

# ZEN MYSTERY AMP



*Reference Vacuum Tube Amplifier  
Model ZMA*

 **DECWARE**

lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user to the presence of uninstalled "dangerous voltage" within the product's enclosure that may be of risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**AVIS** RISQUÉ DE CHOC ELECTRIC-NE PASOVRIR.

**WARNING- TO REDUCE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.**

**NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.**

To prevent the risk of electrical shock, do not remove cover or bottom. No user serviceable parts inside.

## IMPORTANT SAFETY INSTRUCTIONS!

### PLEASE READ THESE BEFORE OPERATING THIS EQUIPMENT.

1. Read and Follow these instructions.
2. Do not plug your amplifier in or attempt to turn it on until you have read and followed the steps in this complete manual.
3. **Never leave this amplifier powered ON while unattended or at night when sleeping.**
4. Do not use this amplifier near water or in damp locations.
5. Do not place this amplifier near any heat sources such as radiators, heat registers, stoves, or directly above other amplifiers that produce heat.
6. Do not defeat the safety of the 3 prong power cord by attempting to lift the ground. If you only have two prong outlets in your home, have a licensed electrician install a grounded outlet near the amplifier.
7. Protect the removable power cord from being walked on or pinched at either end.
8. Do not attempt to move this amplifier until after it has been turned off and cooled down to room temperature.
9. Unplug the amplifier during lightning storms or when unused for long periods of time.
10. Refer all service to Decware or a Decware authorized service tech. Do not attempt to fix internal problems. There are no user serviceable parts inside.
11. **WARNING HIGH VOLTAGES PRESENT** - This amplifier stores up to 500 volts in the capacitors. Do not open the amplifier under any conditions.
12. Never touch a vacuum tube while it is operating. Some can reach temperatures near 400 degrees F.
13. **ALWAYS** place amplifier on a solid sturdy clean and level surface that can support over 100 pounds so there is no risk of the amplifier falling or getting tipped over.

## Thank You

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By purchasing this amplifier you are helping to preserve the art of finely crafted audio products with absolute world class reference fidelity.

## Please Take a Moment

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The serial number and date of your amplifier are recorded on the bottom. Take a moment to write them down here so you don't have to move your amplifier once it is installed.

Serial Number: \_\_\_\_\_

Date (Month/Year): \_\_\_\_\_

Model Number: \_\_\_\_\_

## Technical Assistance

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You can get help by calling us directly or you can e-mail [zen@Decware.com](mailto:zen@Decware.com)

If you have any issues, check the web sites contact page for up to date e-mail addresses and phone hours.

We also have a strong online support forum that is very active. This can be a handy way of getting help during off hours or weekends when our office is closed.

### **DECWARE/High Fidelity Engineering**

75 S. Riverview Dr. East Peoria IL 61611  
(309) 822 5255 [www.decware.com](http://www.decware.com)

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## Unpacking

Your Zen Mystery Amp is shipped in a military grade waterproof case. The insides of the case contain a foam impression of the amplifier and the amplifier is stored upside down inside the case and without tubes.

As you can see, there are wheels and a pull out handle on the case making it easy to transport. Please do not try to carry the case because with amp it weighs over 50 lbs.



Set the case on a low table or the floor and carefully lift the amplifier straight up out of the foam. Get someone to help if you're not able to dead lift 40 lbs.

**NOTE: Before picking the amp up you need two things:**

1. A soft place to set the amp down on after you remove it from the case so you can flip it over. Once flipped over you can then pick it up again... and...
2. A place to put the amp for its initial test. Picking up the amp before you've found a place to set it down is unwise.

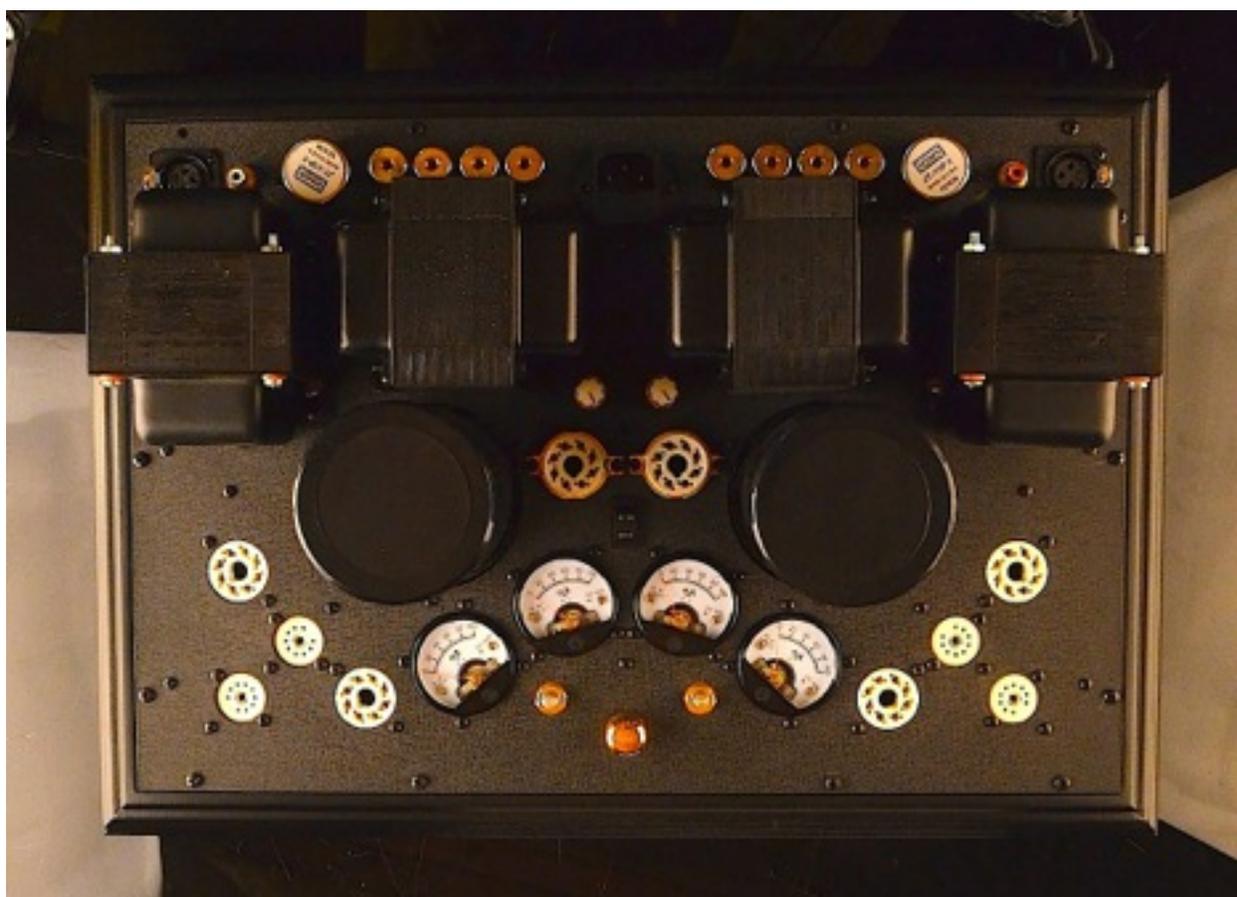
## Unpacking Continued:

