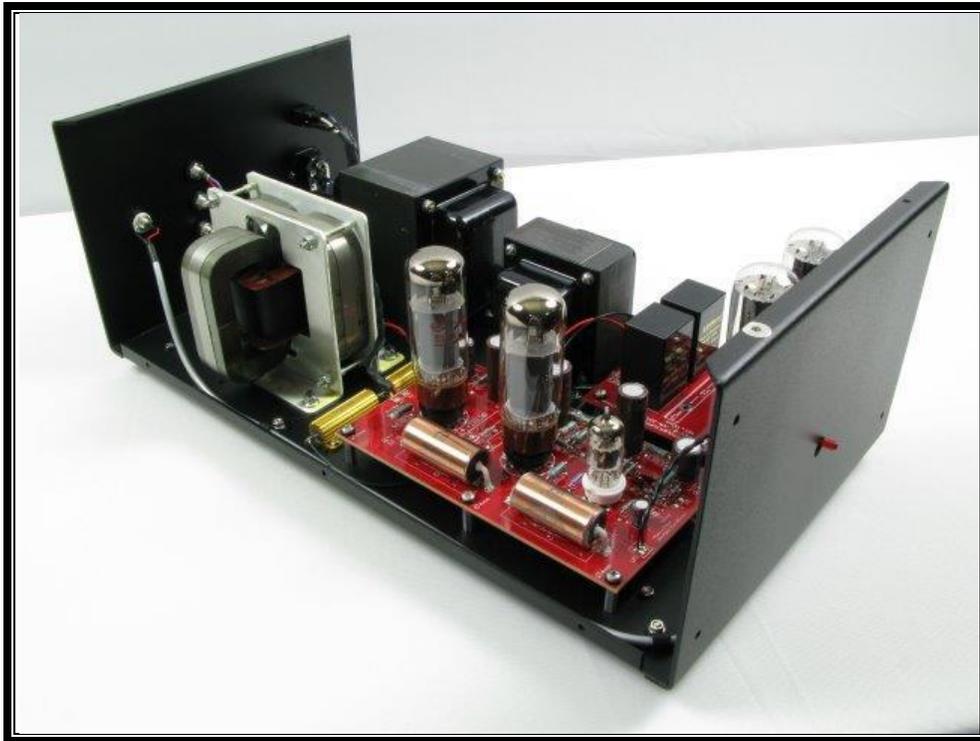


EL34 Triple C-Core Monoblock "The Artiste"



Construction Manual

Version 3.03, July 2019

audionotekits@rogers.com

1-613-822-7188

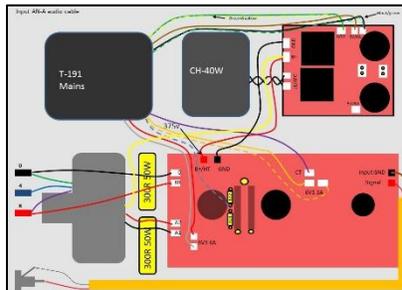


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Section 1

Introduction

Thanks for purchasing the ANK Audio Kits EL34 Triple C-Core Monoblock – "The Artiste". We believe it is truly the finest EL34 amplifier on the planet! Our goal is to provide you with the highest quality kit that you will build from scratch with these instructions.

This is very high end and sophisticated piece of audio equipment that will surely become a showpiece of your sound system. We're excited that you have chosen to join us in enjoying and appreciating superb audio and we've created this manual to help guide you through each step of the assembly process with as much detail and clarity as possible. To facilitate the build process, the manual has been divided into a number of sections, each focusing on a separate aspect of the system: follow the sections in order and we guarantee you not only a problem-free experience, but a pleasant time doing so. If you are new to building kits, or if at any time you feel as though you need help or advice, feel free to contact us and we will do whatever it takes to get you on the right track.

1.1 About ANK Audio Kits

Audio Note (UK) started out in the early '90s developing several DIY audio kits while they were building up their finished product business. DIY Audio has a long history and it was an opportunity for knowledgeable customers to take advantage of world class designs and components. Audio Note (UK) was focused on using the very finest materials and components custom-made to their specifications, across their entire product line — from custom film and electrolytic capacitors to tantalum resistors, transformers, binding posts, wires, etc. The Kit1 300B Single Ended integrated amplifier was born during development of the Meishu and it proved to be extremely popular worldwide. The ANKit business was born!

As the finished product business and dealer network started to flourish, Audio Note (UK) eventually moved the kit business off into a separate division; thus, in 2004, Audio Note Kits started up and was supported by a website so that customers not located near Audio Note (UK) dealers could order kits and have them shipped direct. Kit development continued in earnest during the 2000s with development assisted by Audio Note (UK) engineering. Audio Note (UK) parts were used throughout the kits, depending on the various levels and budgets. By 2013, ANK Audio Kits (as it came to be called) had developed a wide product range covering all areas of two channel audio: a single-ended 300B product line, an EL34 classAB and single-ended product line, digital to analog converters, pre-amplifiers, Phono stages, and Audio Note (UK) speaker kits. The end result today is that customers worldwide with DIY skills can now build an entire high end audio system to their liking. With the introduction of higher levels in 2013 and the release of the Level 5 Mentor Pre-amplifier and the DAC 5.1 Signature, some customers wanted these high end products assembled by a professional builder. As a result, ANK Audio Kits began offering this service for Level 4 and 5 products so that a significant investment in a kit could be turned into a work of art! Since ANK Audio Kits was born in 2004, over 2,500 kits have been shipped to customers worldwide. Clearly, there is a real demand for high end audio kits and ANK Audio Kits has been delivering the goods now for 15 years.

We believe and hope that you will have a great experience building your kit and we look forward to hearing from you about your experience.

Regards,

Brian Smith — Director ANK Audio Kits



1.2 Basic Operation of the Amplifier

1.2.1 Overview

ANK Audio Kits is pleased to announce the EL34 Triple C-Core Monoblock – "The Artiste". There is something very special about the music that flows from an EL34 amplifier: gorgeous midrange, transparent highs, and solid bass. "The Artiste" is an ideal power amplifier and an exceptional value.

The circuit is a classic design: the amplifier is based on a pair of EL34 pentodes in classAB push-pull mode driven by an ECF80/6BL8. The triple C-Core transformers bring a weight and authority to the EL34 sound that must be experienced and the dual 5U4G rectification brings a smoothness to the sonics that will make you addicted to tube rectification.

