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The Select Zen Triode Amplifier

MODEL SE84UFO2.1

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INTRODUCTION

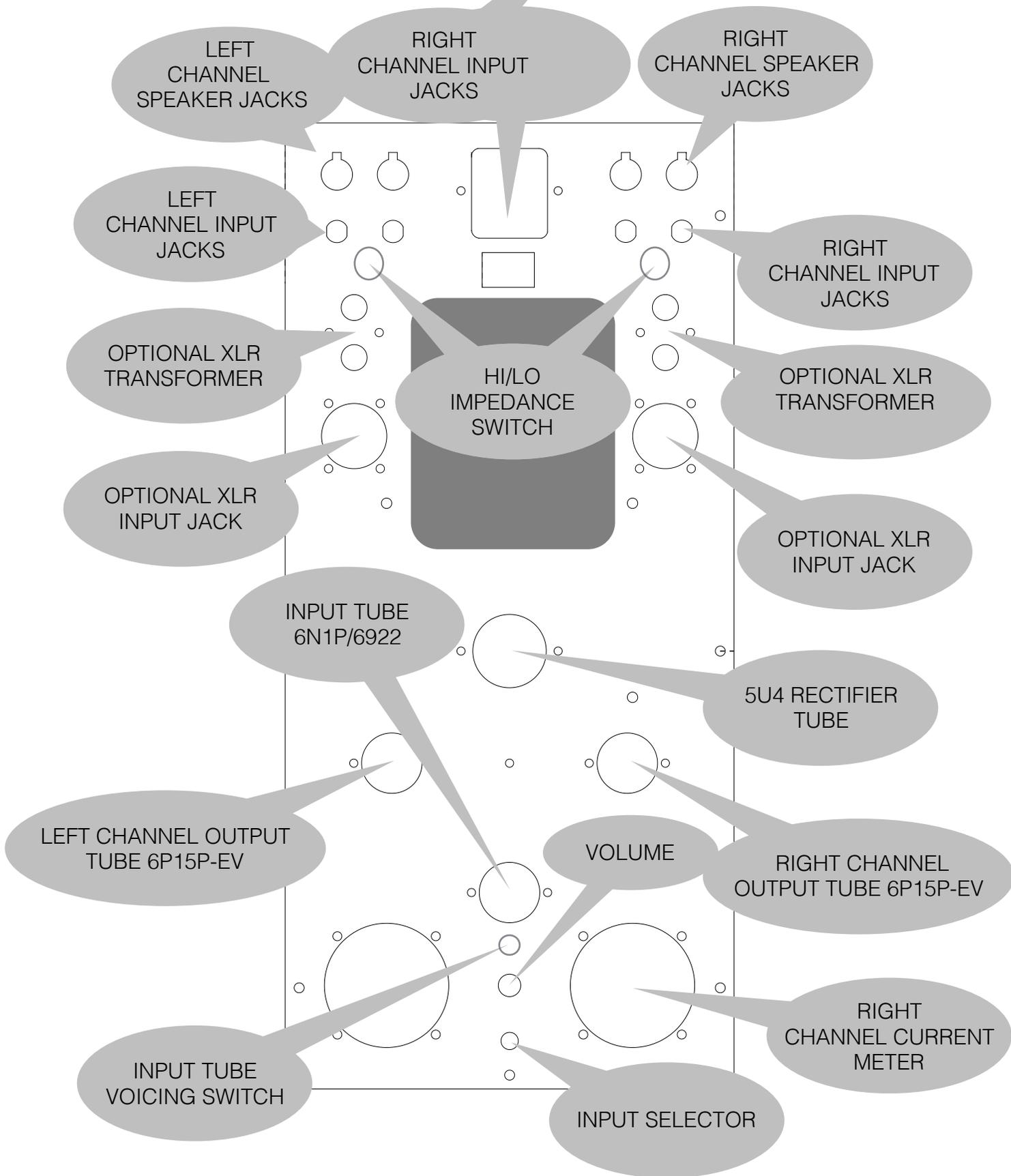
The SE84UFO2.1 is a *select* version of our popular SE84UFO Zen Triode Amplifier, which is the two watt SET amp that basically launched Decware into the amplifier business when it was first released in late 1996.