Once you have the amplifier setting right side up in a location where it can be tested, make sure it has come to room temperature before doing anything else.

This is especially important in cold climates. Cold steel will experience condensation in a warm house and this is a high voltage amplifier so wait until the steel is room temperature before installing tubes or the power cord. This can take up to 24 hours in extreme cases.

## Getting Started

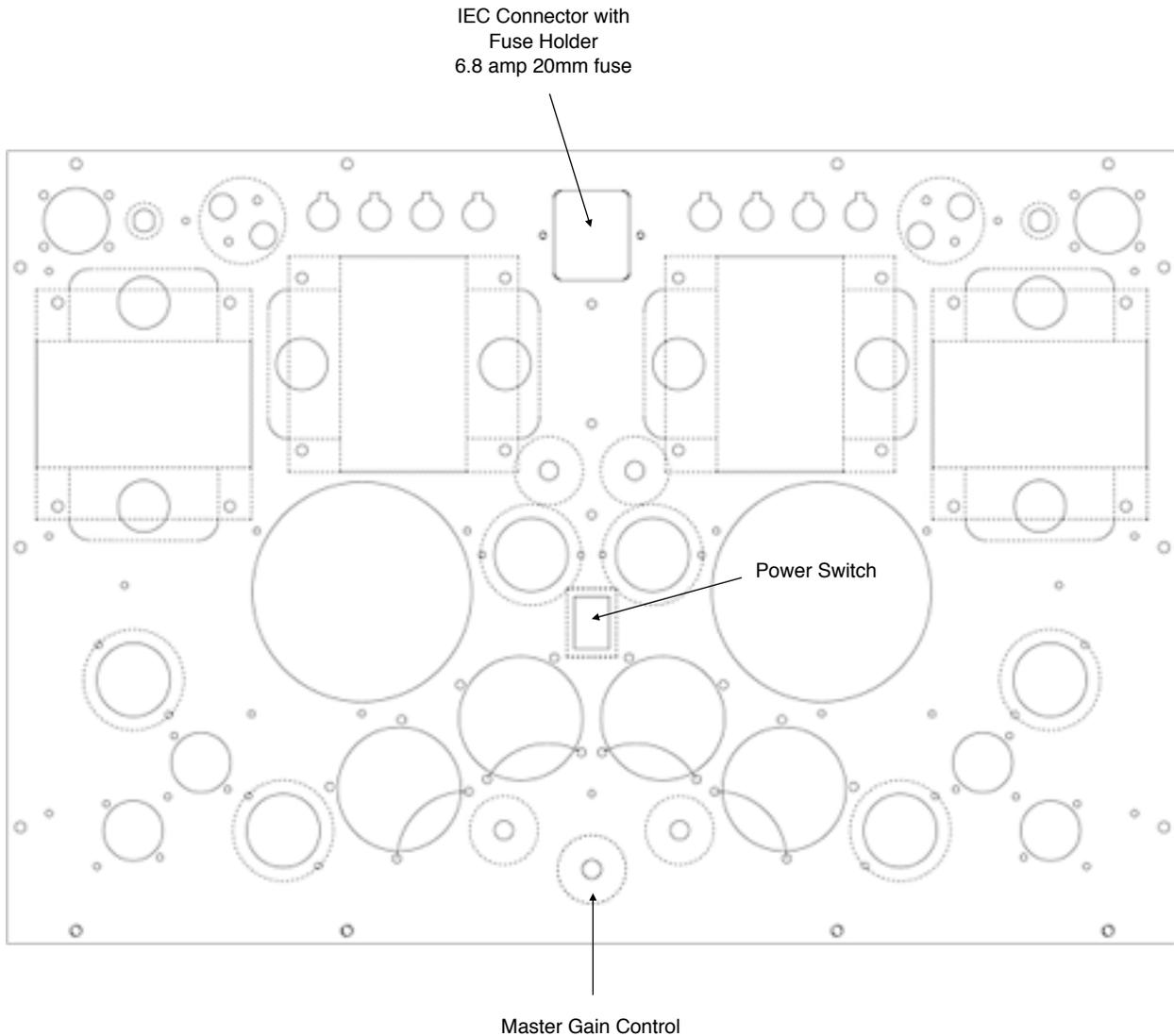
First lets get familiar with layout of the amplifier. Your amplifier will look like this:



The important thing to notice about your amplifier is that it is actually TWO mono amplifiers that are laid out symmetrically in a mirror image pattern from an imaginary centerline between the IEC plug for the power cord and the volume control. In other words, everything on the left side of the amp is repeated in a mirror image on the right side of the amp. From this view, the left side of the amp is typically used for the left channel and the right side, the right channel.