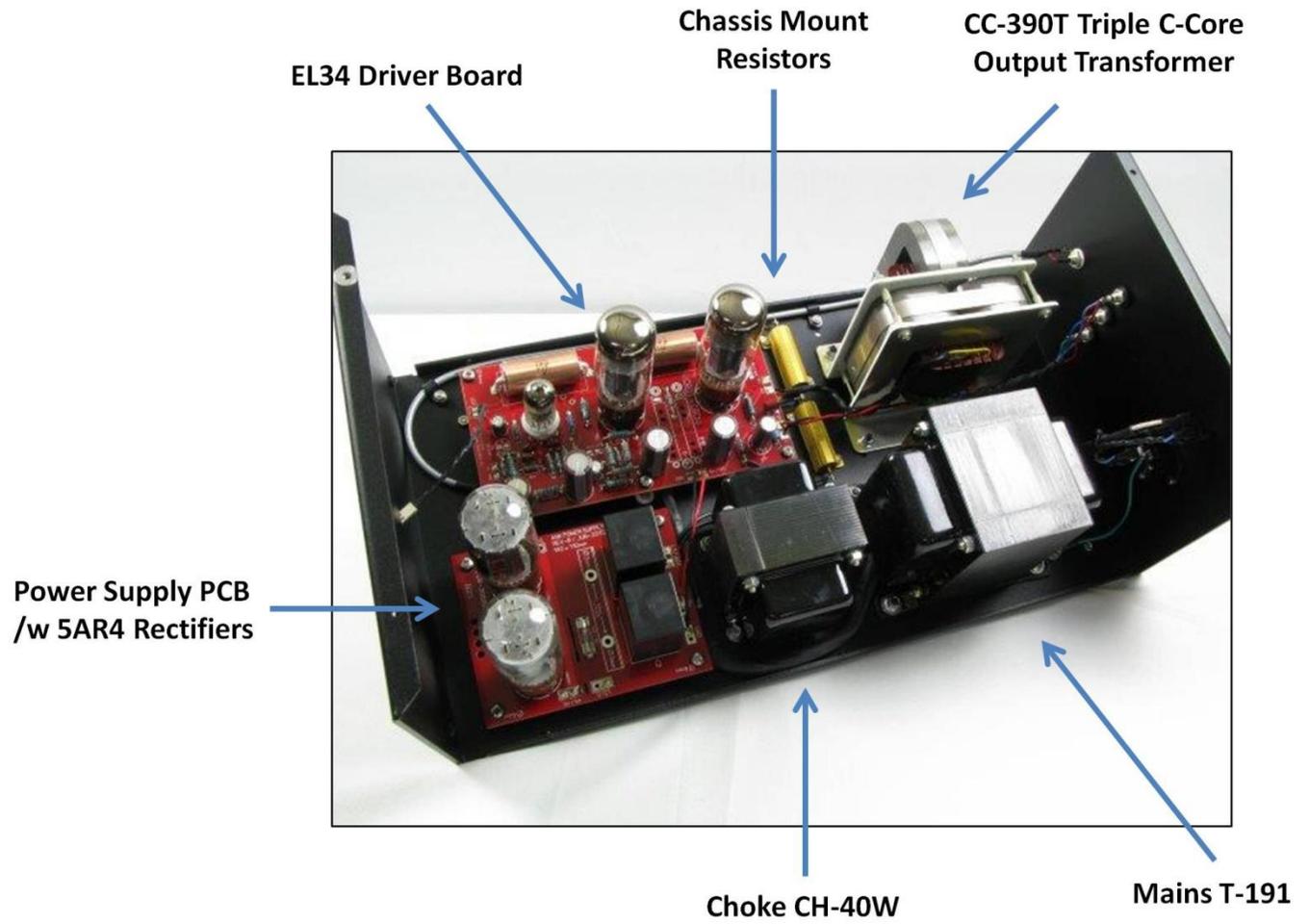
The Power Supply is very modern. A large Choke handles both the HT and screen voltages and two high quality Mundorf MLYtic capacitors of 30uf and 220uf provide smoothing and energy storage. The high quality 3mm thick and 2oz copper trace line stage printed circuit board (PCB) houses all the circuitry to drive the output transformers and new 300R chassis mount gold 50W resistors¹ have been added. With triple C-Core output transformers (CC-390T), extra large Mains and Choke transformers, and dual 5U4G tube rectifiers, the EL34s provide about 40W of classAB power. Additional high quality components include non-magnetic Takman Resistors from Japan, Audio Note (UK) Copper Foil Capacitors, speaker posts and RCA jacks, and PTFE silver-plated stranded copper wire.

Construction is fairly straight forward as the kit is very well architected. Our PCBs are expertly designed with all signal and chassis grounding and CATHODE and HT test points, guaranteeing a perfectly working amplifier even for a beginner builder. You'll start with the Power Supply and IEC section: there you'll install the Mains, Choke and Power Supply board,. Then we'll test it. After that you'll build the line stage, install the output transformers, and then do the interwiring to connect the component modules.

¹ Just in case we forget later! these new resistors mean that R21 and R22 on the main board are now empty.

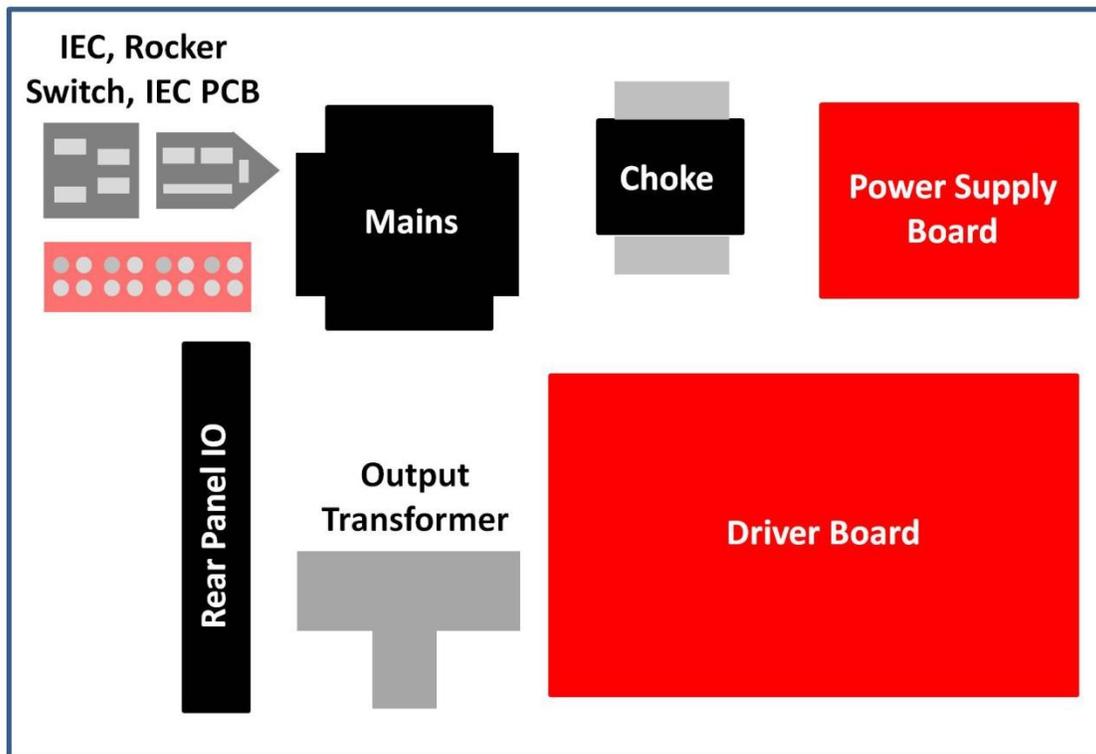
1.2.3 Component Placement

Let's take a look at the overall layout of the amplifier:



1.2.4 Block Diagram

Here's another way of looking at how the manual sections fit into the 'big picture': the sections basically follow how the components are positioned in the amplifier chassis:



1.3 Equipment

Here is the list of equipment that will be required:

- ❖ Philips screwdriver
- ❖ A pair of quality wire strippers
- ❖ A large, organized work area
- ❖ Soldering iron station with wet sponge
- ❖ Lead-based solder (4% Silver is recommended)

1.3.1 Overview of the Kit

In your kit you will find a series of kit bags containing all the hardware, wire, and parts for the associated sections of the amplifier. See the Parts List files on the disk to match up the parts in the kit bags with the lists. There is also a Master list for the kit.

1.4 Tips and Suggestions

We have learned a lot about kit building over the last decade from our customers and I'd like to share some tips with you to ensure a successful project. Please read through this section thoroughly, it will give you a good idea of what's ahead and help ensure your success!

1.4.1 Soldering

We highly recommend using lead-based solder with some silver content³ on the build. You should use lead-free ONLY if you are experienced using it and confident. Lead-free solder requires a higher melting temperature and thus is more difficult to use. We don't recommend lead-free solder for first-time builders.

We suggest that you practice your soldering before starting on the kit. Feel free to request practice parts with your kit so that you can practice tinning wires and making nice solder joints. The key is a good soldering station with a sponge, the right temperature, a good size tip, and experience; remember, tips can wear out so make sure your tip is working. (You can also check out YouTube videos for soldering lessons and examples.) The solder should flow freely; if it's forming balls then there is likely a problem with the tip, the temperature, or (sometimes) the surface. Feel free to contact us for help!

³ For example, WBT-0800.

1.4.2 Components

Using the Ohm setting on your multimeter is very useful when building a kit. It's a good, practical way of measuring resistors and continuity and is much easier than reading the color codes on the side. (With practice, the color codes can also be a good way to determine the resistance, but that method is better left to experienced builders.)

1.4.3 Resistor Sizes

Resistors today, particularly metal film resistors, are often smaller than you might expect. It used to be that the difference between a 1/2W and a 1W resistor was obvious: the 1W was considerably larger. That way of looking at things sometimes now no longer applies. Please be assured that all resistors supplied with ANK Audio Kits are rated at least per the specified wattage: in some cases, a higher than specified wattage may be supplied.

1.4.4 Capacitor Manufacturers and Voltage Ratings

Occasionally, depending on parts availability, we may use capacitors from different manufacturers. These will always be of equal or higher quality! As a result, some of the pictures in the manual may look a bit different at times. With regard to voltage ratings, normally, the voltage rating of the supplied capacitors will be exactly what you see on the parts lists. Occasionally, a part may be supplied with a higher voltage. Think nothing of it!