About a year into the game that amplifier design began to develop a serious following and being hand built it was easy to modify. Suddenly there were dozens of competing modifications, mostly done by non-professionals, and each claimed to make the amp sound better. The reality was that many made the amp sound worse.

To correct this situation, we decided to come out with our own modified version of the amp to set a standard on how it should be done and offered it as our “Select” version. This killed the DIY modification trend with our amps since the “Select” version could not be further improved and because it was priced so well it wasn’t worth buying a stock Zen Triode Amp and modifying it.

So since about 1998 there have always been two models of the Zen Triode amplifier, the standard version and the select version. During the bulk of time that has since passed, the select version was deliberately voiced to be faster and thus have higher levels of inner detail. In recent years however, the original model has itself evolved to become just as good as the select version, so today the two amps sound virtually the same. The differences are the chassis, meters, and optional XLR balanced inputs on our select version model SE84UFO2.1

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TUBES - output

The SE84UFO2.1 uses a single EL84/6BQ5 output tube per channel. It is also compatible with the Russian SV83 and the premium Russian 6P15P-EB extended life tubes, which is what we ship with the amp. There is no better sounding output tube than these because of their amazing speed and transparency. This is possible because these N.O.S. output tubes are left over from the Russian Cold War where they were used as video tubes in radar displays. A video tube has far wider bandwidth than an audio tube which is why the bass and treble are so extended and transparent sounding.

A Technical side-note regarding the unique fidelity of the SE84UFO2.1's output tubes:

We took the transparency a step further with what we call the Hazen Grid Mod, aka Christmas Comes Early Mod, where we couple the suppressor grid to the cathode through a capacitor adding great clarity to the tube by reducing stray electrons that typically bounce off the plate and reattach themselves in a different location due to the potential on the suppressor grid. This pushes this popular tube up the fidelity later even higher and as a result handles stray electron bounce better than expensive directly heated triodes like the 300B. Another advantage to using this output tube configuration is that it's quiet.

Many 300B amplifiers that do not employ ultra expensive power supplies will have more hum than the select Zen Triode amplifier.

Expect output tubes to last approx 6000 hours.

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TUBES - input

The smaller 9 pin input tubes in this amplifier are dual triodes meaning the tube does both channels. This is handy because it ensures the signature of the tube is maintained across both channels with no variations. It also makes rolling tubes easy because changing just one tube changes the sound of the entire amplifier.

The tube used is our favorite Russian NOS military grade 6N1P-EV. (In Russian that reads 6h1n-EB, which is what is printed on the tube) Alternately you can use 6922's which are a touch less warm but slightly more dynamic. Using 6DJ8's may or may not work depending on the brand and condition of the tube. This is because the voltages used are on the max end of what a 6DJ8 likes to see. There are two grades of this tube the better tubes have shiny plated pins, while the consumer grade are un-plated and dull looking.

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TUBES - rectifier

The rectifier tube in this amplifier is located directly in front of the power transformer. DO NOT TOUCH IT WHEN IT IS ON as it will be HOT and WILL burn your hand. Same for all of the tubes! Of course this is normal for all tube amps.

The SE84UFO2 ships with a version of the attractive looking 274B rectifier that works well in the amp. Not all brands of 274B's are compatible. We recommend if you want to try a different rectifier to see what effect it has on the sound, use a good 5U4 or 5U4G. *There are many different brands of 5U4 type rectifiers both in New Old Stock (NOS) and in current production. Each will have a subtle effect on the sound of your amplifier. Different brands of the same tube will also sound different.*

There are also some compatible substitutes that you can try which include 5Y3GT and 5AR4. The 5AR4 is an indirectly heated rectifier with a soft start up so it may be a bit more expensive than the 5Y3GT and 5U4. Also the 5R4 works well.