## What's what

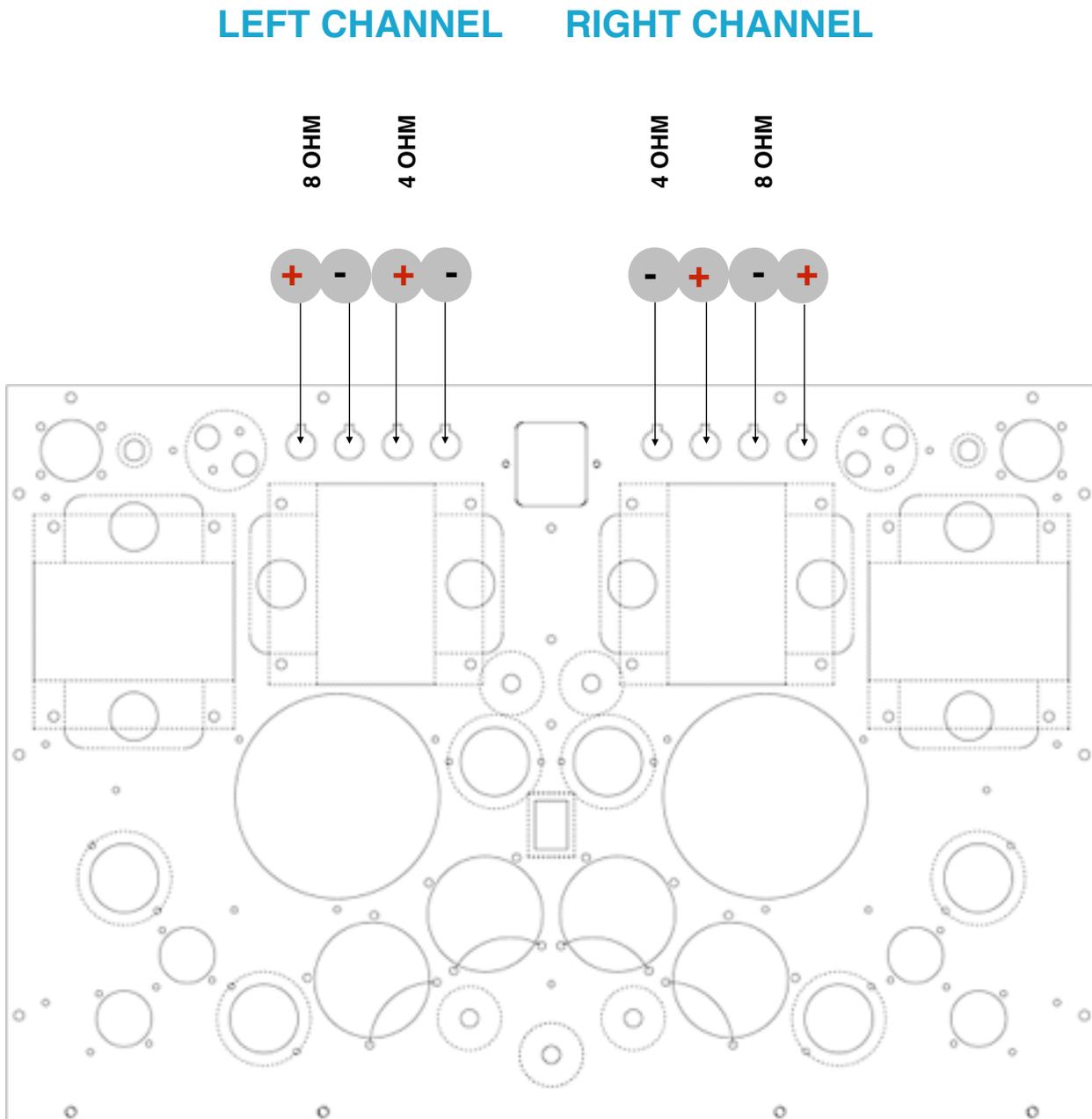
There are only three things on this layout that are common to both channels. The IEC connector for the power cord, the power switch and the master gain control.



These three items serve both of the mono amplifiers that make up the Zen Mystery Amp. This way you only need one good power cord, whereas separating the amps into two chassis would of course require two.

## Speaker Connections

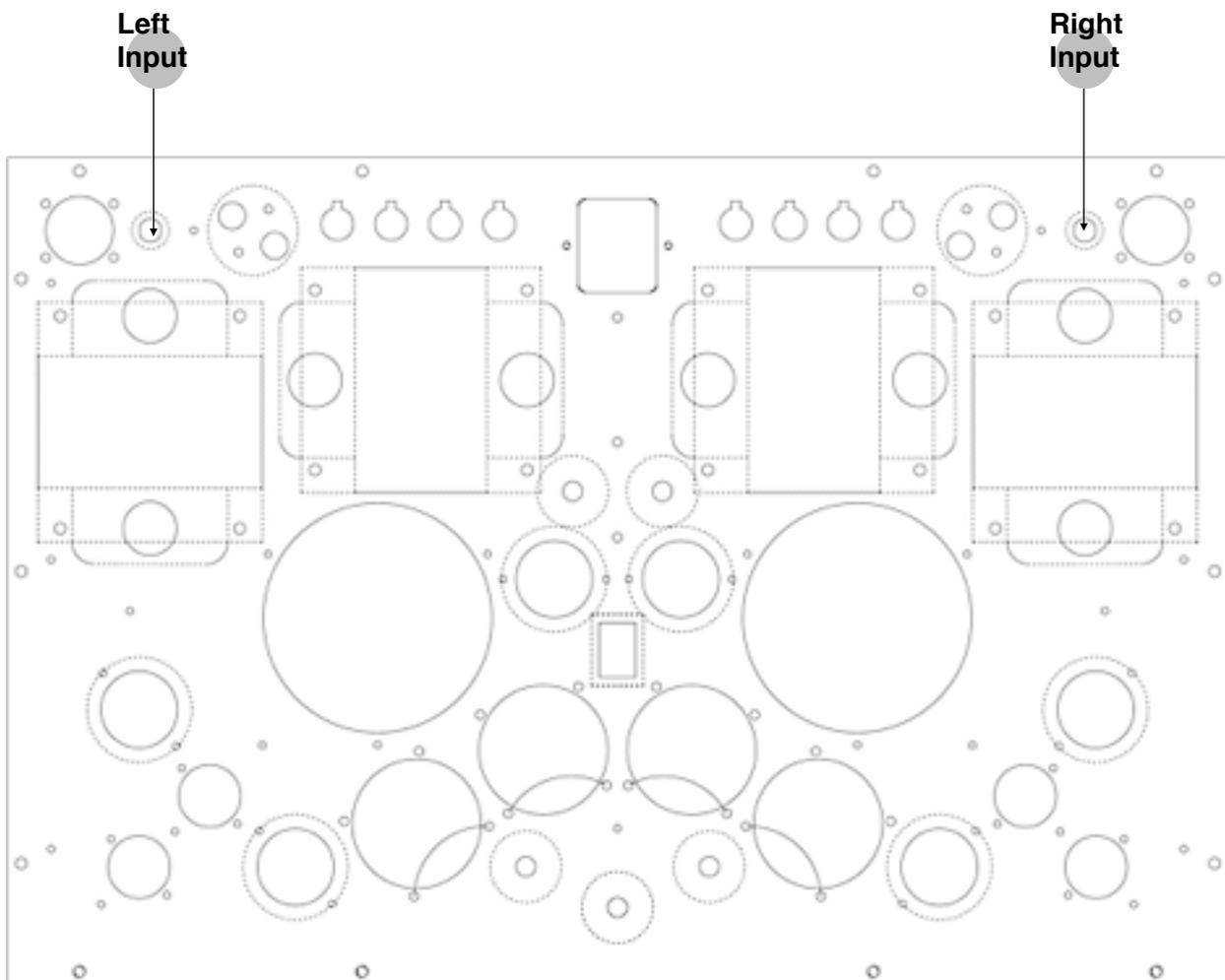
The ZMA has heavy duty gold plated binding posts that can accept up to 8 AWG bare wire, banana jacks, or the larger spade connectors commonly found on hi-end speaker cables.