1.4.5 Electrolytic Capacitors

For those who have not built a piece of electronics before, here is a little lesson on capacitors. There are basically two types of capacitors that we use in the kits: electrolytic and signal capacitors. Of these, electrolytic capacitors require special attention. Electrolytic capacitors are "polarized," which means they have a POSITIVE (+) and a NEGATIVE (-) lead and typically have values like 100uf 450V, 10uf 160V, or 470uf 35V. *These capacitors need to be installed correctly or else they will possibly blow up at some point!*

Each electrolytic capacitor will have a *wide stripe* on the NEGATIVE side. Always ensure that this stripe (NEGATIVE) is positioned correctly. There are several keys on a printed circuit board to help you to know how to position the capacitor:

1. There may be a "+" on the board indicating where to position the POSITIVE lead.
2. The segmented half of the circular stencil on the board shows where to position the NEGATIVE lead. The unsegmented ('half-moon') part of the circle is where the POSITIVE lead goes.
3. The POSITIVE lead goes to a square solder pad while the NEGATIVE lead goes to a round solder pad.

1.4.6 Diodes

When installing diodes note that they are oriented with a stripe — *match the stripe on the diode with the banding (||) stencil on the board.*

1.4.7 Hardware/Mechanical

Not all of us are mechanically oriented. So, the kit is well laid out such that all the hardware is provided and bagged in individual sections, so things should make sense. Start thinking mechanically because about a third of the kit is mechanical. The first thing to remember is that good hardware is beautiful: we use all stainless steel metric hardware in the kits. It truly is a thing of beauty: don't rush your hardware! Here are a few helpful things to understand:

- ❖ We use British metric hardware (M3, M4, M5, screw size 10mm, 15mm, etc..) as opposed to the American imperial system (5/1000th or 50/1000th, 1 inch, 3/4 inch). Please familiarize yourself with the hardware in the kit.
- ❖ The screws will be called M3 or M4, which is the diameter of the shaft. The length of the shaft will be in millimeters, so you will encounter things like an M4 screw 16mm, a PAN head screw (which is a round spherical head), or a COUNTERSUNK or FLAT head screw (a screw head that needs to be flush with a surface — for example, under a transformer). So if you are asked to use an M3 16mm CSK screw, this is an M3 size (obviously), which is a thinner shaft diameter than an M4; 16mm is the length of the shaft; and the head type is CSK, which is a countersunk or flat head screw.
- ❖ Once you have the screws mastered, look at the matching nuts such as M4 nut or M3 nut and corresponding washers.
- ❖ Standoffs are common in the kits (again, they are either M3 or M4 size, with different lengths). They are typically threaded, so the screw goes into them.
- ❖ If any of the hardware is confusing or something is not fitting right, please email us.

1.4.8 Wire Stripping and Tinning

When it comes to wires, we typically use 18 gauge (thicker) and 22 gauge in the kits. It's PTFE: Teflon silver-plated copper wire. Basically this is classed as hook-up wire; we typically twist wire for you when it needs to be. The other wire we use is called shielded cable, like an AN-A (Audio Note (UK)) for signals. This is two-conductor wire: one is for the signal and the other (a big ground braid wrapped around the signal wire) is the shielding, which helps prevent the cable from picking up noise. You should practice stripping some 18g or 22g wire, and then try tinning this wire; this is the process of adding solder to the bare wire so that the invisible coating on the wire is burned off. This makes for easy soldering to a PCB, an RCA connector, or a transformer terminal. So it's a good idea to practice this a little before starting the kit.

1.4.9 Wire Color

In the earlier sections of this manual, particularly those sections dealing with the Mains transformer and Choke wires, the colors of the wires should match the color of the wires in your kit. If they don't, or if you're unsure about things, contact audionotekits@rogers.com. Later on, at the Interwiring stage, there may be some differences between the descriptions (or pictures) of the color of wires that you will connect and the color of the wires supplied with your kit; for example, depending on inventory, we may supply a Black-Red twisted pair instead of a Green-Red (or vice-versa). Don't worry! Just be sure to check the wiring diagrams carefully and connect the correct points together and all will be well!

1.4.10 Optional Finishing Touches

From time to time we get asked about some of the build details of the ANK Finished Products that you can see in the pictures in the "Assembled Kits Gallery!" (<https://ankits.smugmug.com/>) on our website. It's important to understand that these stunningly beautiful products were done by an accomplished professional builder with decades of experience and that some particulars of the build may be beyond most of us. However, experienced builders who want to incorporate some of these finishing touches should feel free to do so. While we don't officially support or supply parts for these optional enhancements, there's no reason why you couldn't or shouldn't do them if you want to and feel that you can handle them. Without getting into the details (you're on your own here), what you'll want to get hold of are: heatshrink (to bundle wires), cable ties (to secure large capacitors), stacked (male/female) standoffs and cable clamps (to elevate and secure signal cables), and cable sleeving. You can get some of these from your local hardware store (for example, 1/4" Cable Clamps) and other, more specialized, parts from online distributors such as Grainger, Digi-Key, Mouser, or Cable Ties and More. If you do decide to dress your build with some of these, please send us a picture or two. We'd love to see what you did!

1.5 Build Process

1.5.1 Some Good Rules of Thumb for Building Your Amplifier

- ❖ Take your time, prepare, and try and work on a small task each time you start to build the kit.
- ❖ Instead of rushing through another section — use the end of your session to check your work. Always ask yourself if the step you are performing makes sense.
- ❖ Have fun with your build and savor the experience. Take the time to do a really good job!
- ❖ Feel free to contact us via email audionotekits@rogers.com if you have any questions or suggestions during your build — and feel free to send us pictures, etc. We'd be pleased to give you tips along the way.

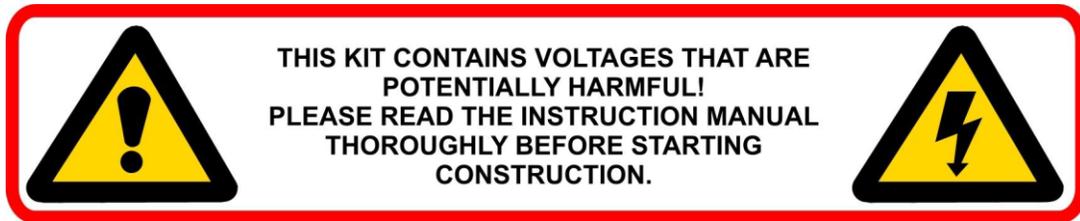
1.5.2 Organization of this Manual

We have divided the build and the manual into the following sections:

1. Introduction
2. Mechanical Assembly and Initial Mains Transformer Wiring
3. Choke Installation
4. Power Supply Installation
5. Driver Board Installation
6. Output Transformer Installation
7. Interwiring
8. Turn-on Procedure and Testing
9. Finishing Touches
10. Final Thoughts

Appendix

1.5.3 Electrical Safety Warning



Please be aware of proper electrical safety.

There are sufficient voltages in this kit to give you a very nasty and harmful shock, so be careful when powering on, debugging, and probing around.

Please contact ANK Audio Kits via phone or email (audionotekits@rogers.com) to discuss any precautions necessary when building the kit if you feel unsure about what you are doing at any stage of the build.

