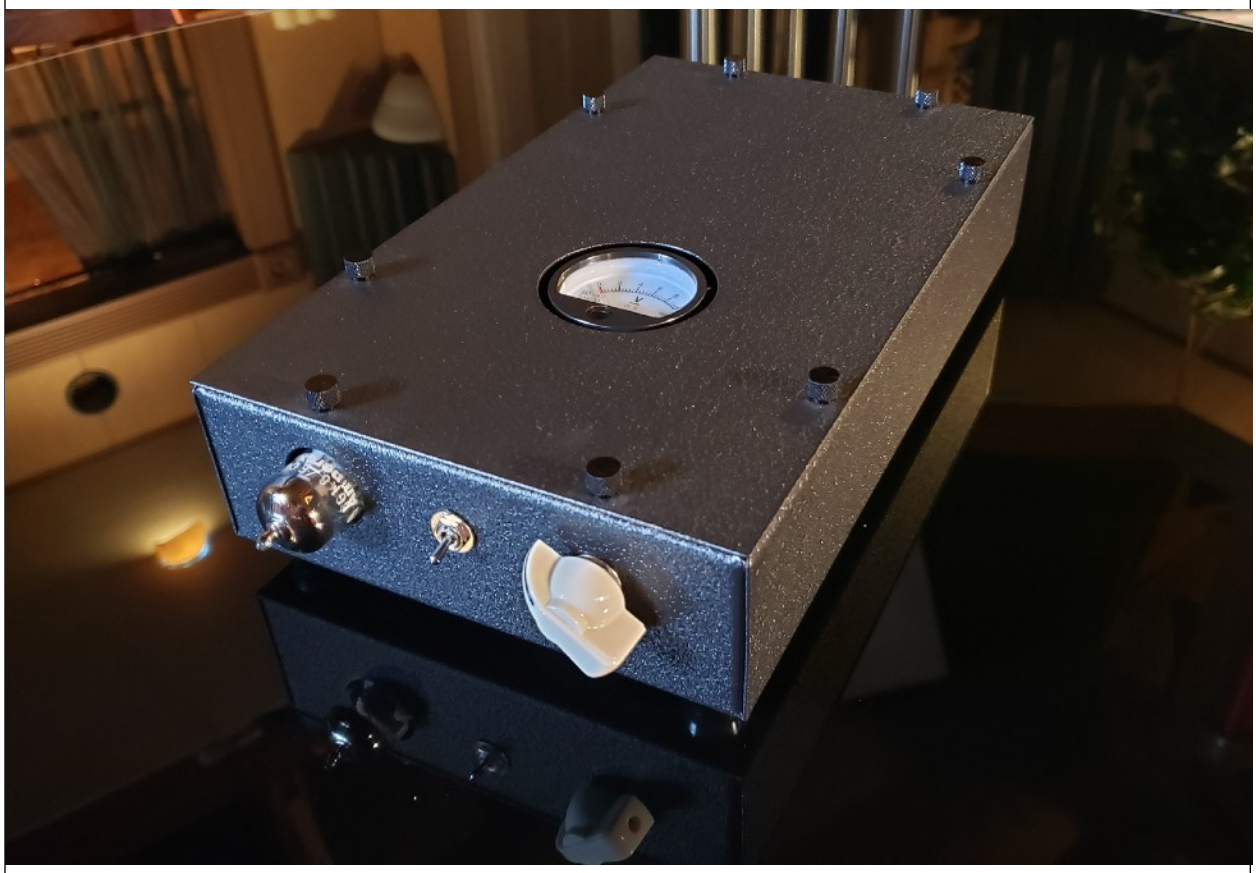
DECWARE

ZEN CARTRIDGE AMPLIFIER



Battery Operated Vacuum Tube Phono Cartridge Amplifier

MODEL **ZCA**

OWNERS MANUAL

INTRODUCTION

The Zen Cartridge Amplifier was designed to increase (or decrease) the output of a phono cartridge.

This is particularly useful when you have low output moving magnet cartridges or high output moving coils that work into a 47K input. An example would be a cartridge with 2mV of output could be increased to 6mV with the simple turning of a knob, and while you're listening to it.

Just as easily, you may have a 6mV cartridge that's a little hot in your system and the ZCA can turn it down to anything you like. Because the ZCA is an active tube stage, there are no losses dynamically or otherwise no matter if you use it to increase or decrease the output of your cartridge.