As you can see, there is a separate positive and negative post for both 4 ohm and 8 ohm speakers. Use only one pair at a time.

## Input Connections

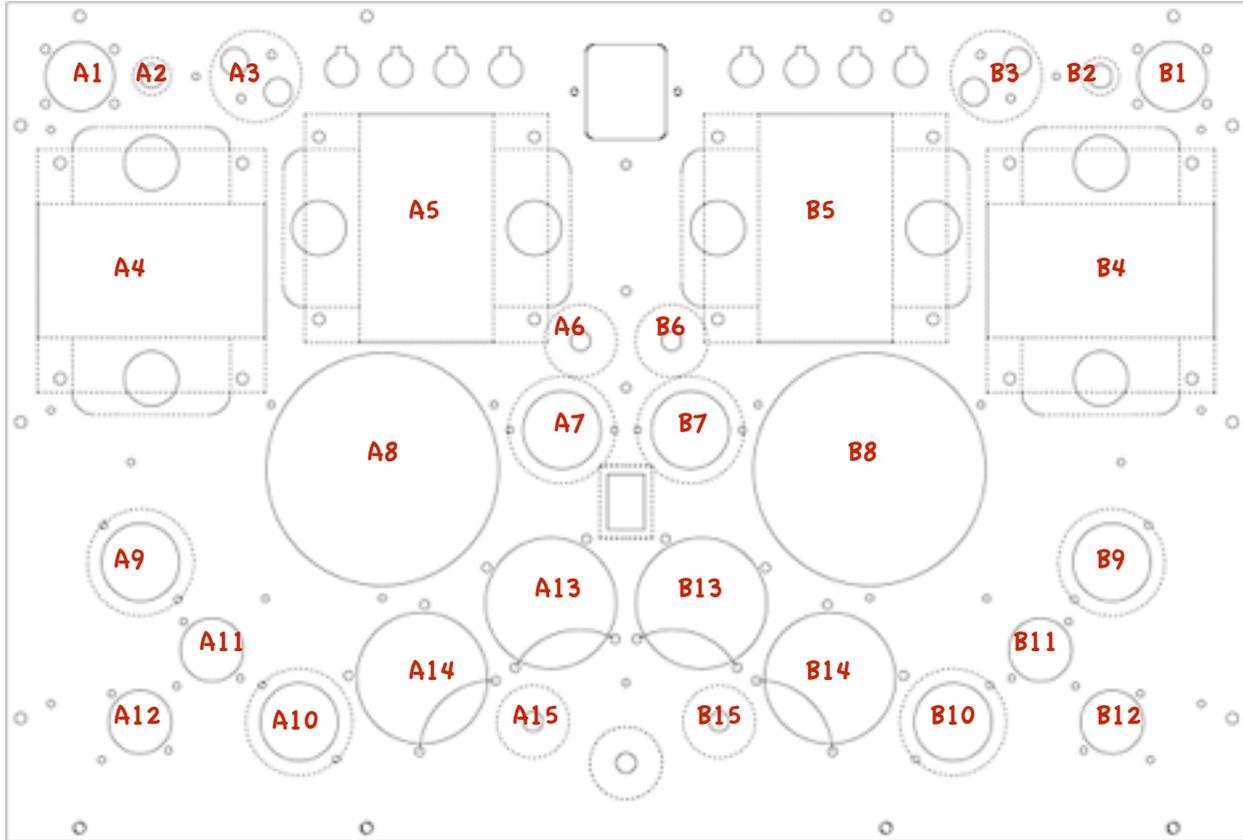
The ZMA comes standard with single-ended RCA input jacks rated at 2 volts for maximum power. Transformer balanced XLR inputs are optional and located directly next to the RCA input jacks on either side. If your amp was built with these you can use either balanced XLR inputs or RCA inputs but not both at the same time.



With professional grade equipment featuring differential or transformer balanced outputs we recommend having your ZMA built with the balanced inputs for best sound. For example, on our studio mastering reel to reel tape machine there are only transformer balanced outputs. Although these outputs can be converted to a single-ended RCA jack the tape machine will not sound as good that way. On a hi-end DAC with both balanced and single-ended outputs, the DAC will sound good on either as will the ZMA.

## Components

Please refer to the diagram below to identify the remaining components of a Zen Mystery Amp.



