

# TORII JR V2 OWNERS MANUAL

MANUAL NO. 01

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THE ZEN TORII JR AMPLIFIER

MODEL TORIIJRV2

 **DECWARE**

## INTRODUCTION

The TORII JRv2 is a purist designed ultra-linear push-pull amplifier of around 20 watts depending on tube choices. It features Decware's UFO output transformers and is a simple point-to-point wired design featuring cathode bias for the best sound. This approach isn't popular because it is the least efficient costing as much as 50% of the potential power, but it makes it impossible to melt down a tube, or your amp and eliminates the need for critical tube matching. Also this design allows you to enjoy the different sounds of over an half a dozen different types of output tubes with no adjustments whatsoever.

The amp is set up with a pair of input jacks on each channel to accommodate two line level sources and the needed switching. Additionally it has a volume (gain) control for each channel which makes it possible to use like an integrated amplifier with no preamp if you want.

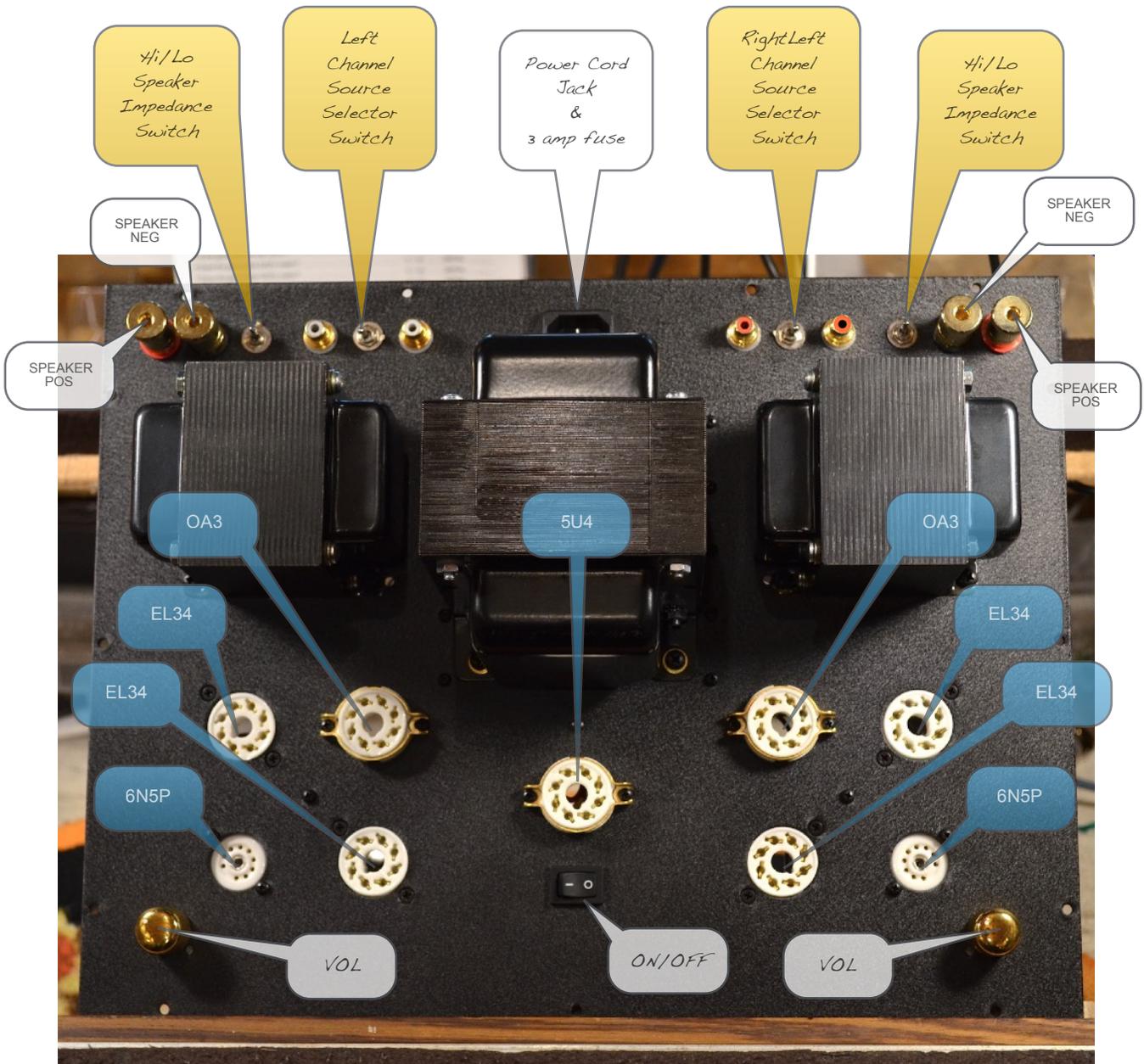
What set it apart from other push pull amplifiers is that it has a single-tube direct-coupled phase inverter that makes it possible to have only one capacitor in the signal path at any given moment so it has transparency like our Single-Ended designs.