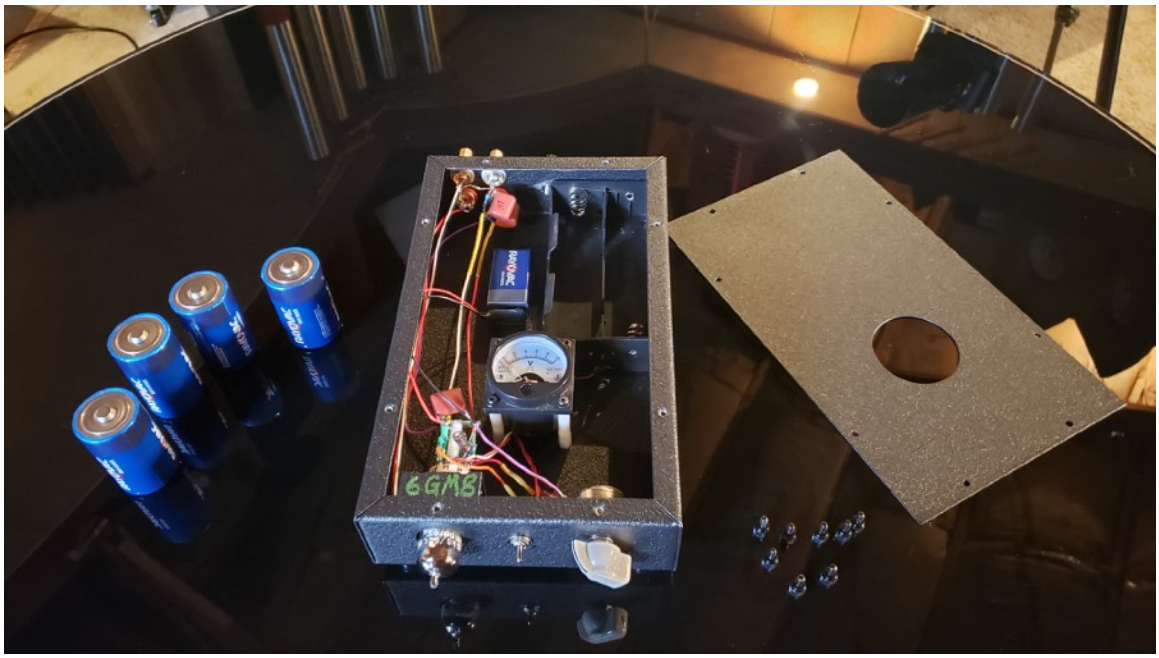
The ZCA uses a single 6GM8 dual triode tube. This tube has a 6 volt heater like many other small signal tubes, but what makes it unique is that it operates on low voltages. Rather than needing several hundred volts, this tube will operate on just a few volts which is rather amazing. So to feed the heater/filament inside the tube the ZCA uses 4-D-Cell batteries wired to an on/off switch at the front of the unit and a voltage meter on the top of the unit.

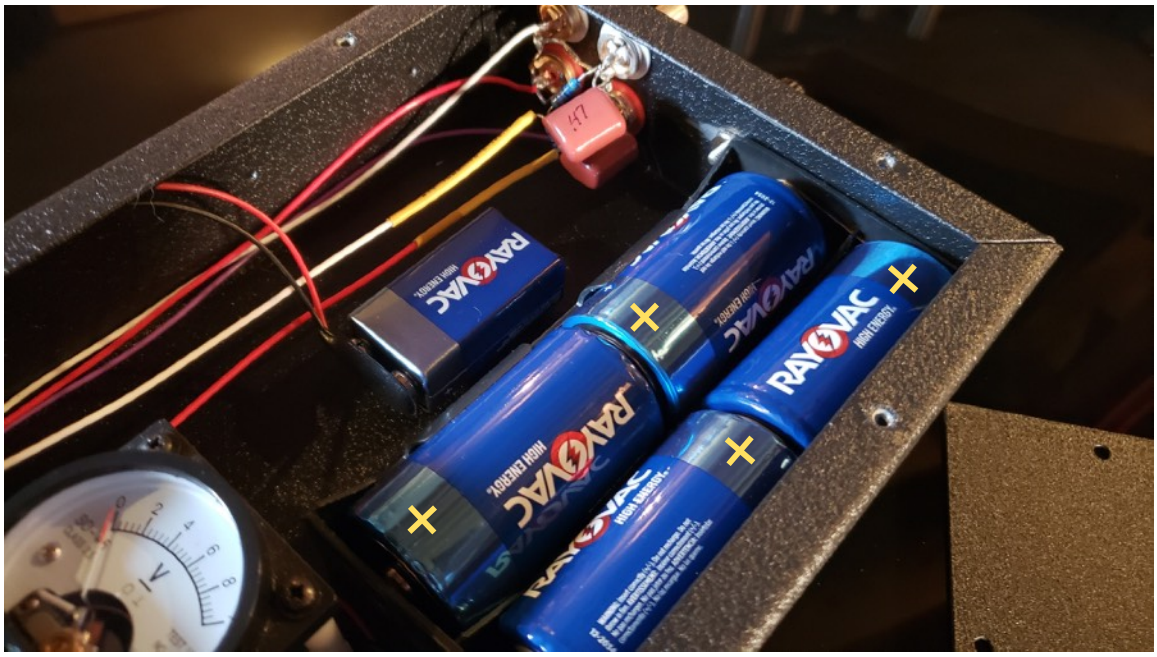
The voltage meter on the top of the unit shows the condition of the D-Cell batteries. A fresh set will read near 6 volts. We recommend replacing the D-Cell batteries when the meter reads between 4 and 5 volts. These batteries last on average 30 hours before reaching 4.5 volts.

The operating voltage for the tubes plate is supplied by the 9V battery. The 9 volt battery typically lasts 500 hours or more.