A popular rectifier tube that many people try to substitute is the 274B. There are different manufactures and different types of 274B rectifier tubes. Of the ones we've examined, most required no more than a 10uf capacitor in the first section of the power supply. Very few tubes amps today use that small of a value. The Select Zen Triode uses a 47uf capacitor in this location which can cause some types of 274B's to arc on start-up and thus reduce the life of the tube. The 274B we ship with the amplifier is compatible with the 47uf capacitor which is a big part of the reason for including it with the amp.

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CLIPPING

With 6N1P input tubes and a standard 2 volt source such as a CD player, the volume control can typically reach 2/3rds before the amp runs out of steam (clips). Of course if you have a source with higher than 2 volts of output, the amp will clip sooner.

SPEAKER BINDING POSTS

The Select Zen Triode features heavy duty (almost bomb-proof) connectors for the speaker wires. They are red copper 5-way posts with standard spacing. They accept banana jacks, large spades, or bare wire up to 10 AWG in thickness. They are color coded with a RED and BLACK bands. Black is the NEGATIVE speaker connection and RED is the positive speaker connection. In this amplifier (unlike most) the two black speaker jacks are NOT connected together and or tied to ground.

BRIDGING INTO MONO

You can bridge both channels into one by simply connecting the Left Channel + speaker binding post to the Right Channel - speaker binding post by using a short 8 inch piece of wire. The two binding posts that you left alone will be used to power the speaker.

INPUT JACKS

The input jacks are standard single-ended RCA type connectors for consumer grade interconnect cables. Additionally there are also optional XLR transformer-balanced inputs available for this amplifier. When optioned with these XLR input jacks be aware that they share one of the two pair of RCA inputs. That means you can use one RCA input and the XLR input, selectable by the input switch. You can not use both RCA inputs and the XLR input at the same time. Doing so will put both the XLR and RCA input in parallel which would have negative effects on the sound, although no harm to the amplifier would occur.

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POWER UP

The power switch is located on the left rear of the amp. It will take approximately 30 seconds for the tubes to warm up after you turn on the switch. You can watch this happen by looking at the tubes because they will begin to glow

As a general rule is it always best to have speakers hooked up to the amp whenever it is on. If you have a volume control and IF you have it turned all the way down, it is OK to have the amplifier on without speakers connected for brief periods of time. Having NO speakers connected and the volume control all the way up with music playing can damage the output transformers. This is common for all tube amps except that MOST will absolutely fail if this is done and so far no Decware amp ever has but why tempt fate?

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, this protects the output transformers from operating without a load. They can handle a dead short ALL DAY LONG without issue. This is JUST THE OPPOSITE of many solid state amplifiers, which as you may know, will blow up instantly if you short the speaker wires together, even for just a split second.

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DECWARE TRANSFORMERS

Since the output transformer is the only component you're hearing other than the two resistors and one capacitor inside the SE84UFO2.1 it should become obvious that this is a critical component relative to the overall fidelity of the amplifier. And given that, the quality of the power transformer and power supply in general is at the heart of the amplifiers performance.

Our transformer cores have always been made with M-6 29 Gauge - 0.014" (0.355 mm) Grain Orientated Electrical Transformer Steel Lamination with steam blue oxide on the surfaces and edges to minimize stray losses between laminations.

This squared hysteresis loop iron-silicon alloy was expressly developed to provide lower core loss with higher permeability in the rolling direction. Grain oriented laminations are supplied in the stress relief annealed condition. The elementary patterns of the crystals in the material are "oriented", or arranged so that the axis of easiest magnetization is nearly parallel and aligned in the direction of rolling. The alignment is accomplished by a special cold-rolling and annealing processes. This allows the product to withstand more severe vibration and shock and enables the following:

1. Lower core losses as a consequence of design.
2. Higher initial permeability.
3. Higher permeability at higher inductions.
4. More stable VA/Temperature relationship over a wide range of ambient temperatures.
5. Most importantly, Superior Bandwidth and The Coherency Decware amplifiers are famous for.