Section 2

Mechanical Assembly and Initial Mains Transformer Wiring

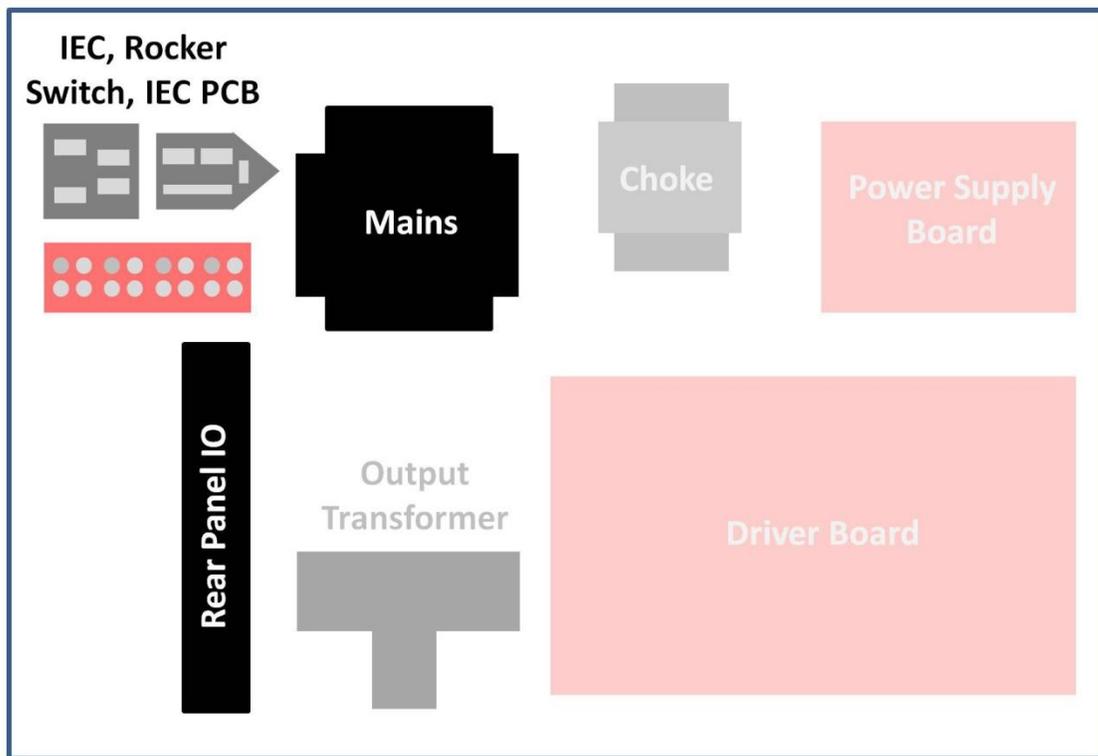
In this section we will install the feet, IEC socket, Rocker Switch, and the IEC PCB. Before we begin, It's a good idea when you receive the kit to do a complete inventory. You should see the following parts:

- ❖ Mains Transformer T-191
- ❖ Choke CH-40W
- ❖ Output Transformer CC-390T

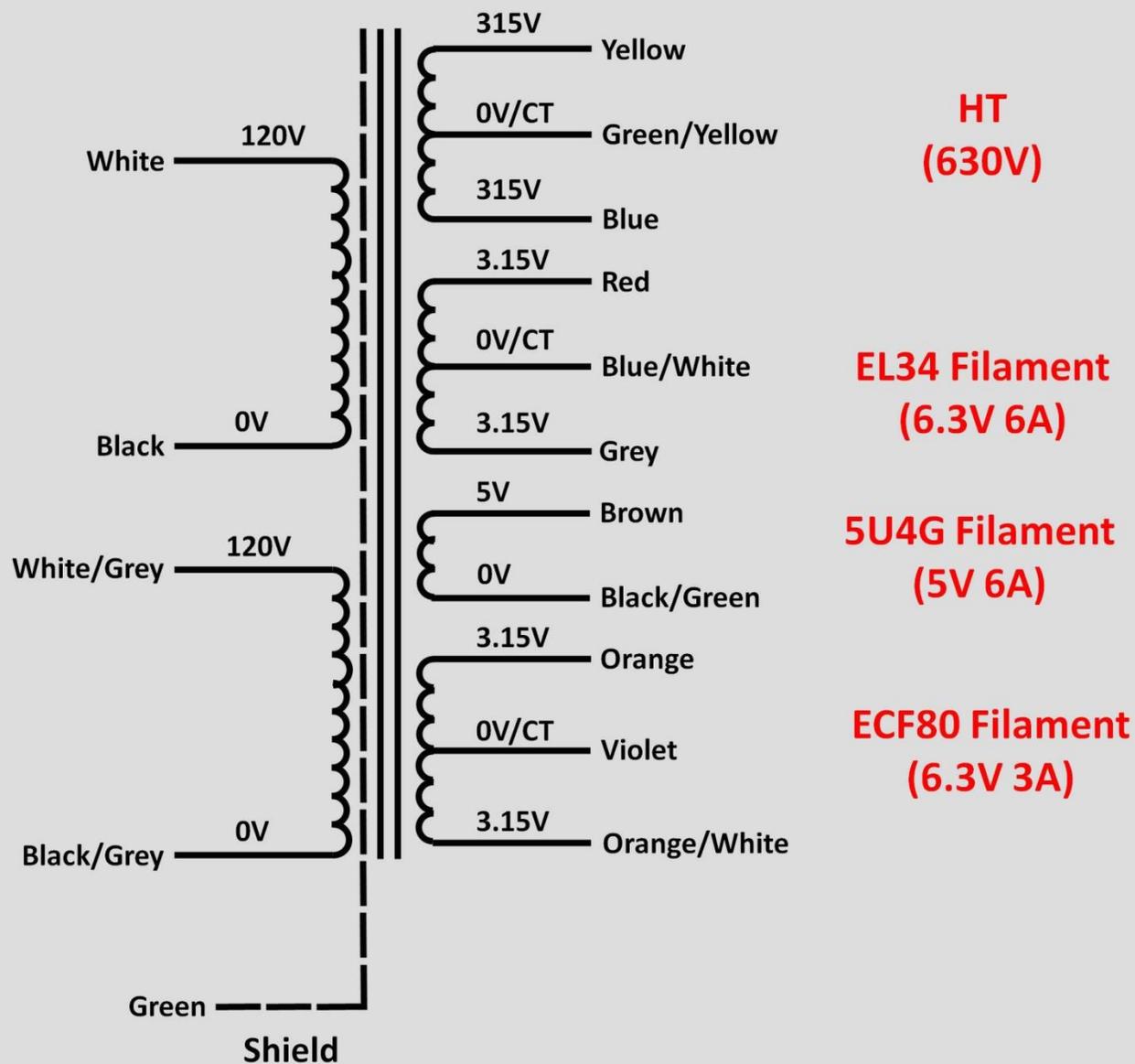
The kit bags will have a complete list in each bag that you can check the parts against.

- ❖ Hardware Kit Bag – All hardware in individual bags corresponding to each section
- ❖ IEC Bag – Rocker Switch, etc.
- ❖ Power Supply Kit Bag – PCB and all associated parts and tubes
- ❖ EL34 Monoblock PCB – PCB and all associated parts and tubes
- ❖ Chassis Fittings – speakers posts , RCAs , feet, etc.
- ❖ Wire Bag – various wires required for the kit

2.1 Overview



Here's a graphic for reference showing the various Mains transformer windings that will be used for the HT and various filament needs throughout the amplifier:



2.2 Installing the Feet

Take the 4 feet and the M4 x 20mm screws and M4 nuts and washer and mount the feet into the four corners of the chassis, as shown below.





Feet installed on the chassis

2.3 Installing the Rocker Switch and IEC

- Install the Rocker Switch, which just snaps into position. *Be sure to install it with the narrow switch lugs nearest the side of the chassis.*
- Use M3 screws to Install the IEC plug; it can mount from inside the chassis or from the outside. *Be sure to install it with the IEC Ground at the bottom of the chassis..*

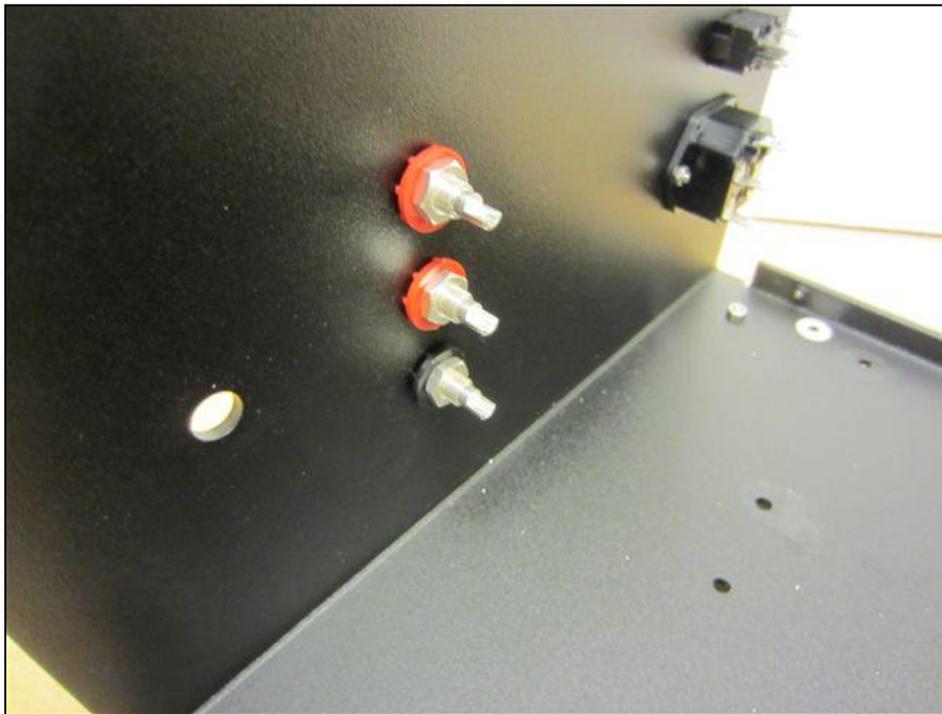


Here's the view from the rear of the chassis:

2.4 Installing the Speaker Posts

Install the speaker posts found in chassis fittings bag. Let's do it, from top to bottom:

- **Red**
- **Red**
- **Black**



The view from inside the chassis: *Note the insulation against the chassis.*

2.5 Installing the RCA Jack

- Next, we'll install the RCA jack for the input to the amplifier. It goes in the hole to the edge side of the chassis near the speaker posts.

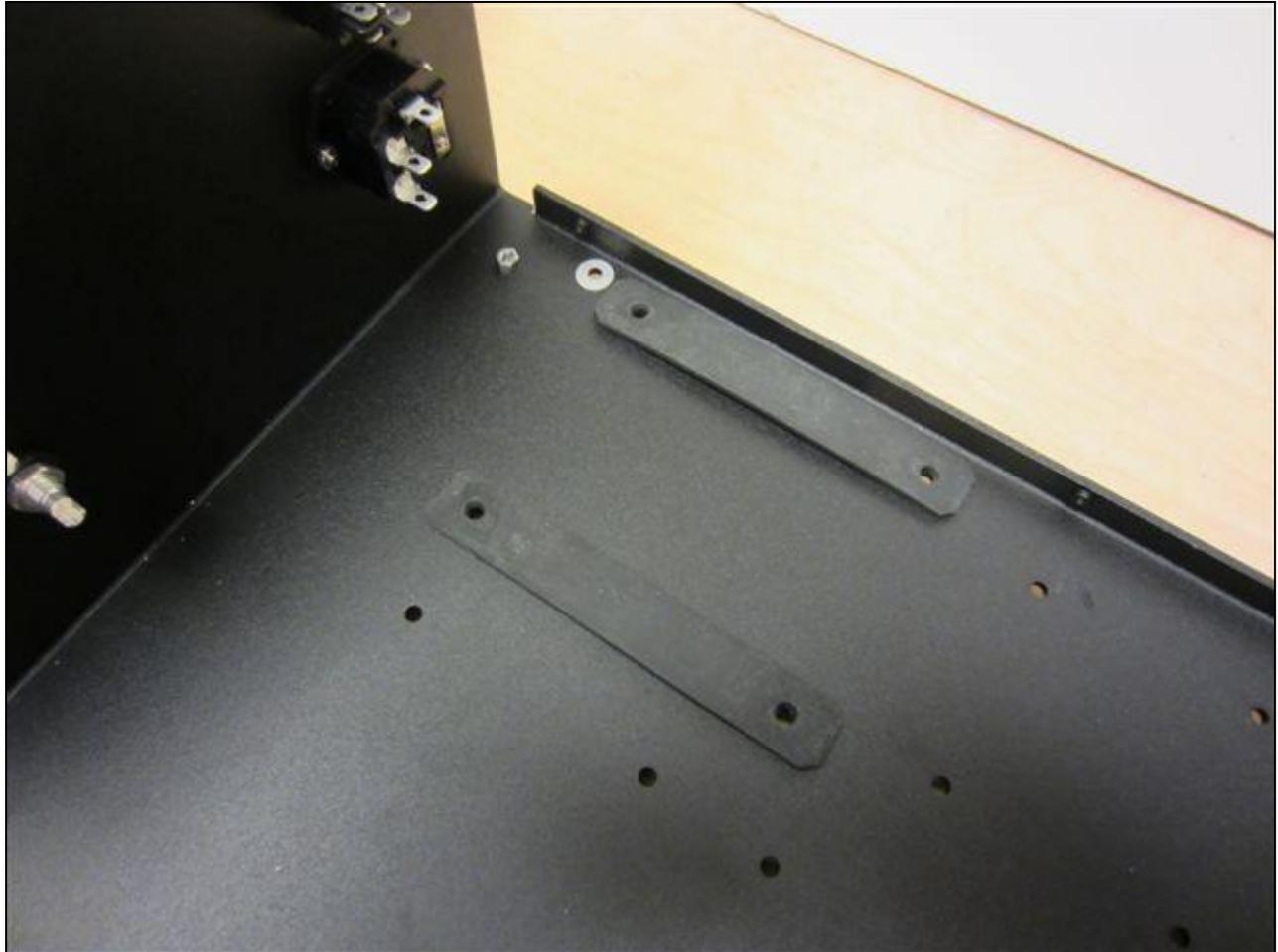


- Insert into the chassis from the outside:
 - ❖ The white insulating washer with the raised ring facing inwards into the hole
 - ❖ The RCA jack
- Attach, from the inside of the chassis, onto the protruding jack:
 - ❖ The other white insulating washer
 - ❖ The ground lug
 - ❖ The nut (don't immediately tighten this more than one or two turns)
- Bend the ground lug up about 30 degrees and position at about 2 o'clock. *Make sure it is away from the chassis.*
- Tighten the jack *such that the inner lug is facing up/open*; it'll make soldering much easier in that position.

Make sure everything is snug and well tightened. We'll wire the jack later.

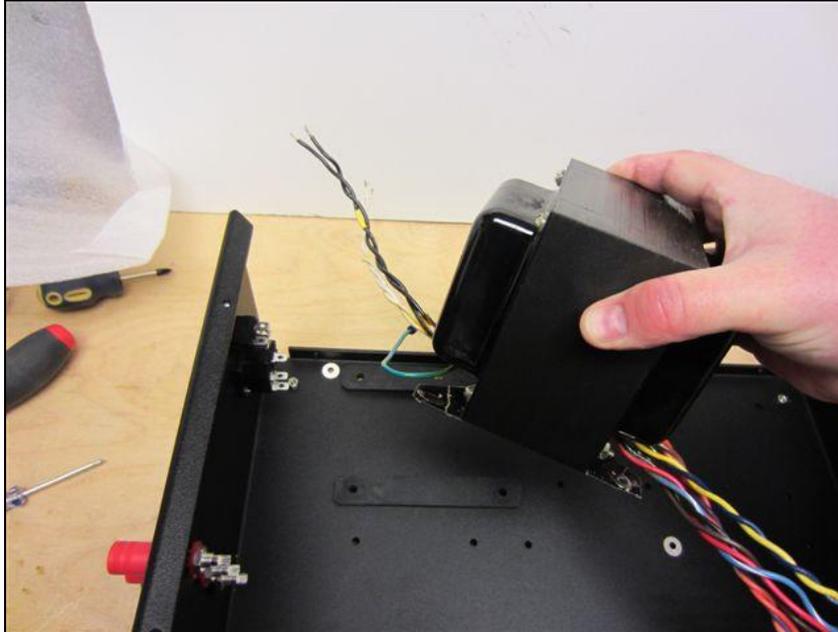
2.6 Installing the Mains Transformer

Now we're going to install the T-191 Mains transformer. We suggest that you read through this entire section to see what you will be doing before starting in on it.