SET UP GUIDE

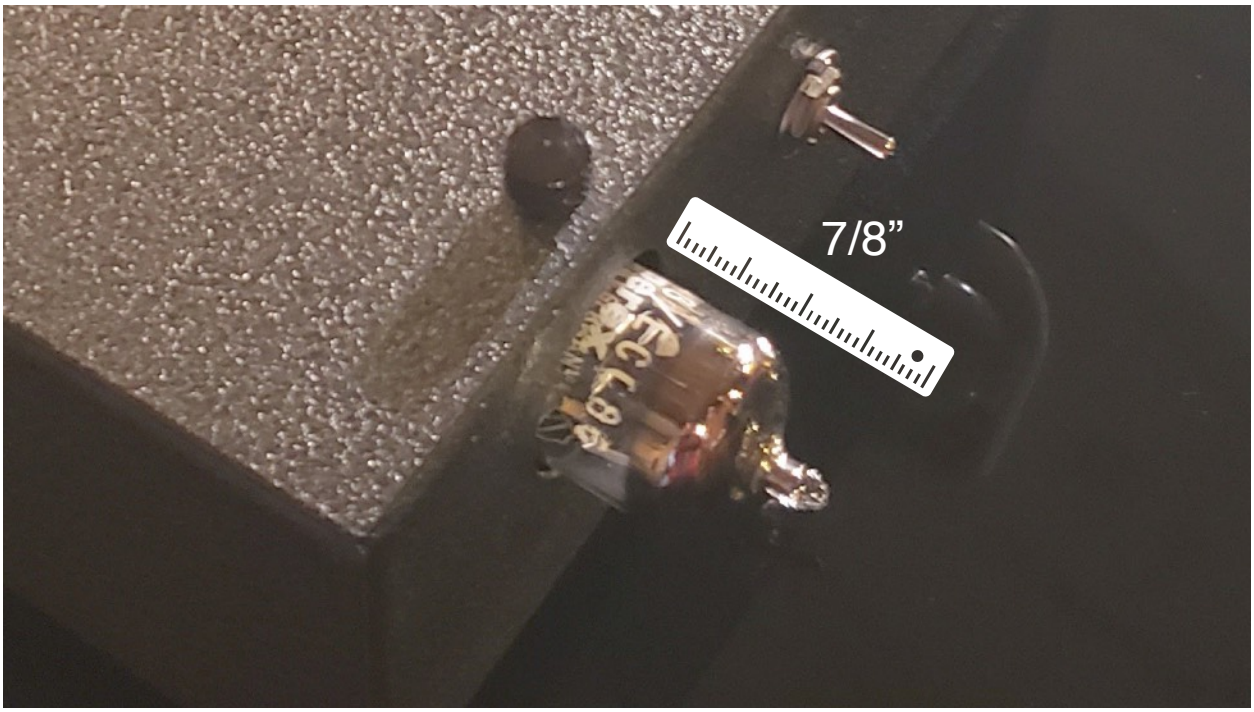
Step one is to install the batteries and the tube. The top of the ZCA features a removable lid held in place with 8 thumb screws. Once the lid is removed you will see the battery compartment for the D-Cell batteries. There is also a clip for a 9 volt battery and a small round magnet used to hold the battery in place.





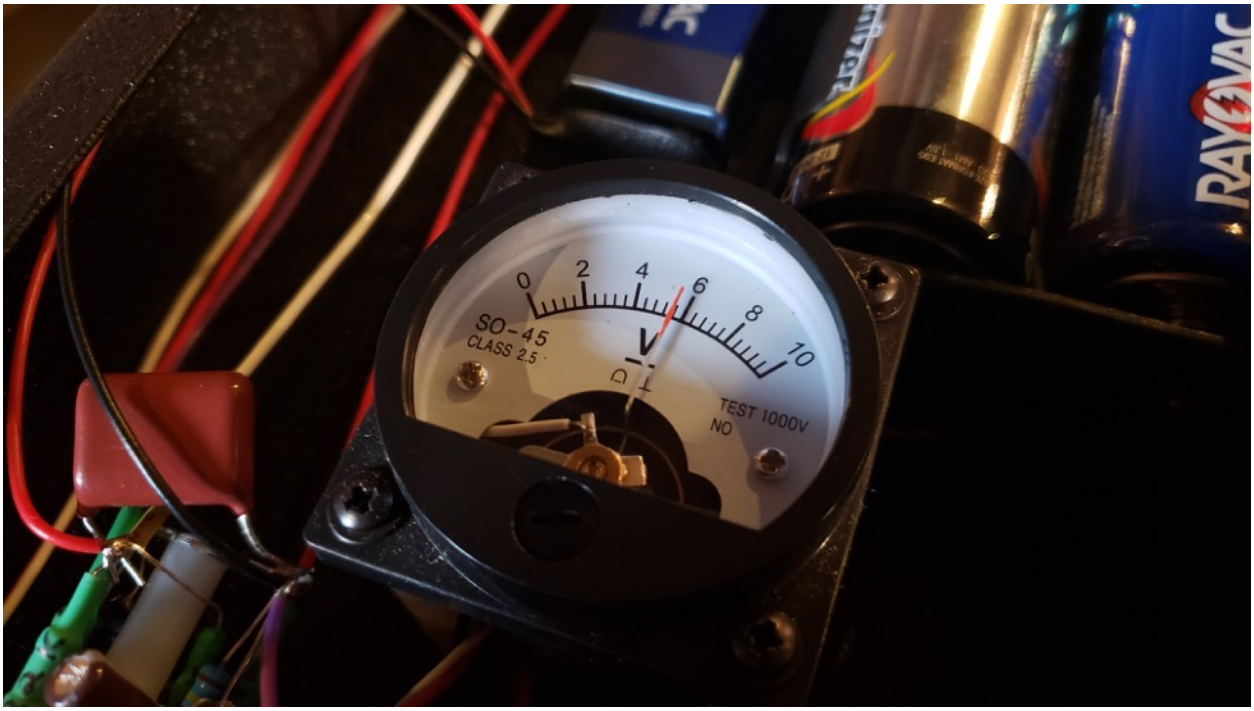
Be sure the batteries are installed with the positive ends facing the correct way as shown in the picture above.