Additionally, it has vacuum tube regulation and filtering for each channel. We said *regulation* not rectification. It has tube rectification also, but tube regulation is ultra rare in tube gear anywhere near this price. Why would you want it? Liquidity. It filters grain and harmonics (that creep into your amp through the power cord) out of the power supply giving the critical input stage ultra clean DC power without using solid state components.

The rectification is 5U4G, the regulation is OA3, the input stage is 6N5P or 6922 or 7308. Output stage is one pair of EL34 per channel. Alternate tubes are as follows: 6L6G, 5881, 7027, KT66, KT77, KT88, 6550, and 807 with adapters.

There is no global negative feedback in this amplifier design and perhaps most importantly the input stage clips before the output stage which creates single-ended even order harmonics and lengthens tube life. This is what makes a Zen TORII sound like our low power SET amplifiers instead of the cooler odd-order harmonic sound of push-pull.

# TORII JRV2 OWNERS MANUAL



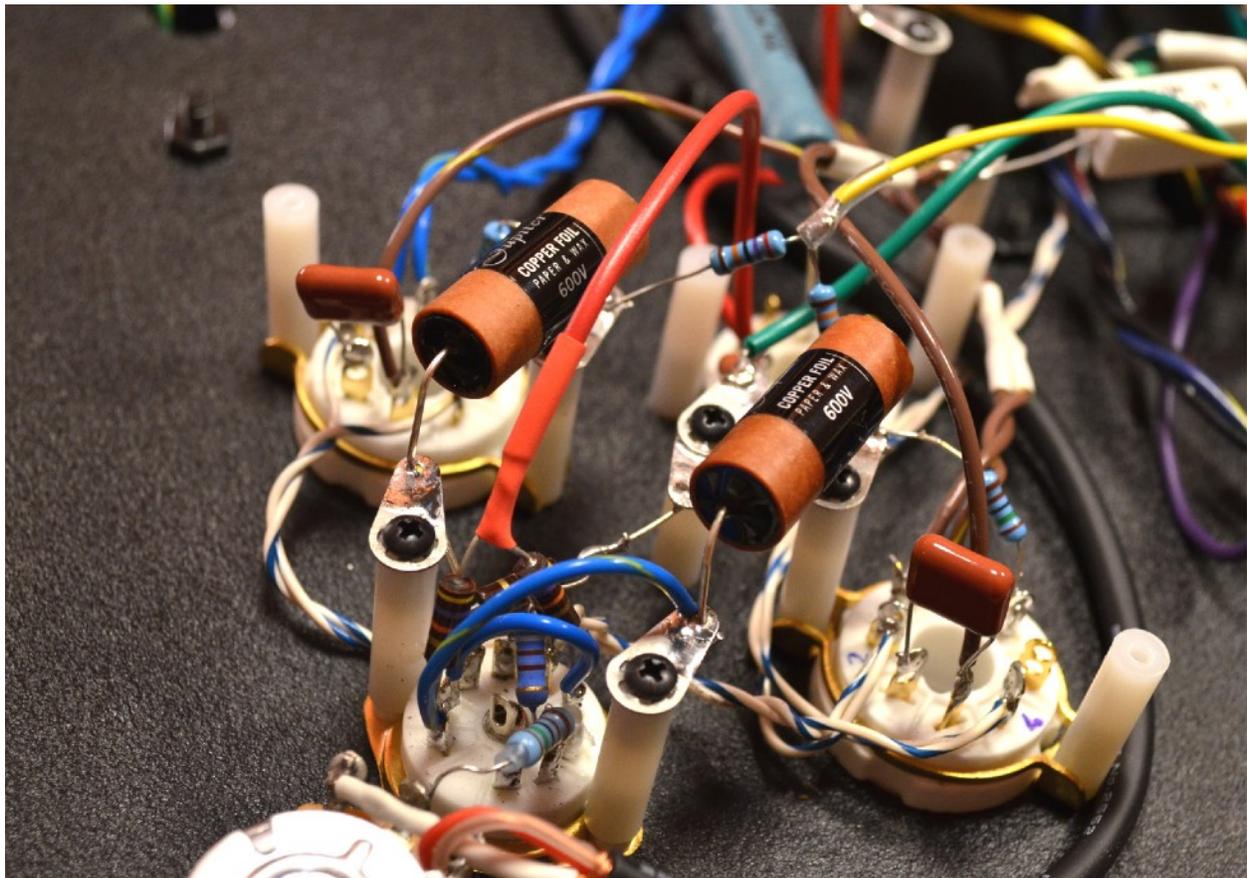
*Input Switch  
Points to Selected  
RCA Jack*