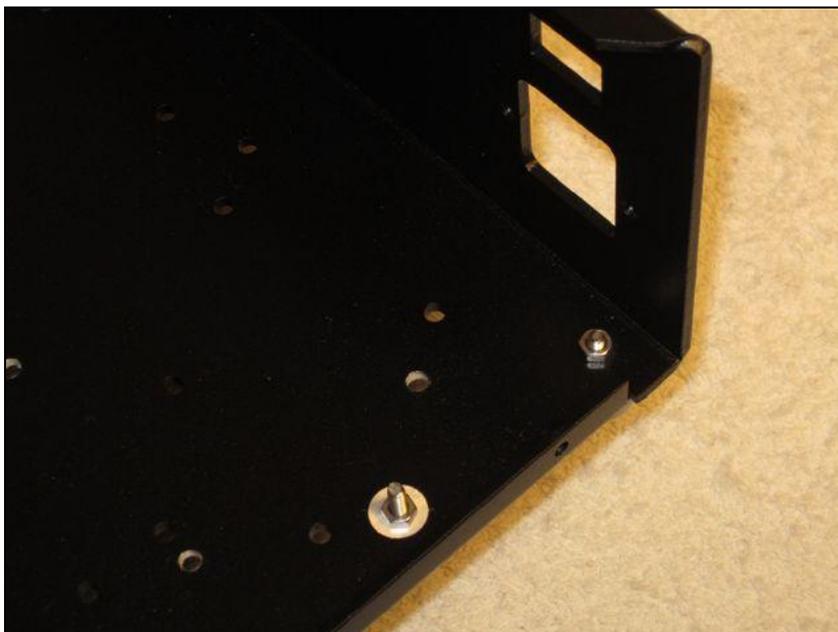
- Install the rubber strips on the chassis in the position where the T-191 Mains transformer will go.

- Position the T-191 Mains transformer (double check the code on the bottom!) into the chassis such that the two White, two Black, and one Green wires go towards the back of the chassis, as shown below. These wires are the Primary.
- Secure the Mains transformer to the chassis using the provided hardware in the "Mains" bag.



2.7 Installing the Chassis Ground Screw

- Insert the M4 16mm chassis Ground screw into the unpainted position in the corner of the chassis, from underneath the chassis.



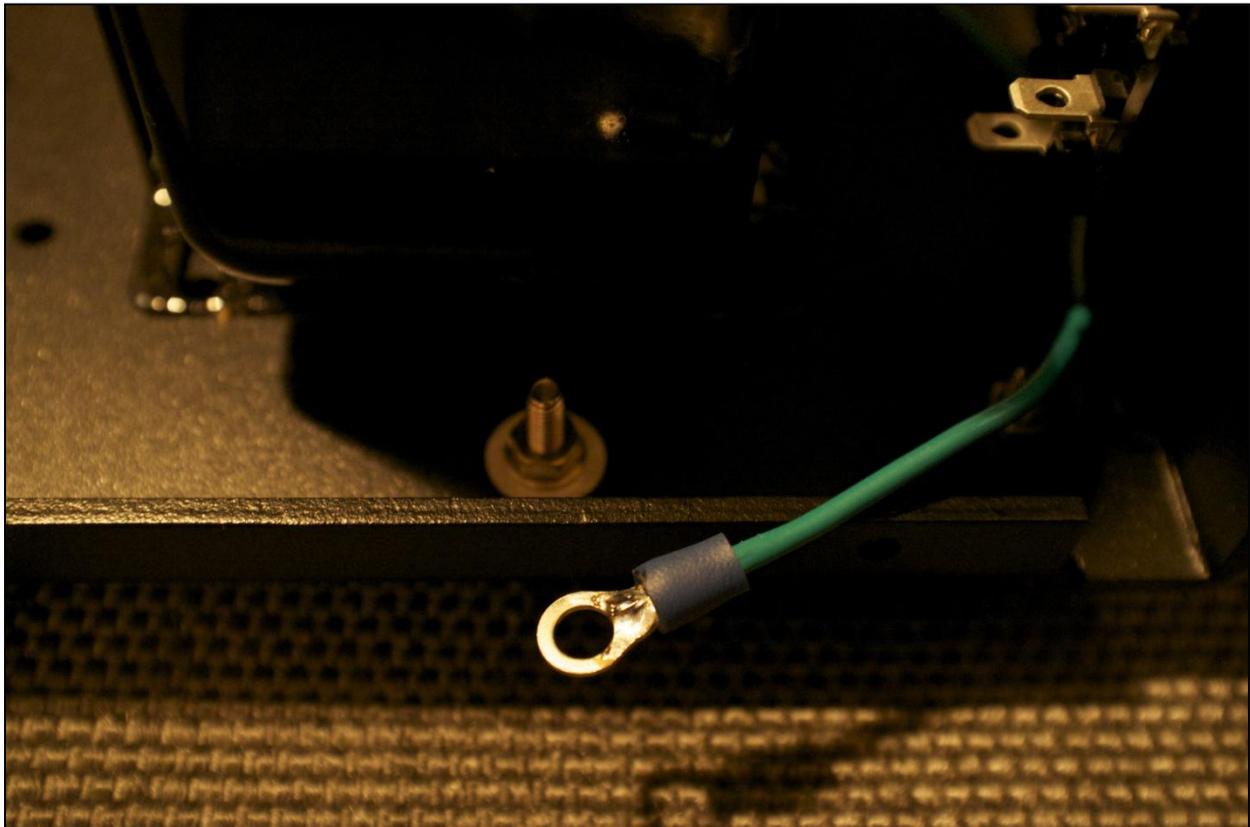
2.8 Installing the Chassis Ground

Now let's prepare the Green Ground wire.

- Insert the Green wire into the provided Ground lug and solder it in place. Do this by adding solder through the front of the lug, as shown below.



Add a fair bit of solder and apply heat for at least ten seconds, as the solder must “take” to connect to the lug. The lug will get hot so don’t touch it for awhile; let it cool! When you are done you should have a nice smooth solder joint.



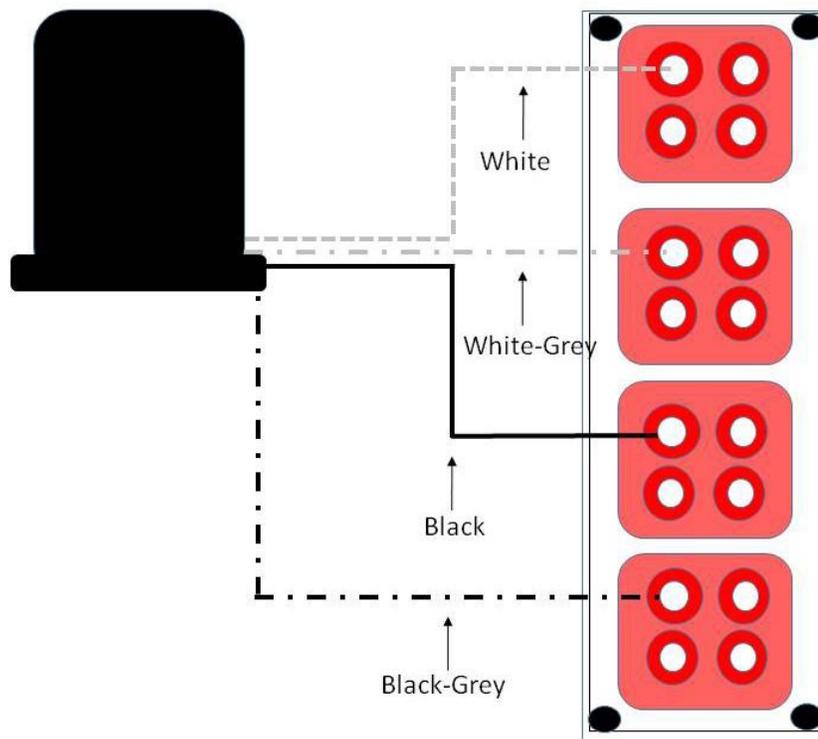
2.9 IEC PCB Wiring

Now we'll wire the IEC PCB, which will make the remaining wiring from the Rocker Switch to the Mains transformer much easier to follow and to implement.

120V and 240V Operation

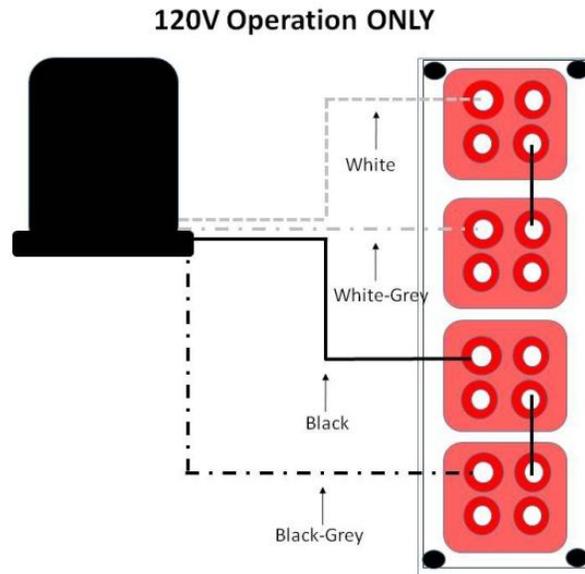
- Cut the four wires (White, White-Grey, Black, and Black-Grey) coming out of the Mains Primary to 30 cm. Strip and tin the ends. (You can add some heat shrink if you like.)
- Connect these four Primary wires to the IEC PCB as shown in the diagram below.