Also, be sure the tube is fully inserted into the socket. The socket is typically very tight when the product is new and requires some force to get the tube fully inserted. See picture below to see what it looks like properly installed.



Once the tube and batteries are installed, you may want to test the unit before re-installing the lid.

To test the unit simply turn on the switch and see where the voltage meter reads. If it is between the 4v and the 6v then your unit is working. Below 4v means your D-Cell batteries are weak.



Once you have tested it, re-install the lid and proceed to hook up your tonearm to the input jacks on the ZCA.

With **moving magnet** (or high output moving coil cartridges), the tonearm cables are connected to the vertical pair of RCA jacks on the inside indicated by the yellow circle in the picture. White (the top jack) is the Left channel and Red (the bottom jack) is the Right channel.

The tonearm cables (if not supplied by the tonearm manufacturer) must be shielded and there must be a tonearm/turntable ground wire between the turntable and the ZCA's ground lug. The ground lug is the black jack centered in the rear of the ZCA. It can unscrew to accept bare wire or spade connectors. Additionally it can accept banana plugs pushed straight into the end. IMPORTANT: This connects your vinyl rig's ground to the ZCA but you will also have to connect a wire from this ground post to your phono-stage (preamp or receiver). That is to say the ground post on the ZCA must be connected to both your turntable and your phono stage or receiver at the same time.

With **moving coil** cartridges, the tonearm cables are first connected to a step-up-transformer. This is assuming you have a classic moving coil cartridge, which is also a low impedance cartridge. If you have a high-output moving coil cartridge, which is also known as a high impedance (47kOhm) cartridge just like a moving coil, then no step up transformer is used.

When a step up transformer is required, the tonearm ground wire is connected to the ground post on the transformer. The transformer's left and right channel outputs as well as the ground are then connected to the ZCA.

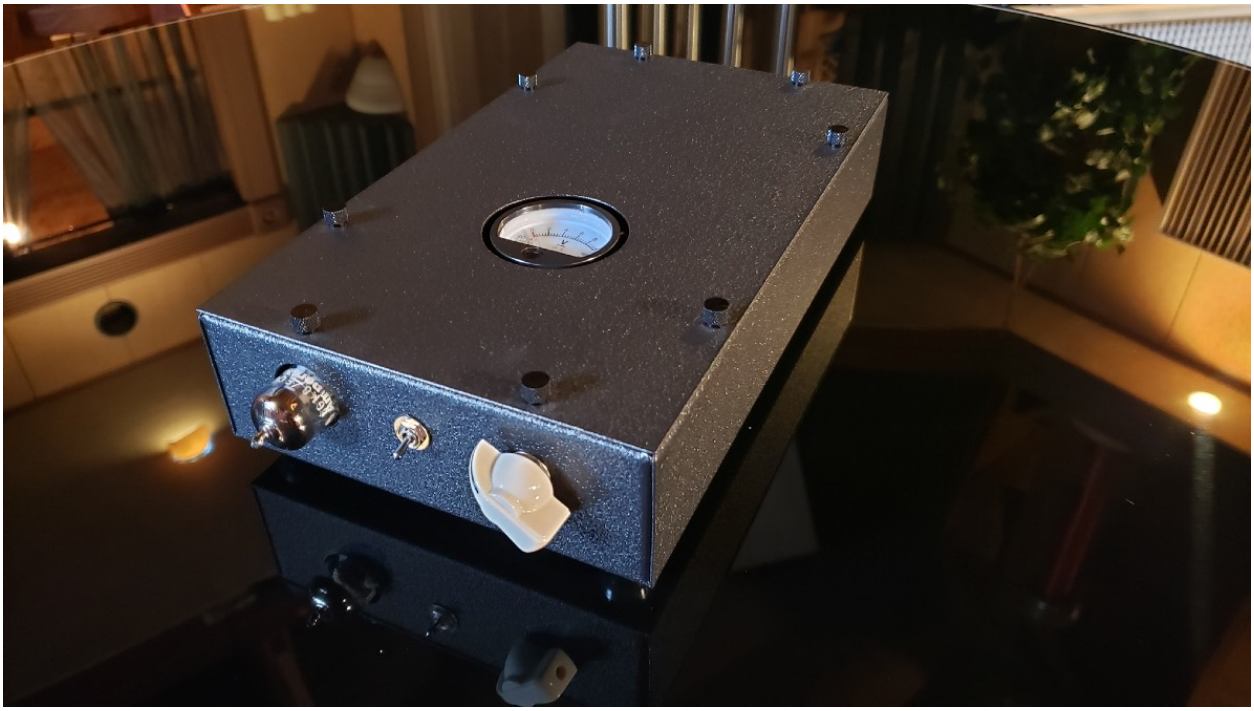
The output jacks on the ZCA are the vertical pair in the previous picture that were not circled, which is to say the pair closest to the outside edge of the unit. These connect to the MM (Moving Magnet) inputs of your phono-stage/preamp/receiver.