A1	Left XLR Input Jack	B1	Right XLR Input Jack
A2	Left RCA Input Jack	B2	Right RCA Input Jack
A3	Left Balanced XLR input transformer	B3	Right Balanced XLR input transformer
A4	Left Output transformer	B4	Right Output transformer
A5	Left Power Supply transformer	B5	Right Power Supply transformer
A6	Left Bias Level Control	B6	Right Bias Level Control
A7	Left OA3 Voltage Regulator Tube	B7	Right OA3 Voltage Regulator Tube
A8	Left 500V Power Supply Capacitor	B8	Right 500V Power Supply Capacitor
A9	Left output tube (1 of 2)	B9	Right output tube (1 of 2)
A10	Left output tube (2 of 2)	B10	Right output tube (2 of 2)
A11	Left phase inverter tube	B11	Right phase inverter tube
A12	Left input tube	B12	Right input tube
A13	Bias Meter for A10 tube	B13	Bias Meter for B10 tube
A14	Bias Meter for A9 tube	B14	Bias Meter for B9 tube
A15	Balance Control for Bias Meters A13,A14	B15	Balance Control for Bias Meters B13,B14

## Installing Tubes

Refer to the illustration below for tube placements. Right channel is shown, simply do the same for the left channel.



**WARNING:** If the amp was plugged into the wall, and the power switch was turned on and then off again, enough time would have passed to fully charge the large 500 volt caps. Do not insert tubes if the 500 volt caps have been charged. Unplug the amplifier and let it set for 8 hours to let the charge drain away before installing tubes. Do not turn amplifier on until all tubes have been installed. Installing the OA3 tube in particular while the 500 volt caps are charged will cause an arc inside the OA3 tube and likely damage the tube, not to mention scare the crap out of you when it happens.

**NOTE:** The OA3 tubes are different in that they will often flash a few times during start up and during shut down. This is a normal characteristic of the tube. OA3 tubes (also known as VR75s) do not get hot. Therefore it is safe to hide the bias level controls behind these tubes and safe to put the power switch in front of these tubes.

## Tube Matching

The default factory tube compliment on each channel consists of a pair of 6N23Ps driving a matched pair of KT66 output tubes complimented by an OA3 voltage regulator tube. To keep the volume of both channels exactly matched we recommend only using matched QUADS of output tubes. Simply split the quad into two pairs and install the matched pairs from the quad into each channel.

Due to the direct coupling between the two smaller tubes we recommend they be of the same type and be matched from side to side. 6N23P is a dual triode, so actually two tubes in a single bottle, which is why it's desirable to have both halves of the tubes match.

If you can't find 4 matched tubes like this, you can get by with two matched pairs. Simply make tube location A11 and location B11 match. Then do the same for A12 and B12.

## Tube Substitutions

<b>STOCK</b>	<b>Alternates</b>
KT66	KT77, KT88, 7027, 5881, EL34
6N23P	7DJ8, 6N1P, 6922, 6DJ8
OA3	None

Tube substitutions are many times part of the reason why people own tube amps since changing from one brand to another or even the same tube type will change the sound of the amplifier.

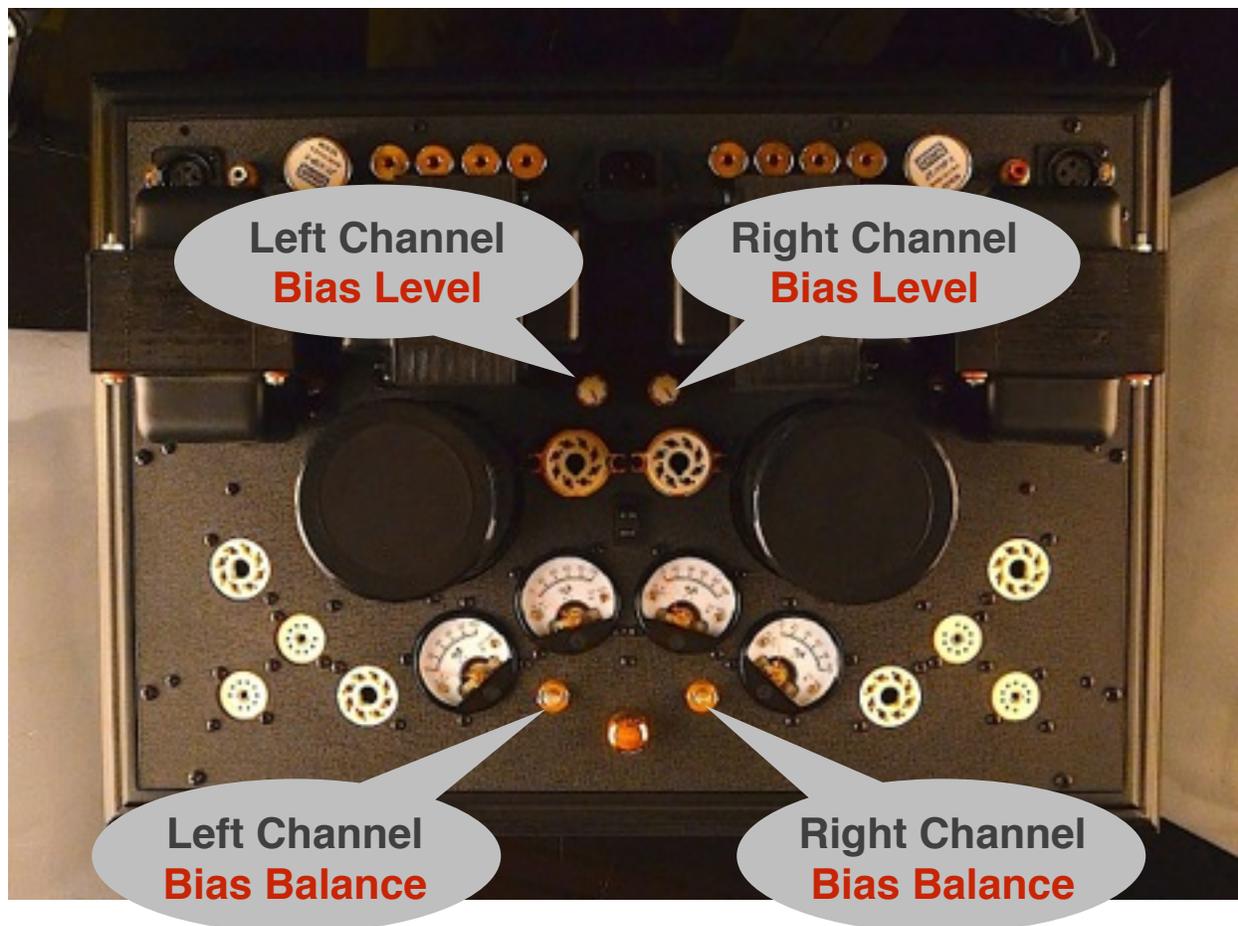
Your Zen Mystery Amp has been carefully tested with hand selected and matched tubes that we feel represent the best possible voicing for the amplifier. We match the tubes so carefully that we are able to match channel for channel output to within a couple milliwatts throughout the range of the volume control. You can always obtain replacements from Decware.