The stacking of these cores, the wire and interleaving are trade secrets, and you can certain that Chinese built transformers which are so inefficient they have to be twice the physical size to do half as much, can't compete. You can relax in knowing you have the best.

The SE84UFO2.1 features our newest version of these transformers - called UFO output transformers. These feature a switch to go between hi and low impedance loudspeakers. Lo is anything between 2 and 6 ohms, Hi is anything between 6 and 16 ohms.

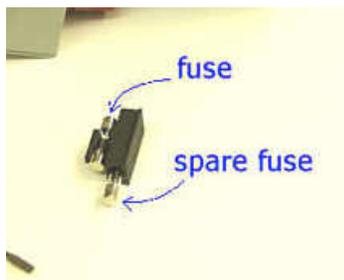
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LOUDSPEAKERS

We find that some speakers rated as low as 90dB 1w/1m get loud enough on this amp to fill a smaller sized room with a nice full sound. However, the speakers rated at 94dB or higher are considered ideal for all rooms.

POWER CORD / FUSE

Your amplifier has the highest quality fused IEC connector available. It is SUPERIOR to the Gold Plated Chinese units that are rebranded and passed off as expensive audiophile gear. This is important because if you choose to use a high grade audiophile power cord it makes no sense to plug it into a 50 cent IEC connector, which btw is what is on many amplifiers today - even expensive ones.



The fuse is a 3 amp, 20x5mm glass fuse. You can use fast or slow blow type replacements in this amp. It is located INSIDE the IEC connector. To access it, remove the power cord and take a small screwdriver to pry the little door open. It will come completely out of the IEC connector and not only holds the fuse, but has a spare fuse in it as well.

INTERNAL FUSES

The amplifier has further protection from shorting rectifiers with an internal fuse board located on the rectifier tube socket. It has two 250mA 5x20mm glass fuses for the high voltage and one 5A 5x20mm glass fuse for the heater. If your tubes light up but you have no sound, it's likely one of the internal fuses.

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GROUND LOOPS, POWER STRIPS, 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 - try to 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 component 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 inputs connected, then hook your inputs up 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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BREAK-IN also known as 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 to the other in as little as 15 minutes time. This process usually completes in less than 100 hours of use, so just a few days really. Of course after the initial burn-in process, the amp will continue to season and refine over several months.

SEASONING

The older your amplifier gets (up to 30 years) the better it will sound. This is why used Zen amps go so fast on audio marketplaces around the internet. Many times the amps will bring as much or more than the original purchase price in the used market. The reason for this is mainly the output transformers simply sound better the longer they're used.

SOUND QUALITY

The fidelity of the amplifier, it's frequency balance, pace, transparency, imaging and sound stage are extraordinary due to the small number of parts to get in the way of the music. That said, you will only ever hear it sound as good as the weakest link in your system, which could be cables, a preamp, your source component. The only way to hear how good the amplifier CAN sound would be to hook an analogue master tape machine with a live two track master tape where the recording was done with top notch microphones and engineering. Even the worlds most expensive DAC and TRANSPORT will not sound as good, so obviously a 2500.00 DAC and transport is going to be a step down, and a 500.00 CD player is going to be another rather large step down. That means you WILL handicap your amplifier, the variable being HOW MUCH. Moral of the story is that given the choice to replace this less than two thousand dollar amp with one 10 times as expensive will sound NO WHERE NEAR as good as keeping this amp and spending 10 times as much on a new source.