A ground wire should be connected from the ground post on the ZCA to a ground post on the phono-stage/preamp/receiver.

If you used a Moving Coil prior to this and connected it to the MC inputs of your phono-stage/preamp/receiver, you will have to use a step up transformer between the turntable and the ZCA and then connect the ZCA to the Moving Magnet inputs on your phono-stage/preamp/receiver.

OPERATION

To operate the ZCA, you would turn the volume dial all the way down and then turn on the power switch. You will see the voltage meter climb to between 4 and 6 volts. Give the tube 15 or 20 seconds to warm up and then raise the volume control to the level that you have determined you like.

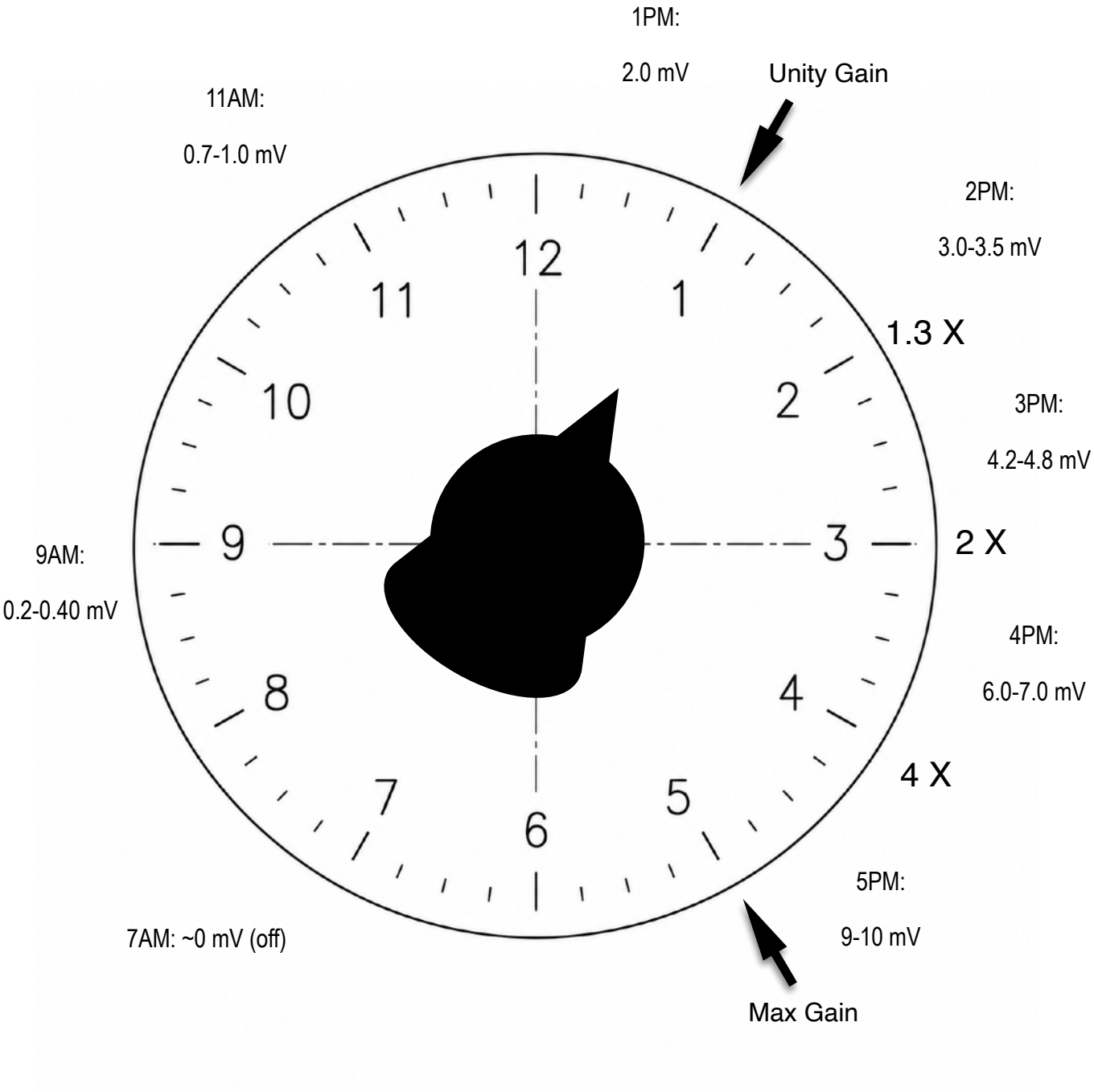


The range of the volume knob is from 7AM to 5PM if it were a watch dial. On most cartridges UNITY gain is at about 1PM. That is the point where there is no gain or cut, the output is exactly the same as if you didn't have a ZCA. This is always a good starting point and accurately represents what your cartridge normally sounds like. Raising the control simply increase output which generally animates the music more.