*Turn Down Both Vol.  
Controls Before Turning  
Amplifier ON*

*Speaker Switch  
Hi = Rear  
Lo = Front*

## THE DECDWARE ZEN LAYOUT

All Decware amplifiers' employ a Zen Layout, but this particular amp is one of the best. No circuit boards are used and if you'll notice, the layout is symmetrical and done in such a way that the entire audio circuit can be created with only the parts leads themselves. This reduces solder nodes, wire, dissimilar metals, noise, coloration and increases sonics and reliability. This is the only way to make an amplifier that sounds this transparent.



You are looking at the entire audio circuit for one channel. Silver wired, silver-bearing solder, nice spacings to avoid magnetic field interaction between the parts, Impact rated for 90G's without lead bending during shipping and soldered by the best penetrating solder. The layout photo of the original TORII JR., the TORII JRv2 now comes standard with Mundorf Supreme caps instead of beeswax.

## FEATURES

### Purist Signal Path

- Silver input selector is located between a pair of input jacks on either side so that only a one inch piece of silver wire is needed to connect the two, which increases transparency while still allowing for source selection.
- Dual volume controls are used and located 1 inch away from each input tube, again eliminating large amounts of wire and further increasing transparency.
- To date the best internal layout of the original torii circuit with a 50% reduction in solder nodes which increases transparency even further.
- Beeswax caps or upgrade to Mundorf Supreme caps.
- OA3 Tube regulation is used to regulate and filter the voltage feeding each input stage which effectively decouples it from the power supply for grain free sound.
- Dual Mono 500V F&T Power supply rails just like it's big brother, the TORII MK4 give better stereo separation and enhance headroom.
- UFO Output Transformers with ultra flat response and a bandwidth reaching out to 100 kHz makes it possible to hear the increase in transparency from all the improvements listed above.
- The TORII JR. works well with or without a preamplifier.
- 20 WATTS into 8 ohms with 4 & 8 ohm speaker impedance selector switch.
- Tube Rectification adds another dimension of voicing not possible with diodes.
- Direct coupled 7308 based input stage but shipped with the silky sounding 6N5P and compatible with 6922, 6DJ8, 7DJ8.

## OPERATION

Your TORII JRv2 ships with matched quads of EL34 output tubes.

Sequence of start up is:

- 1) Turn down left and right volume controls all the way.
- 2) Make sure loudspeakers are connected to the amplifier on both channels.
- 3) Turn on the power switch and wait for tubes to warm up.
- 4) Press Play, or lower the tonearm ; )
- 5) Slowly raise the volume on each channel to the desired listening levels.

## OA3 REGULATION

**You will notice that the OA3 regulator tubes will flicker on and off intermittently during the first 30 seconds of warm up.** This is because in order to make an OA3 “light up” a certain amount of current must be drawn across it. When you first turn on your amplifier, the tubes are cold and are not conducting any current. Then as the input tubes warm up and begin to draw current, electrons begin to flow inside the OA3.

Understanding that the amount of current draw determines how the OA3 behaves, you might also find it informative that the brightness of the glow is determined by the current draw. Too little current, dim glow or possibly even flickering on and off. Too much current, bright glow and lots of heat created. Just right is a nice yellow/orange glow with a temperature that you can keep your hand on for as long as you want.

You will notice **when you turn the amplifier off that the OA3's may flicker on and off** a few times as well, doing basically the reverse of when you turned the amplifier on. This is normal.

Additionally, it should be understood that an OA3 tube takes approximately 20~22 minutes to fully stabilize. During this period it is advised that you keep the amplifier on, for at least 20 minutes. Following this regimen will ensure your OA3 tube lasts for many years, if not the life of your amplifier.