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TROUBLESHOOTING

SYMPTOM	CAUSES	REMEDIES
Amp won't turn on	Blown Fuse	Replace fuse
	Power cord is not pushed in all the way or intermittent	Check power cord, replace if necessary.
Tubes light up but no sound	Rectifier tube is bad even though it still lights up	Replace rectifier tube.
	Volume control is all the way down.	Increase volume control level
	The source switch is set to the wrong source	Adjust the switch to the other position.
	Your source is not playing	Start source
	Interconnect cables are unhooked	Reinstall interconnect cables.
	Incorrect tubes are installed	Install correct tube types
	tubes are installed in the wrong locations	Reinstall tube in the correct locations.
Sound is real weak	Source switch set to wrong source	Reduce volume and Adjust source switch.
Sound is getting weak	Tubes are past rated life of 3000 hours	Replace tubes.
Sound drops out on both channels and comes back on	Power cord is loose	Check power cord, replace if necessary.

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SYMPTOM	CAUSES	REMEDIES
Hum through speakers	Ground Loop	Plug power cord into a different outlet. Install 2-pin adapter on power cord plug to float the ground.
	Intermittent ground or shield wire in interconnect cable	Replace interconnect cable.
	Noisy Input Tube	Replace Input Tube.
	Bad Rectifier Tube	Replace Rectifier Tube.
	Unshielded Interconnect used	Re-route cable away from power supplies and power cords or replace with shielded cable.
	Digital Light Dimmer's on same circuit	Turn off digital dimmers.
	WIFI bridge or router nearby	Locate farther away from audio components
Hum from amp itself	Chattering rectifier tube	Tap on tube to see if chattering stops and if so replace rectifier tube.
	Power transformer	Poor voltage or over voltage at the wall outlet can cause an increase in power transformer vibration, correct voltage.
		Relocate amp to middle of room to see if transformer hum reduces. If so, the shelf or rack the amp was in can be changed.

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SYMPTOM	CAUSES	REMEDIES
Popping or Spitting noise	Noisy tube	Replace noisy tube
	Wifi router or bridge nearby	Locate away from audio components
AC fuse blows	Line voltage surge	Replace fuse
	Rectifier Tube Arced on initial startup	If it continues, replace rectifier tube and fuse.
	Fuse is too small	Install correct amperage fuse. If amperage IS correct and fuse blows, use a SLOW BLO fuse of the same amperage.
One Channel stops working	No signal to that channel	Take the cable from the channel that works and put it into the channel that stopped working. If it starts working, the amp is fine, but you have either a bad cable or problem with your preamp or source component.
	Speaker cable came unhooked	Reinstall speaker cable.
	Output tube failed	Replace output tube.
Channel imbalance	Output tubes no longer match	Replace output tubes with a matched pair.
	Input tube sections no longer match	Replace input tube with a new input tube that has matched sections.
	Speaker HI/LO impedance switches are not set the same.	Adjust the HI/LO switches the same for each channel.

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Power Output	2.3 Watts RMS @ 8 ohms
Frequency Response	20Hz ~ 80kHz
Speaker Range	2 ohms to 16 ohm nominal impedance
Input Impedance	100 kHz
Input Sensitivity	1.8 Volts
Power Consumption	65 Watts
Circuit Design	Single Ended Triode
Negative Feedback	None
THD	2.24% @ 1 watt 20-20kHz. / 0.14% 2nd H.
SNR	-79dB
HUM	-64dB
Tube Rectifier	(1) 5U4
Output Tubes	(2) EL84 or 6P15P-EV
Input Tube	(1) 6922 or 6N1P or 6DJ8 or 7DJ8 or 6H1N
Size Dimensions	8.0"H x 6.125" W x 12.0" D
Weight	17 lbs
Fused	5 x 20 mm 3 AMP/120V or 1.6 AMP/240V
Norm Temperature	Transformer < 139°F @ 80°F ambient room

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WARRANTY

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

If your amp needs to return to the mothership, please call us first or at least e-mail with a description of the problem. Statistically 50% of all amps sent here for repair have nothing wrong with them. We can often head this off at the pass by consulting you by phone and helping you troubleshoot the problem. Decware amps are built to outlast you, and are frankly damn hard to break.

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

FINAL NOTE

We want this to be the best sounding amplifier you've owned and since these amps are like our children we have a vested interest in their continued success. Please call us any time you have questions or need advise 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.

-Steve Deckert