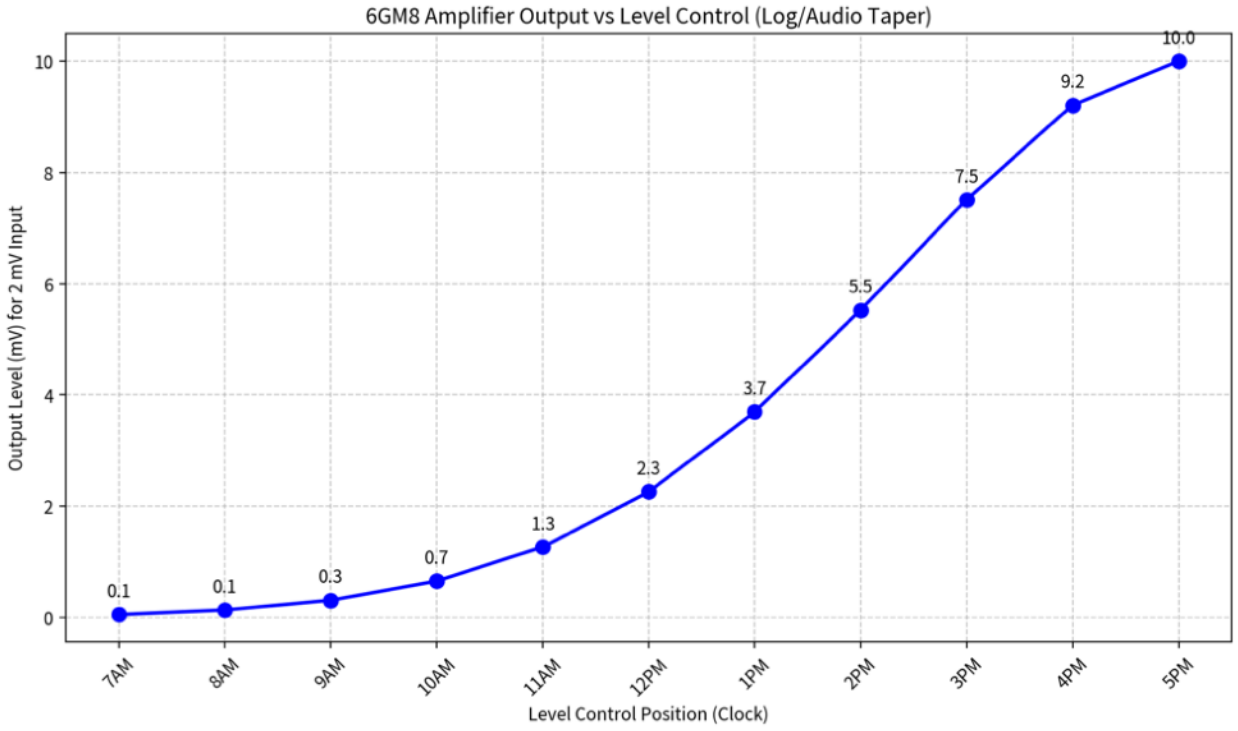
This control can be adjusted on the fly while you listen without issues.

It is best to turn the volume control all the way down prior to turning the ZCA on or off so you don't get a pop sound.

2 MILLIVOLT CARTRIDGE EXAMPLE



The chart above shows how much amplification you can expect to get based on the position of the volume control knob. By the time you get to 4 o'clock a 2mV cartridge will be putting out somewhere between 6 and 7 millivolts.



The chart above and on the previous page show the relative output level of a 2 millivolt cartridge. As you can see even a 2 millivolt cartridge can be turned up to 9 or 10 millivolts!

If you have a 4 mV cartridge, you can double the numbers in the chart.

The max input for the ZCA is 10 mV. At 5 mV input level the harmonic distortion is 0.5%. So you really don't have to worry about overloading the ZCA, even with high output cartridges.

Your phono stage is a different story. Most modern stages can usually tolerate 70~100mV which will cover the dynamic peaks possible on direct cut 45 RPM records. But, if you have your ZCA/cartridge combination turned up higher than 10mV many MM phono stages will start distorting in the bass where the RIAA curve has it's highest amount of gain. We bring this up, because the distortion would only show up in the low bass region, while the midrange and top end remained clean so it wouldn't be hard to miss this on some systems.