120V AND 240V Operation



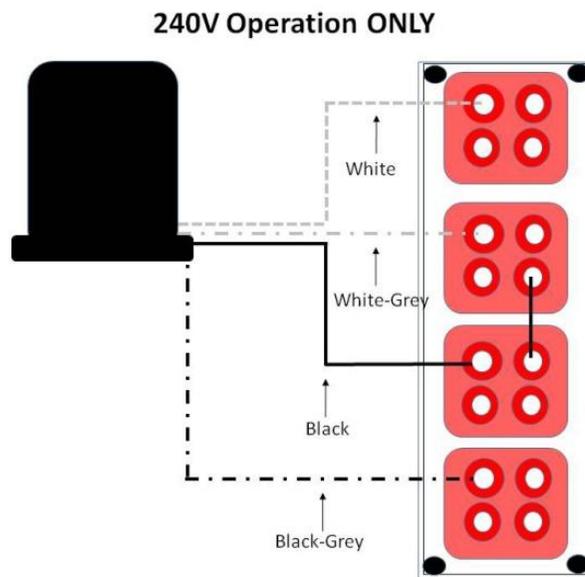
120V Operation ONLY

- Add the two jumpers as shown. (You can use the left over end of the Black Primary wire.)



240V Operation ONLY

- Add one jumper as shown. (You can use the left over end of the Black Primary wire.)

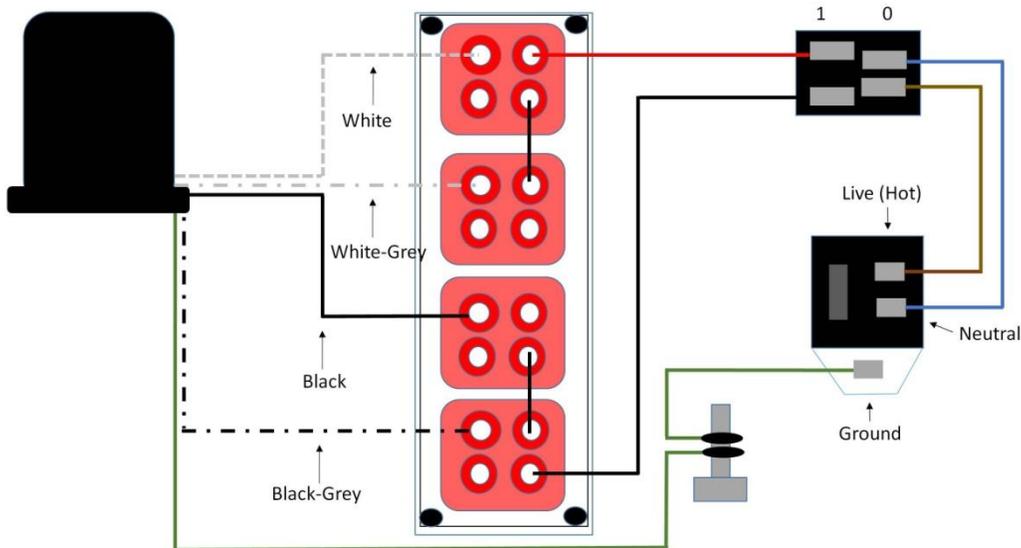


120V and 240V Operation

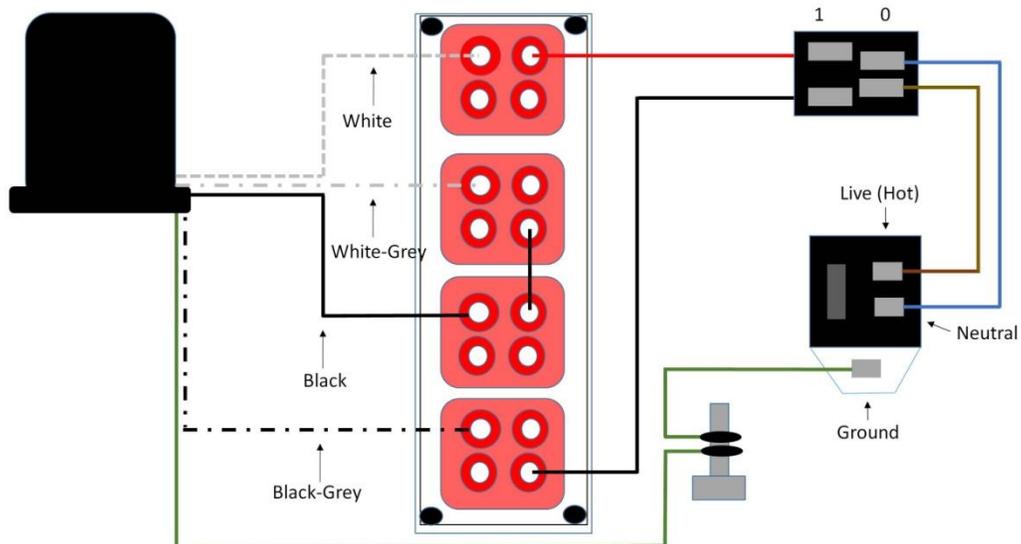
Referencing the appropriate diagram below (they're identical except for the jumpers you've already installed), complete the IEC/rocker switch wiring as follows:

- Tin and solder the unprepared ends of the half-prepared Red and Black wires in the IEC bag onto the IEC PCB, as shown. Suggested lengths: 16 cm for the Red wire, 10 cm for the Black wire.

Complete 120V Operation ONLY



Complete 240V Operation ONLY

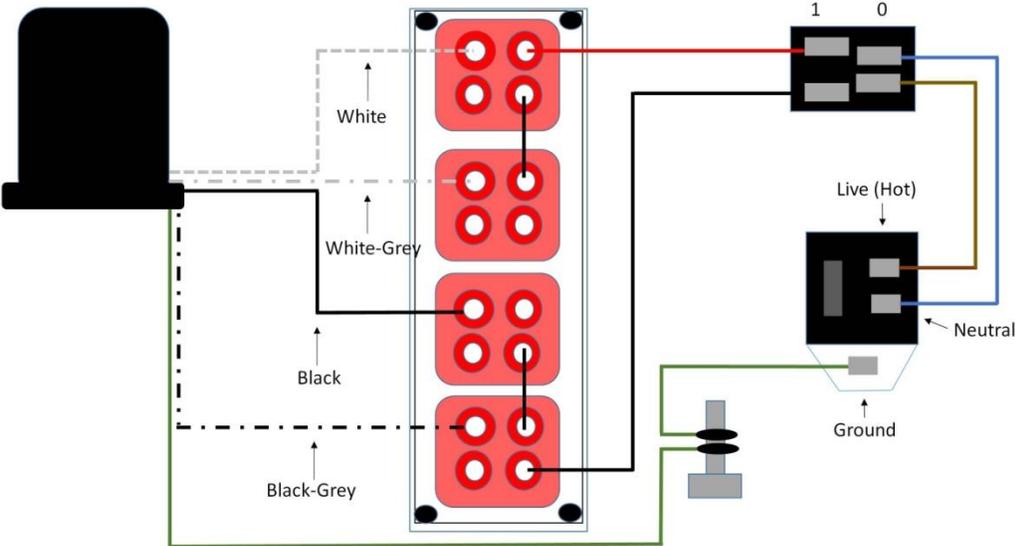


If you are in any doubt as to the IEC/rocker switch/IEC PCB wiring, please contact audionotekits@rogers.com