That said, if you were going to tube roll, as it's called, we would recommend trying different brands of KT66 both in current production and new old stock (NOS). To compliment that you can also explore 7DJ8s as a new old stock replacement for the original Russian 6N23Ps supplied with your amp. If you desire a warmer smoother presentation you can use Russian 6N1Ps.

## Biassing your Mystery Amp

Biassing your mystery amp is easier than almost every other tube amp on the market thanks to an extremely well thought out and tested set of controls.

These controls consist of four meters (one for each output tube) and four knobs. The meters consist of a left and right pair representing the corresponding output tubes on each side of the amp. Since the goal is to have each pair of tubes perfectly match, you simply use the bias balance control.



### STEP 1

Install tubes and hook up speakers. Never turn on amplifier without speakers connected.

### STEP 2

Turn master gain (volume) control all the way down (counter-clockwise)

**STEP 3**

Plug in the amplifier and turn on the power switch. As the tubes heat up you will see the bias meters start to rise. After the needles have stopped rising simply use the bias balance control for each pair of meters to make them match.

**STEP 4**

Adjust the bias level controls so that the meters read 50ma. 50ma is exactly in the middle of the meters range.

**STEP 5**

As the amplifier warms up you can re-adjust things. Once the amplifier has been on for 30 minutes make a final adjustment and then you wont have to adjust anything again unless a tube begins to change. From this point on, regardless of how well the meters match when you first start your amp, they will always be matched at the 30 minute point and stay that way until you turn your amplifier off.

Of course not all tubes are perfect, and tubes do age with use so we made it very easy to adjust the balance at a glance.



## WARNING

This amplifier is designed to operate with a 50ma bias on each output tube. Running higher bias currents for any length of time will overheat the power supply transformers and could cause pre-mature failure. We recommend no more than 60ma per tube at any point. Running less is not an issue for the power supply but doing so will reduce the power output of the tubes and change how they sound. Some will use this technique as an esoteric voicing tool.

**NOTE** - Different output tubes will bias at different levels so you will have to re-adjust the bias level control when changing tubes.

**INSIGHT** - The two small 9 pin tubes (6N23P) that make up the input stage and phase inverter are used to drive the output stage. These tubes have an effect on the overall matching of a given pair of output tubes. That means you can have a perfectly matched pair and an odd or misbehaving 6N23P could cause the tubes to be off slightly. Of course with the Mystery Amp you can simply compensate with the ingenious balance control.

## BIAS WINDOWS and TUBE LIFE

The biasing capabilities of this amplifier operate on two pre-determined windows. Window one is how high and how low you can adjust the bias level, for example, between 20ma and 80ma. This rather wide window is needed to accommodate such a wide range of output tubes. It is nevertheless narrow enough to keep you from getting into trouble and prevents the possibility of the popular term "run away bias" when an output tube completely melts down, shorts out and ruins your amplifier.

### How to tell when your output tubes no longer match well enough to use.

The second is the balance window that has also been set to a predefined width. This is very important because it is what tells you when it's time to replace your output tubes. Quite simply, when you have the bias balance control all the way to the right or left and still can't quite get the meters to match, one of the output tubes has drifted so far away from the other, that they no longer can be used together in the amplifier. If both tubes were installed at the same time we typically will just replace the entire quad so that both channels are new and match.

## OPERATION

Once the amplifier is on, and the bias meters have risen and settled into their proper position, connect your source to the input of the amplifier and slowly raise the volume.

The Zen Mystery Amp has a 2 volt input sensitivity meaning that you will have to turn the volume control all the way up to get the amp to clip when connected directly to an industry standard 2 volt line level source, such as a CD player, DVD player, or DAC, etc., This is intentional and determined to sound better than having the amp come to full power with the gain (volume) control only half way up like most other amplifiers.

## CLIPPING

Your bias meters can tell you when the amplifier is nearing distortion because they will start to move. If they move a lot, the amp is likely clipping. If only one meter dances relative to the other meters it is an early warning of which output tube is most likely to wear out and need replacement first. Again, at a glance confirmation that your tubes are perfect or not perfect when ever you want to look at it.

**INSIGHT** - Since these are real analog meters you can trust their personality to tell you a lot about each output tube. For example, in addition to the above, when you first turn on your amplifier it is possible to notice how fast the meters rise relative to each other. If you have one that takes twice as long as the other three to come up, you can be pretty sure the tube is showing early signs of fatigue.

## PREAMPS

The Zen Mystery is pretty much at home either WITH or WITHOUT a preamp. We recommend if a preamp is used that it be an ACTIVE preamp with GAIN vs., a tube buffer stage, or passive preamp as either can compromise dynamics.

A tube preamp with gain that is of equal fidelity and complimentarily voiced is often recommended for those using digital sources because the preamp adds badly needed density and dimensionality to the digital source. Of course not all DACs would benefit from or need a preamp to sound better, it's a piece by piece decision that can only be made by trying it and evaluating the result.

If your DAC has fully balanced outputs, and you have purchased the optional transformer balanced inputs on the Mystery Amp, then the need or benefit from a preamp is substantially reduced.

## BURN IN

When you receive your Mystery Amp, it will have approximately 72 hours on it, in some cases more. This is accomplished during multiple testing cycles during the QC process. Since this amplifier uses such large capacitors it takes longer than average to fully burn in.

As you listen to it, it will continue to improve noticeably for the first several hundred hours and then less noticeably for many months if not years as it continues to season. This is a nice switch from amplifiers that sound worse with age.

The best way to burn the amplifier in is to listen to well recorded music at normal volumes. Burn in CDs will train the capacitors to sound good reproducing waveforms that are alien to music and therefor accomplish little as the capacitors will still need to be trained on music afterwards.