The OA3 is also known as a VR75. It is a vacuum diode that has a 75 volt drop across it's plate and cathode. This could btw., easily be done with a simple resistor, however using the rare vacuum diode tube we gain 20 times more ripple (hum) reduction and complete isolation from the power supply so that the power that feeds the input stage is nearly perfect like a battery. This makes possible grain-free sound.

It should be mentioned that the voltage drop across the OA3 determines the DC voltage that feeds the input stage. With an oA3, the input stage performs well with low distortion and the maximum amount of clean gain. Occasionally when the full 20 watts of the amplifier are not required, experimentation with VR90, VR150 tubes have proven interesting. Since these tubes create a higher voltage drop, they also increase isolation making them more like a pure battery. The increased voltage drop, lowers the gain of the tube and increase the distortion of the tube once that gain window is pushed. This results in a different clipping character and overall different sound to the amplifier based on the particular input tube that is used. For example, you may drop the power from 20 watts to 6 or 8 watts but within that zone realize better sound that consequently better serves a high efficiency horn loaded speaker system.

The OA3 is in series between the power supply and the input stage meaning it will also become a fuse for the input stage should the input tube exhibit a catastrophic failure or short. In that case, the OA3 will likely flash and go dark killing all power to the input stage and saving the internal parts in the amplifier from excessive stress. There are no heat producing parts internally therefor nothing internally in the amplifier fails unless the fuse was tampered with.

It is also worth mentioning that the OA3 tube does not get hot in this amplifier, but it does get very warm. The other tubes in the amplifier by comparison can NOT be touched. Temperature of the OA3 reaches around 105 degrees F. The EL34's are nearly **300 degrees F**. The 5U4 typically runs at **220 degrees F (100 degrees Centigrade)**.

While we're talking about temperatures, it should be noted that overall heat was a careful part of the design, not an after effect of the design. Heat will be discussed in it's own section of the manual.

## 5U4 TUBE RECTIFICATION

The TORII JRv2 uses a 5u4 rectifier to serve both channels of the amplifier. The first filter cap the rectifier sees is 8uf. The total draw on the rectifier is 200mA. You will find that different brands of 5U4 and 5U4 compatible rectifiers will sound different in your amplifier, effecting bass and midrange quality. It's worth trying a couple different ones to see which sounds best.

We live in a day when it is still possible to acquire new old stock tubes (N.O.S) and it is not that expensive to own a couple N.O.S. 5U4's, or 5AR4's to play with in your amp. The results are generally promising.

It should be noted that some rectifier tubes, particularly those in today's current production have more tolerance in the elements inside the tube. This tolerance causes "chattering" in some rectifier tubes which resonate at 50 or 60 cycles depending on your country and voltage. If this happens, tapping on the tube firmly with your finger can make it stop and return to silent operation, albeit usually for a temporary period of time. We grade our factory tube complements so that tubes that chatter are never shipped with the amp, but if you buy your own replacements, they might do this or even our tubes can do this as a result of rough handling during shipping.

All tubes supplied in Decware amplifiers are hand picked and meticulously tested and guaranteed for 90 days which is plenty of time to determine if you have an issue with one.

## TUBE ISSUES

Rectifier - If the rectifier glows, and the OA3 also has fired and is glowing, the rectifier most likely works. Rare exceptions would be when only one plate is working instead of two. In this case there is a sharp 60 cycle noise or hum present that goes away when a new rectifier tube is inserted.

Output tubes - If the output tubes both glow and are both equally hot they are likely working. If one tube is cooler than the other it's probably bad.

It is possible in any push-pull amplifier for one output tube to fail or start to fail with the other output tube being perfectly fine. If this happens only one half of the music (sine wave) will be reproduced and the suspension of your loudspeaker will be the only thing reproducing the other half. The most noticeable symptom of this is that the channel will drop to about 5 watts and have high amounts of distortion and hum.

Input tubes - the 6N5P input tube consists of one half of the tube as the phase splitter and the other half as a gain stage. The two halves are direct coupled. This means no capacitor is used resulting in no phase shift so the perceived speed and honesty of the amplified signal is communicated rather well above the norm. Symptoms of problems occurring in the input tube could be lower power, increased distortion, drifting loudness levels in that channel, noise, hum, lower gain, softer dynamics. If you're not sure, simply install a new input tube and see if you hear a big change.