BATTERY TYPES

The ZCA can use any type of D-Cell batteries, but Alkaline have the highest performance. The 9 volt battery which supplies the operational voltage for the tube circuit has ultra low current draw, as as mentioned can last 500 hours or more. What wasn't mentioned is that the ZCA will operate well below 9 volts and will sound slightly different with different types of 9 volt batteries. Carbon will sound different than Alkaline and Rechargeable batteries, so it on a finer level becomes another voicing tool for your cartridge.

HUM

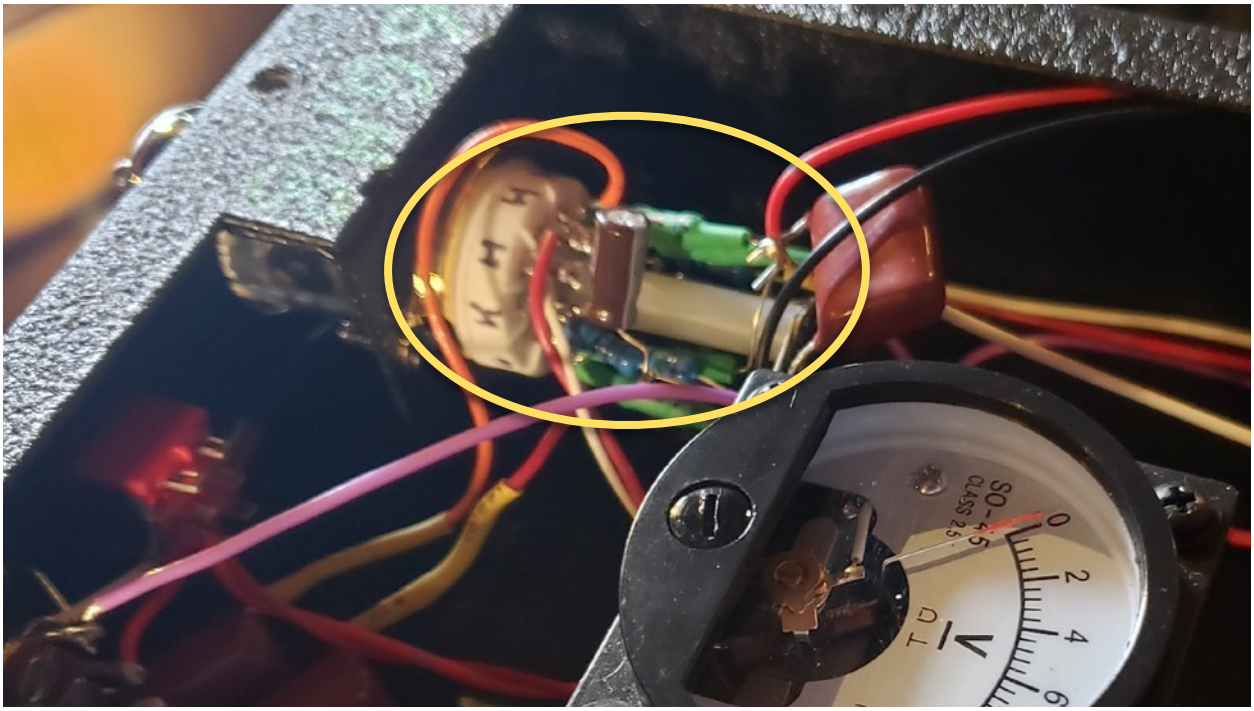
It is impossible for the ZCA to add hum to your system because it is run on batteries and is built in a heavy steel case that provides heavy shielding.

That said, the case must be grounded, just like your turntable must be grounded to the ground lug on your phono stage/preamp/receiver or you will hear hum.

Also, if your tonearm cables have only mediocre shielding, or you run a wood cartridge, or your vinyl rig as a whole is picking up small amounts of hum, using a ZCA to amplify your cartridge will also amplify the hum that is there, making it louder.

If you're having hum problems it will be related to how you have each component grounded, and the quality of the shielding in your cables. From the tonearm all the way to the input of your phono stage/preamp/receiver should be highly shielded cable. If you run a stand-alone phono stage, the output of the phono stage is considered line level, just like a CD player, so shielded cables are less important.

Many cables are shielded, but some are higher percentages than others. Some are braided copper, some steel, some aluminum, some silver, some have foil lining around the shield, some don't, point is, some are far better than others.