A great way to speed up the burn in processes is to play the amplifier for 5 hours followed by 5 hours off repeated 5 times. That said, the amp sounds so good out of the box that you should be able to just use it with the knowledge that things will improve in the coming weeks.

## WARNING

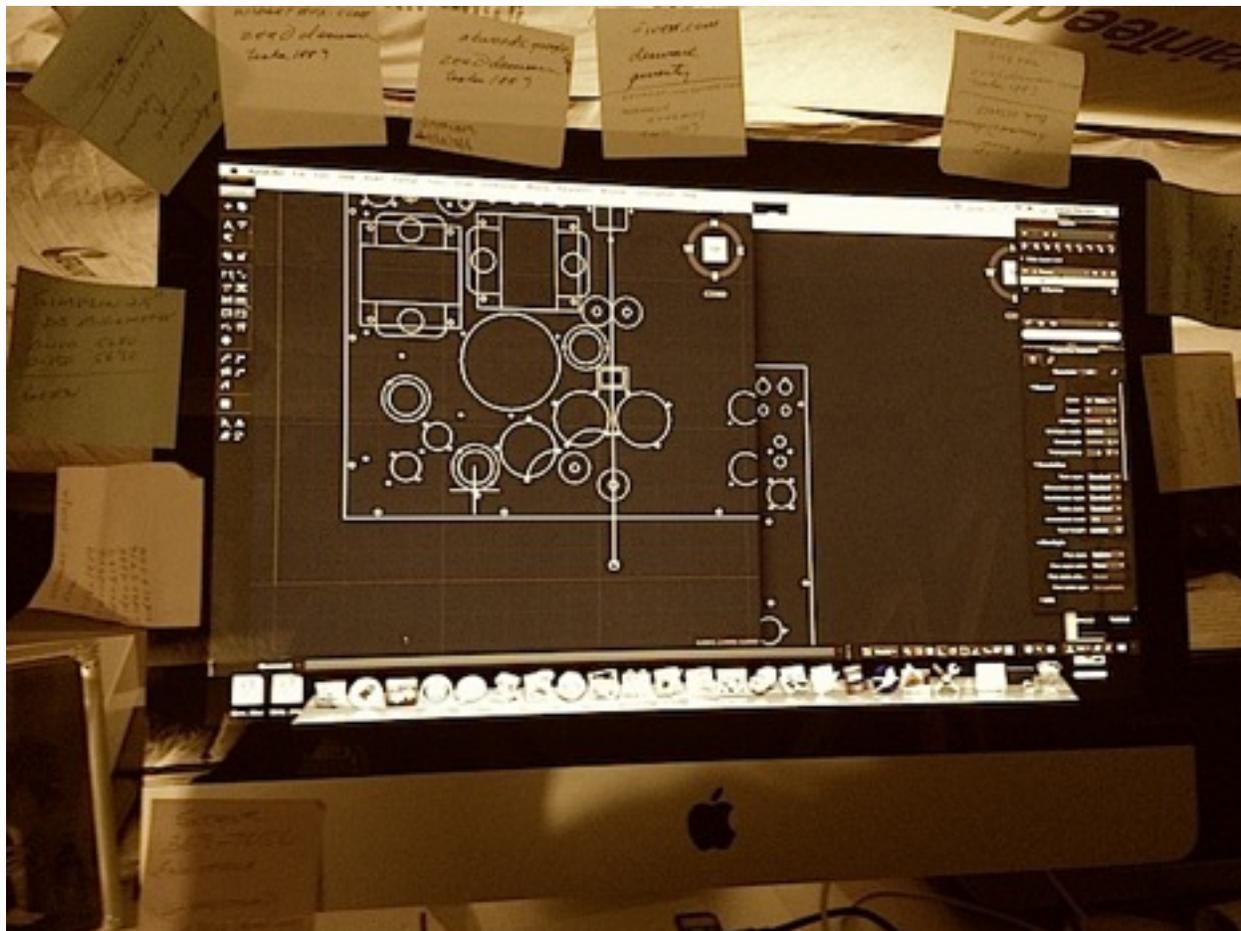
Do not leave your amplifier unattended while it's on for long periods of time or overnight. The ZMA is fully operationally warm an in *the zone* within 30 minutes so there is no need to leave it on.

## HEAT

The ZMA is designed to generate heat. The black top plate will become hot to the touch around the output tubes because it is absorbing infrared heat from the output tubes. This is normal. The power transformers (A5 and B5) will also run warm to hot depending on the length of time the amplifier is on and how high the tubes are biased. When tubes are biased between 50 & 60 mA, the temperature of A5 and B5 will typically be around 120 degrees F after several hours of operation. This is normal. If your transformers run hotter than this, you may have issues with your AC power at the wall outlet or your tubes are biased higher than 60 mA.

## DESIGN

This amplifier is designed and manufactured from scratch as the final word in the Zen TORII lineage of amplifiers dating back to the first TORII amplifier in 2002. Intended to be a scaled version of our signature TORII Monoblocks in a single chassis, it evolved to take the unique power supply design a step further to become 100% direct since there are no resistors or chokes used. That makes it unique in the world of tube amplifiers on multiple levels since this has never been done before.



## VOICING

The Zen Mystery Amp, like all Decware products, sounds the way it does because literally 100s of hours spanning months were put into voicing the amp. Voicing determines resolution, imaging, sound stage depth, timing, phase, timbre, pace and really every other fancy audiophile acronym until the designer, Steve Deckert, is happy with it.

Things that determine voicing are all the internal parts, ie., resistors, capacitors, transformers, wire and solder combined with the circuit itself. To take this reference amplifier to a place very few manufactures are able to go, we developed proprietary signal capacitors for the amp. Unlike 99% of signal caps that are round, we use flat stacked copper foil with natural beeswax for the dielectric and terminate them with silver leads, seal them in heavy paper with resin plugs and cryo treat them before installation into the amplifier. Since starting Decware in 1996 we have yet to hear a better coupling capacitor at any price.

Even solder and the point to point techniques used to build the amp effect how it sounds. Absolutely nothing was left to chance and absolutely no corners were cut.

## EVALUATION

To evaluate the final voicing and performance of the Zen Mystery Amp, we used our listening room with a variety of sources, both analog and digital combined with several different types of loudspeakers including electrostatic panels. To hear what the amplifier ACTUALLY sounds like, we directly connected it to an Otari 1/2 track mastering machine on the balanced inputs and listened to 15ips master tapes representing a wide range of music types.