Clearly, the best way to know if any of the above mentioned tubes are compromised is to simply have a complete set of new tubes that are verified good. Decware would obviously be your first choice for getting the best quality tubes for your amplifier. Anyway, when you have a complete set of replacement tubes, you can fix 95% of any problems your amp might ever develop over its lifetime.

## TUBE ISSUES (cont.)

To find out if one of the tubes is compromised in some way, first you must determine which channel has the issue. One of the things we do when troubleshooting the sound of an amplifier is to listen to only one channel at a time, and do so by switching the interconnect cable between channels. This means we would take the left channel interconnect and switch it manually between the left and right channel of the amplifier and compare the sound. Doing this will let you hear which channel has the problem.

Once the channel with the problem is identified, you simply change either the EL34 or the 6N5P for that channel and see if the problem goes away. In rare cases you may find the problem persists even after you have replaced both EL34's and the 6N5P in the problematic channel. At this point to know if the problem is the tubes or the amp, take all the tubes in the left channel as they are, and swap them with all the tubes in the right channel. If the problem actually is a tube, the issue should switch sides. If the problem does not switch sides, then it is either the source, preamp, cables or amplifier.

In summary typical tube problems can result in: Lower power, Higher Distortion, Noise, Hum, Channel imbalances.

## HEAT

The TORII JR. has been designed like many Decware amplifiers with a non-ventilated chassis and a black steel plate to hold and distribute heat evenly throughout the amplifier. There are two advantages to this technique, 1) Better Sound and 2) The insides of the amp remain clean and factory new even after 30 years of operation.

The temperature of a TORII JR ramps from room temperature (76 degrees F) to max of around 135 degrees F at a very slow and linear rate. Peak fidelity is reached early at temperatures as low as 108 degrees.

Should the amp be enclosed in a cabinet with no ventilation in a high ambient room temperature, it is possible for the amplifier transformer temperature to reach 140 degrees F., at which point the sound quality of the amplifier will begin to regress but otherwise pose no harm to the amplifier.

It may be of interest to know that the reason this amplifier's heat ramp is linear and gradual over many hours is because the heat is not coming from current draw on the power supply, but rather from the infra-red radiation of the tubes themselves. This radiation is absorbed by the black steel chassis and stored as heat.

This amplifier runs slightly warmer than the larger TORII MK4 because it has almost the same amount of tubes oriented into a much smaller area.

All this talk about temperature is to let you know the amp is designed to run warm to optimize the sound.

## INPUT SENSITIVITY

The TORII JRv2 uses the same circuit as the all previous TORII amplifiers so it has a similar input sensitivity of 1.9 Volts with 7308's and about 2.5 Volts with the 6N5P. That means on characteristic CD's in a typical CD player you can turn a TORII JRv2 up between 75% 90% before distortion is heard. If you use a preamp, then the point at which the volume controls on the TORII JRv2 distort will be relative to how loud you have the preamp turned up. You can actually use this to your advantage by turning the volume on the TORII JRv2 down to around 1/2 and then run the volume on the preamp higher to compensate. The result is often better sound.

## SOURCE SELECTION

The TORII JRv2 has a silver contact source selector switch for each channel. It is located directly in-between the two input RCA input jacks on each channel. The handle of the switch will point to the jack that is selected. Using a switch for each channel costs more but locating them in-between the input jacks makes it possible to replace about 14 inches of shielded cable with a single 1 inch piece of silver wire.

## VOLUME CONTROLS

Continuing the theme of eliminating all possible internal cabling, dual volumes were chosen and located directly in front of each channel's input tube. This again replaces about 12 inches of shielded cable with a single 1 inch piece of silver wire. Also, for amplifiers that are not configured with stepped attenuators, it is possible to make infinitely fine adjustments to channel balance which in turn makes it possible to shape your sound-stage around the non-symmetrical properties of your listening space.

## SPEAKER IMPEDANCE SWITCH

The TORII JRv2 uses the new DECWARE UFO wide bandwidth output transformers that feature a dual output impedance to accommodate different loudspeakers that fall primarily into but not limited only to the typical 4 and 8 ohm speakers. Since impedance is reflected from the speaker backwards through the output transformer and ultimately to the plate of the output tube, 4 and 8 ohm taps are only actually 4 and 8 ohms when the amp is designed at the most efficient point of the tubes plate curves. For an EL34 that is typically around 4 kOhms. The TORII JRv2's UFO's are closer to 6.6 kOhms. This has many advantages, including more realistic air and timbre in the top end and the ability to handle deep dips in loudspeaker impedance with grace.