SOUND QUALITY

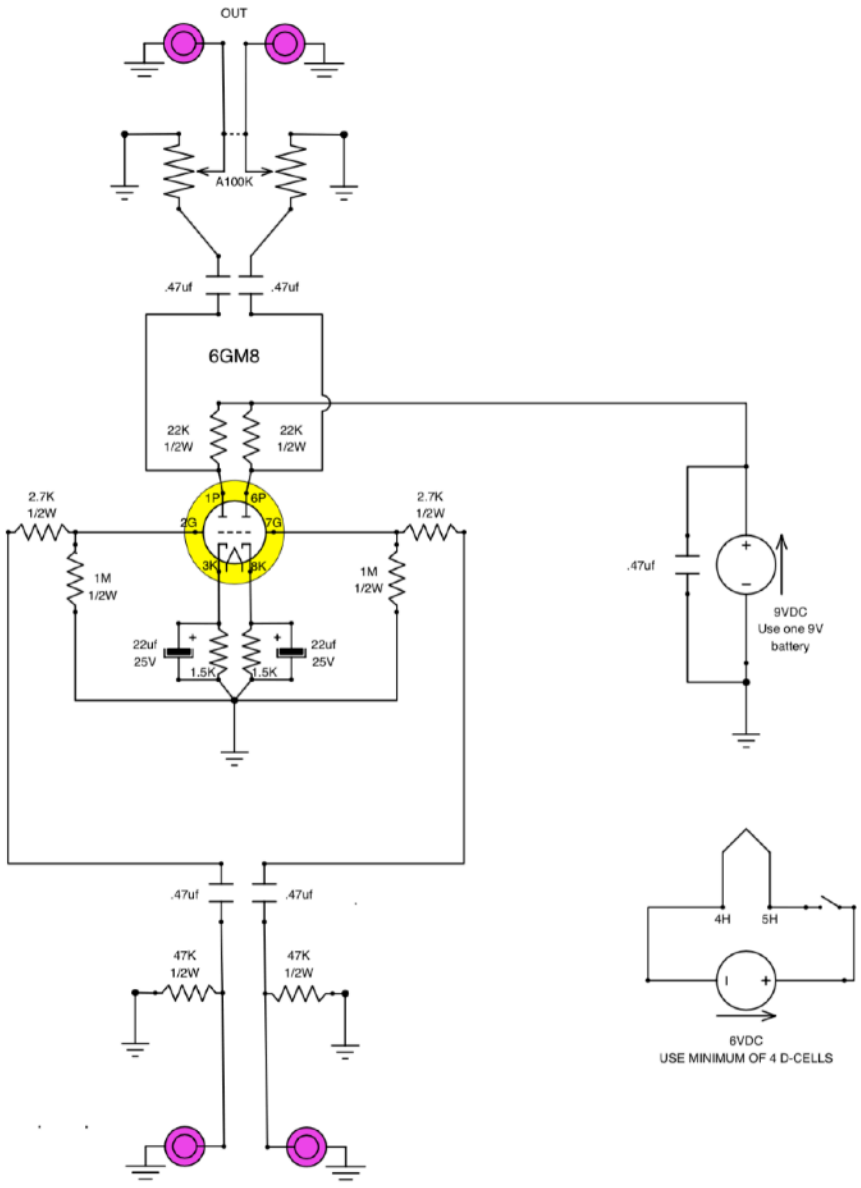
The entire circuit is using point to point wiring built on the tube socket itself. This provides a signal path for the entire audio circuit that is only 1 inch long. Wiring from the input and output jacks is silver plated copper stranded wire in a Teflon jacket. The output control is an infinitely variable carbon potentiometer that has been selected for it's warmer sound.

The 6GM8 tube is a dual triode offering two channels in one tube. This is a simple SET (Single-Ended-Triode) circuit without global negative feedback deserving of any top grade phono cartridge..

The design solves the common problem of dealing with low output moving magnet cartridges as well as high output moving coils by giving them additional output. Standard Moving Coils will need step up transformers prior to going into the ZCA. Step up transformers are a superior form of gain for a MC cartridge because they are noiseless and add no distortion. So switching from a MC input on your phono stage/ preamp/receiver to a step up transformer will often sound better. Adding a ZCA to that signal path makes it untouchable, and allows you to use a wider variety of step up transformers than without it.

SAFETY

The ZCA was designed with capacitor coupled inputs and capacitor coupled outputs making it impossible for any DC voltage of any kind to ever reach your cartridge in the event of catastrophic failure of the tube.



SERVICE

There are no user serviceable parts inside other than the replacement of batteries.

This unit comes with Decware's lifetime warranty to the original owner. If you need service you can receive an Return Authorization number by contacting us through our web site at www.decware.com. Go to either the SERVICE or the CONTACT sections of the site. Repairs typically take 14 business days.

SCHEMATIC

The schematic is provided for understanding the design only. Please return to Decware for authorized service.

The on/off switch in this circuit controls the 6 volt heater circuit which is supplied by the 4 D-Cell batteries. There is no switch for the 9 volt battery because when the tube is not being heated by the 6 volt circuit, it no longer conducts and effectively becomes a switch that turns off the 9 volt battery.

MODS

While it is popular to "Improve" things with mods, most commonly replacing capacitors with over-sized and over-priced boutique caps, you will only degrade the unit by attempting to do so. The polypropylene film caps we selected as part of the voicing from dozens of different possible alternatives. These have the lowest noise, and best performance and imaging and speed so please don't assume they are a cheap capacitor that needs to be replaced. Matching polypropylene caps are used in the power supply so that the speed characteristics of the power supply exactly match the speed characteristics of the signal caps.

The ZCA was voiced and tested with London Decca's signature cartridges that are known to be the fastest and most dynamic cartridges in the world. Do not modify your ZCA. Spend the money on a "Smartractor" cartridge setup tool from Germany or on better cables, or something that will actually improve your system, like a better cartridge?