## ABOUT

The Zen Mystery Amp is a class A push-pull tube amplifier featuring an ultra linear output stage with zero negative feedback. It is built on a high mass solid steel plate that has been machined and designed to damp out resonances.

There are no circuit boards in favor of the far more difficult but better sounding point to point topology where everything is symmetrically laid out in three dimensions and hand soldered with both channels in a mirror image ensuring every part and wire length is matched between the two channels. The layout is structured to have the least number of solder nodes. The result of these efforts is world reference imaging and focus that we feel is not obtainable any other way.



Shown above is a Zen Mystery Amp ready for its final soldering phase. What you see completed in the picture is only the power supply. It is now ready for the hand full of parts that make up the audio circuit.

## SPECIFICATIONS

*OPERATION: CLASS A1*

*INPUT TUBE CHOICES: 6N23P, 6922, 6N1P, 7DJ8*

*OUTPUT TUBE CHOICES: EL34 6CA7 KT77 KT66 7027 5881*

*INPUTS: OPTIONAL TRANSFORMER BALANCED XLR INPUTS*

*INPUTS: SINGLE-ENDED RCA INPUT*

*OUTPUTS: 4, 8, or 16 OHM SPEAKERS*

*IDLE CURRENT: 40~60 MILS PER OUTPUT TUBE - ADJUSTABLE*

*HIGH B+ VOLTAGE: 410 VDC WITH LOAD*

*INPUT IMPEDANCE: 100 K OHMS*

*INPUT SENSITIVITY: FULL POWER @ 2.0 VOLTS ON RCA INPUT*

*POWER INTO 4 , 8 or 16 OHMS: 38 WATTS PER CHANNEL*

*NOISE: -90dB*

*PRECISION CURRENT METERS 0 to 100 MA*

*WINDOWED BIAS CONTROL to ADJ OUTPUT TUBES*

*DYNAMIC BIAS BALANCE CONTROL FOR PERFECT MATCHING of EVEN UNMATCHED TUBES*

*600V CRYO TREATED FLAT STACKED COPPER FOIL BEES WAX - SIGNAL CAPACITORS*

*OPTIONAL 20 POS STEPPED ATTENUATOR w/ GOLD CONTACTS for INPUT LEVEL (GAIN) CONTROL*

*4400 UF 500V LABORATORY GRADE POWER SUPPLY CAPS*

*TOP GRADE GOLD TEFLON INPUT JACKS*

*RECTIFICATION: ULTRA FAST RECOVERY 3 AMP 1000V*

*MACHINED STEEL CHASSIS with POWDER COAT LIFETIME FINISHES*

*TOP GRADE FUSED IEC CONNECTOR for REMOVABLE POWER CORD*

*SOFT START- NO STANDBY NEEDED*

*SHIPS WITH:*

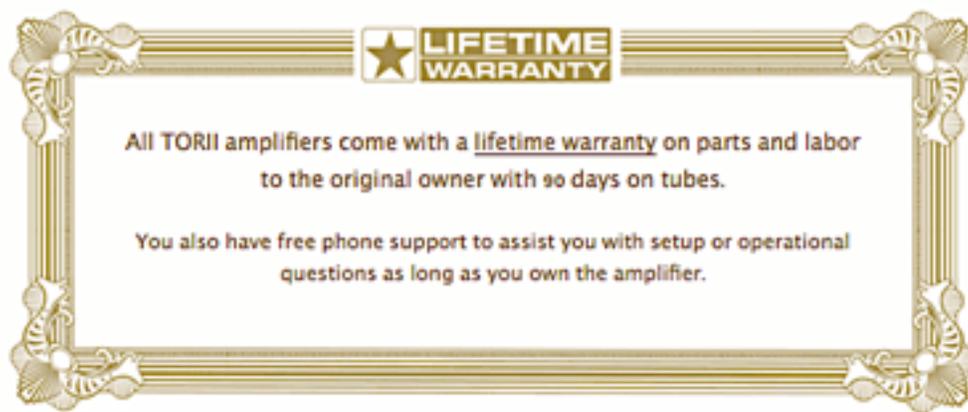
*PREMIUM GRADE KT66 OUTPUT TUBES*

*PREMIUM GRADE 6N23P INPUT TUBES*

*OA3 REGULATOR TUBES*

*SIZE: 19-1/8 " DEEP x 13-3/4 " WIDE x 8-3/4 " HIGH*

*NET WEIGHT: 43 lbs.*



BALANCED XLR INPUT SPECIFICATION

Transformers



Bringing Science To Sound

# Transformers

## JT-11P-1

Data Sheet

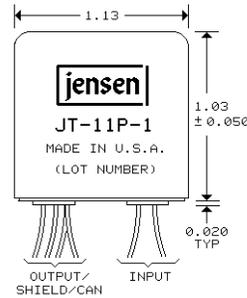


Jensen

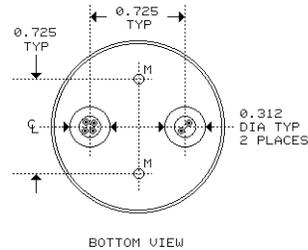
**LINE INPUT TRANSFORMER**  
1:1 FOR "BALANCED BRIDGING" INPUTS

- Ideal for balancing any high-impedance unbalanced input
- Wide bandwidth: -3 dB at 0.25 Hz and 95 kHz
- Recommended for levels up to +20 dBu at 20 Hz
- High input impedance: 13 kΩ with 10 kΩ load
- High common-mode rejection: 107 dB at 60 Hz

This transformer is designed for use in wideband line input stages. Distortion remains very low and CMRR remains high, even when driven by high source impedances. The primary is fully balanced and its leads may be reversed to invert polarity, if required. A 30 dB magnetic shield package is standard.



#30 AWG (7x38) UL STYLE 1061 COLOR CODED WIRE LEADS, 8" MINIMUM LENGTH



USE ONLY #4 TYPE B SELF TAPPING SCREWS IN HOLES "M". ALLOW NO MORE THAN 0.15" PENETRATION INTO TRANSFORMER HOUSING.