The reason we listed the speaker impedance switch as HI and LO instead of 4 and 8 ohm, is because that's exactly what it really is. We expect you to try the switch back and forth many many times as you get used to your new amplifier until you determine which of the two setting serves your speakers the best.

Remember a typical 8 ohm speaker can have dips below 3 ohms and peaks over 100 ohms. This is the reason why it's not black and white. Trust you ears and you can always be sure the switch is in the right position.

## POWER CORD / VOLTAGES and FUSE

The Zen TORII JRv2 can be wired for any country in the world. If you are in one country and moving to another, just send the amp to Decware and have it rewired and fitted with the proper power cord for the destination country. The IEC connector on the TORII JRv2 is the same high quality unit used in all of our amplifiers featuring an integrated fuse holder with a spare fuse located inside it. Costing 8 times more than the ones found in many amplifiers it is worthy of a good power cord.

**The 120V TORII JR uses a 6.3 AMP 20mm fast blow fuse.  
(220/230/240 volt customers use a 4 AMP 20mm fast blow fuse.)**

The power cord itself, supplied with the amplifier is rated for no less than 10 amperes, is fully shielded and has an earth ground. That said, the standardized IEC connector used in the TORII JRv2 will support most after market power cords. We recommend if you want to explore what kinds of differences an “after market” aka “high-end” power cord can make, you start with ours. We only make one, it’s silver, and comparable to retail cords costing in excess of the price of your amplifier yet it costs only a couple hundred bucks.

## JACK ORIENTATION

The TORII JRv2 utilizes a vertical input/output jack orientation. This has two advantages:

- 1) You can remove the amplifier from the hardwood base by simply removing the wood screws and separating the two. This makes it easy for the owner of the amplifier to change the wood base his or herself at any time during ownership.
- 2) It greatly relieves stress in the cable connectors by diminishing leverage on the RCA jacks, the banana jacks for the speaker binding posts, and the power cord itself. With so many high-end cables being stiff, thick and or heavy, this is the best way to prevent jack and connector fatigue that typically happens over time.

## UFO OUTPUTS

Of interest would be that original the TORII JR was the platform for testing Decware's Ultra-linear boutique UFO output transformer design.

## ADJUSTMENTS / FEEDBACK

The TORII JRv2 has ZERO global negative feedback and can therefore cast an intoxicatingly deep sound stage in a well done room. The 3D imaging capabilities of this product are benchmark and faithful to the recording.

Because this amplifier employs an ultra-linear output stage design combined with a vacuum tube regulated power supply to handle the phase inverter/input stage, it gives a very linear response just like the SET amps that inspired it. Due to this inherent linearity, no treble or bass adjustments are needed nor provided.

## OUTPUT TUBE DESIGN CHOICE

We chose the EL34 as the default tube in the TORII JRv2, because it's probably the most neutral sounding of all the possible choices. EL34's are the only tube that can take advantage of the the Hazen Grid Mod which has been implemented in this amplifier! The EL34 is a true pentode meaning the cathode and suppressor grid are not internally connected. This make it possible to wire the tube as a true triode, or to manipulate the relationship of those elements inside the tube.

Since upgrading the design to the TORII JRv2, now a multitude of output tubes can be also be used. These include 6L6, 5881, 7027,KT66, KT77,KT88, 6550. No it can not run KT90's or above.

## TUBE BIASING

The TORII JRv2 has an cathode bias set to around **40mA** with the **EL34** output tubes it shipped with. Using other tubes will move it up or down slightly. This is what sets the power, not the tube choice. Therefor moving from an EL34 to different output tubes will cause no increase in power, just a different sound signature.

## TUBE ROLLING

THE BIGGEST change to how your amp sounds will likely be from the input tubes, of which there is one for each channel. Different brands of the same tube will usually sound different. The biggest thing to remember with regard to input tubes is to use tubes with matched sections. So for example, a 6N5P or a 6922 with matched sections will perform better in this amp than ones without matched sections.

You can be assured that the stock tube compliment that shipped with your amp will be hard to beat, as it was carefully tested in your actual amplifier and evaluated during several listening tests!

## REPLACEMENT TUBES

Replacement tubes are always available from Decware's website or you can call us directly.

## SHORTING SPEAKER WIRES

When your tube amp is on and you want to unhook your speaker wires without turning the amplifier off, it is an acceptable practice to SHORT the speaker wires TOGETHER.

Yes, it's true, believe it or not, this actually protects the output transformers from operating without a load. They can handle a dead short without issue. This is JUST THE OPPOSITE of many solid state amplifiers, which as you may know, can blow up instantly if you short the speaker wires together.

## GROUND LOOPS, POWER STRIPS and HUM

Whenever we connect more than one audio component together we run the risk of creating a ground-loop which causes hum.

A ground loop happens when the path to ground in one component finds an easier (less resistive) path through another component via the ground or shield wire in your interconnects. This is a common problem when components are plugged into different outlets or a power strip is used, as the resistance varies at the ground point of each receptacle.

Ways to combat the problem are to try and plug everything into the same outlet when possible, do not use power strips, try to keep the length of the power cords the same.

If all else fails, you can try lifting the ground on one or more components until the hum goes away.

How to tell if you have a ground loop causing hum - simply remove all your interconnects from the input jacks of your amplifier so that the only thing hooked to it is your loudspeakers. You should hear no hum on all but the most efficient speakers and even those would sound quiet from the listening chair some 6 or 8 feet back. If you do hear hum, then it's likely the amplifier assuming your speaker wires are not wrapped around a power cord somewhere. The most likely cause if it is the amplifier itself would of course be tubes. Start by installing a new rectifier tube and see if that corrects it. If not you can systematically try the remaining tubes in the amplifier.

If the amp is acceptably quiet just hooked to your loudspeakers with no input cables connected to it, then connect your inputs to one component at a time and listen for hum. If you get hum, then you either have a ground loop between that component and the amplifier, or that component is bad.

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To prevent ground loops the TORII JRv2 employs a separated audio ground and earth ground/chassis shield by using a 10ohm resistor across a poly film cap for noise and hum free operation even in adverse conditions. It's a fairly effective ground loop eliminator/ preventer.

## BREAK-IN aka BURN-IN

When your amplifier is new, it will not sound as good as it does when it's several months old. The reason for this is the internal parts breaking in. The process typically involves the amp sounding a little harsh, or a little muddy, or having premature distortions when run at higher volumes. It can change from one symptom to another in as little as 15 minutes time. This process usually stops with less than 100 hours of use. Of course after the initial burn-in process, the amp will continue to season and refine over several months. That said you can still expect the amp to sound good and be more than usable right out of the box.

## SEASONING

The older your amplifier gets the better it will sound. This helps to explain why used Decware amps exceeding ten years of age often get their original purchase price on the used market.

## SPEAKER PLACEMENT

The Zen TORII JRv2 should be able to make even a refrigerator size speaker disappear. Using the amp to watch movies in two channel mode often fools guests into thinking you have surround sound due to the amplifiers impressive imaging capabilities. That said, give yourself a chance to experience exquisite two channel listening by occasionally pulling your speakers out into the room several feet away from the walls. Toe them in to create an X just in front of your face and sit anywhere from 5 to 7 feet back. Close your eyes and we'll see ya when you return to Earth.

## WARRANTY

Your amplifier comes with a lifetime warranty to the original owner. It covers defects in materials and workmanship. If you decide to sell your amp for any reason, the buyer can return the amplifier to us for inspection at which point we can offer to transfer the lifetime warranty to him or her for a reasonable fee.

If you think your amp needs to return to the mothership, please call us first or at least e-mail with a description of the problem. *Many of the amps sent here for repair without that call or e-mail have nothing wrong with them.* We can often prevent an unnecessary trip back to Decware by consulting you over the phone and helping you to troubleshoot the problem. Decware amps are built to outlast you, and are frankly damn hard to break which we understand is definitely not the norm with many mass produced tube amplifiers.

Returns should be sent to our main office. Please use the Return Form on our web site for the correct address and required information.

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## PERSONAL NOTE

*We want this to be the best sounding amplifier you've ever owned and since these amps are like our children we have a very vested interest in their continued success. Please call us any time you have questions or need advice on how to improve your sound, or room acoustics. We want you to love this thing as much as we do, and will bend over backwards to make sure you do with unrivaled customer support.*

*Please reach out any time you want help determining what the weakest link is in your current audio system... I'll be more than happy to talk with you and lead you to an answer that makes sense.*

*-Steve Deckert / Decware High Fidelity Engineering Co.*