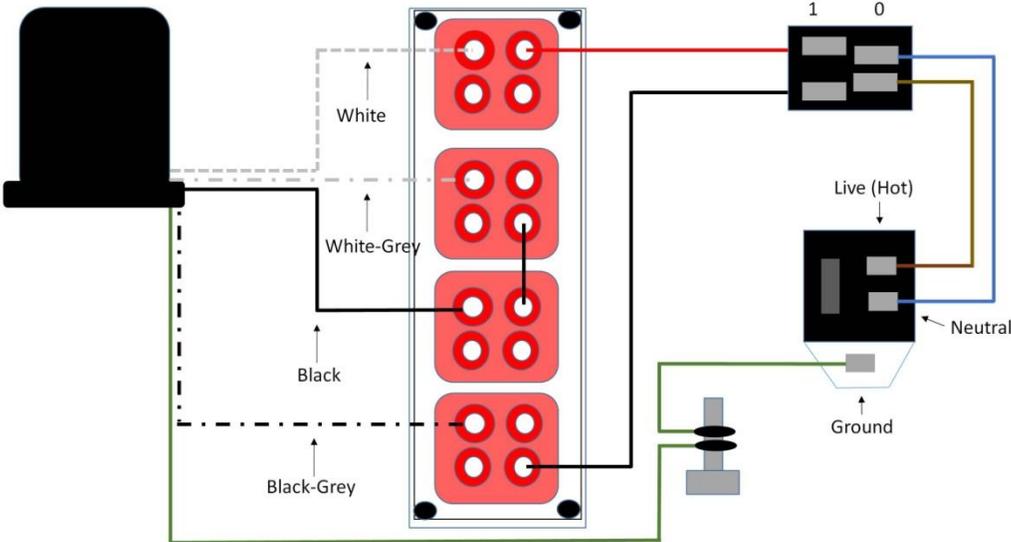
2.10 Connecting and Mounting the IEC PCB

Again, referencing the diagrams below,

Complete 120V Operation ONLY

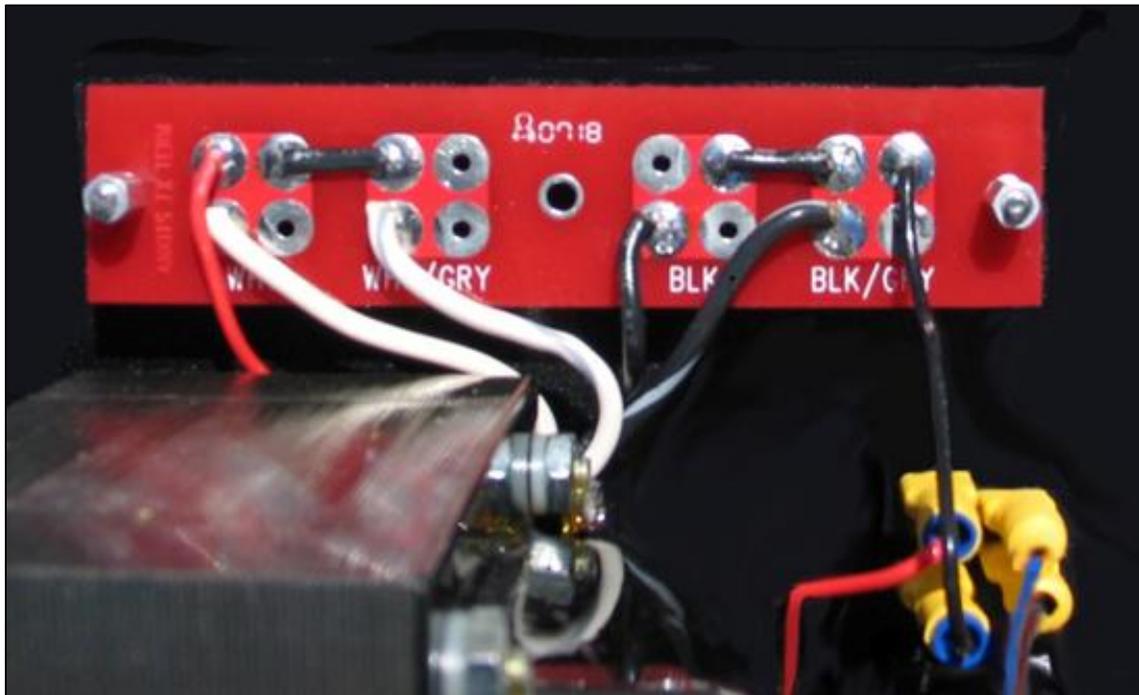


Complete 240V Operation ONLY



- Push the crimped ends of the Red and Black wires coming from the IEC PCB onto the left lugs of the rocker switch, Red on top, Black below. Apply the pressure necessary to position the wires correctly onto the lugs.
- Using the prepared Blue–Brown twisted and crimped pair of wires, connect the IEC socket — Blue (Neutral) from the middle lug, Brown (Live (Hot)) from the top lug — to the right lugs of the rocker switch, Blue on top, Brown below. Again, apply the pressure necessary to position the crimps correctly onto the lugs.

Here's a picture of the IEC PCB, without the plastic insulating board (which we'll install in a moment).



- Take the Green wire that is prepared at one end with a ground lug and at the other end with a crimp. Attach it to the bottom lug of the IEC socket.

Finally, let's make the chassis Ground connections.

- Retrieve the Green ground wire from the Mains transformer and the Green IEC ground wire, using a nut, tightly secure the two grounds: the Green Mains Primary wire and the Green wire from the bottom lug of the IEC socket to the chassis ground lug, as shown below.



Next, let's test these important connections. Using your multimeter's Continuity setting, verify the following:

- IEC socket ground to Chassis Ground
 - IEC socket Neutral to IEC PCB White solder tab
 - IEC Line (Hot) to IEC PCB Black-Grey Solder tab
-
- Finally, peel off the paper covering on the plastic insulating board, then, using the IEC hardware, mount the IEC PCB to the back of the amplifier above the Mains transformer as shown in the picture above: use a 30 mm screw, a short standoff, then the PCB, another short standoff, and finally the plastic insulating board and a nut.

Time for a break!

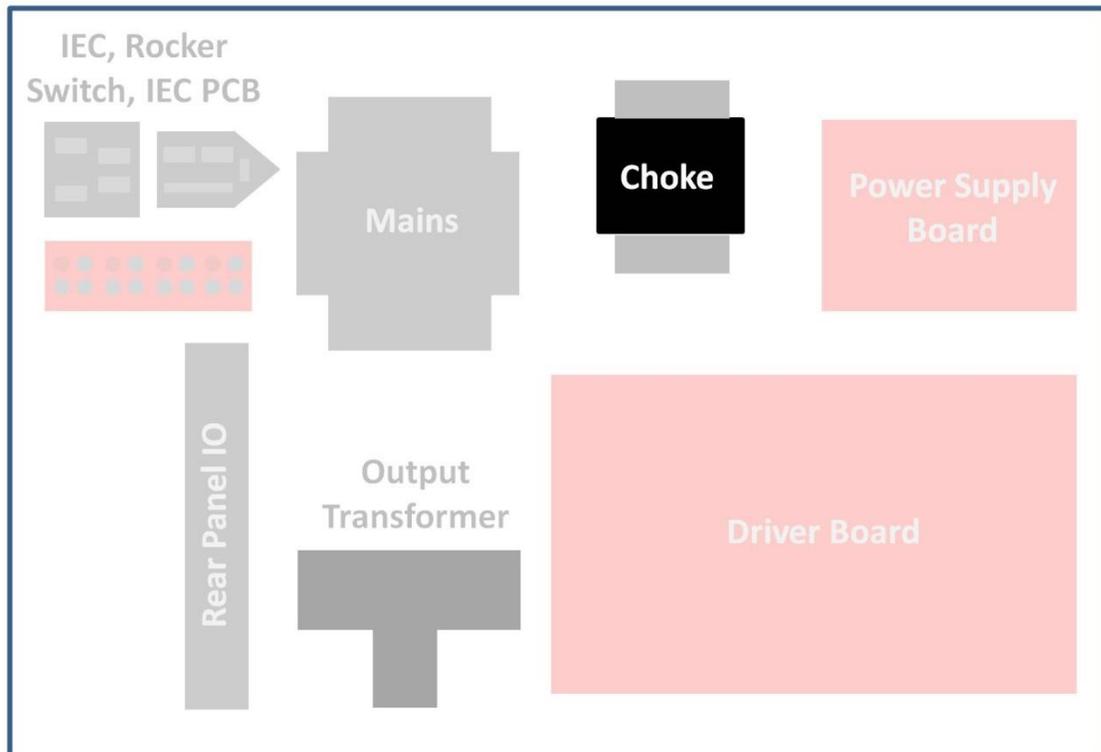


Section 3

Choke installation

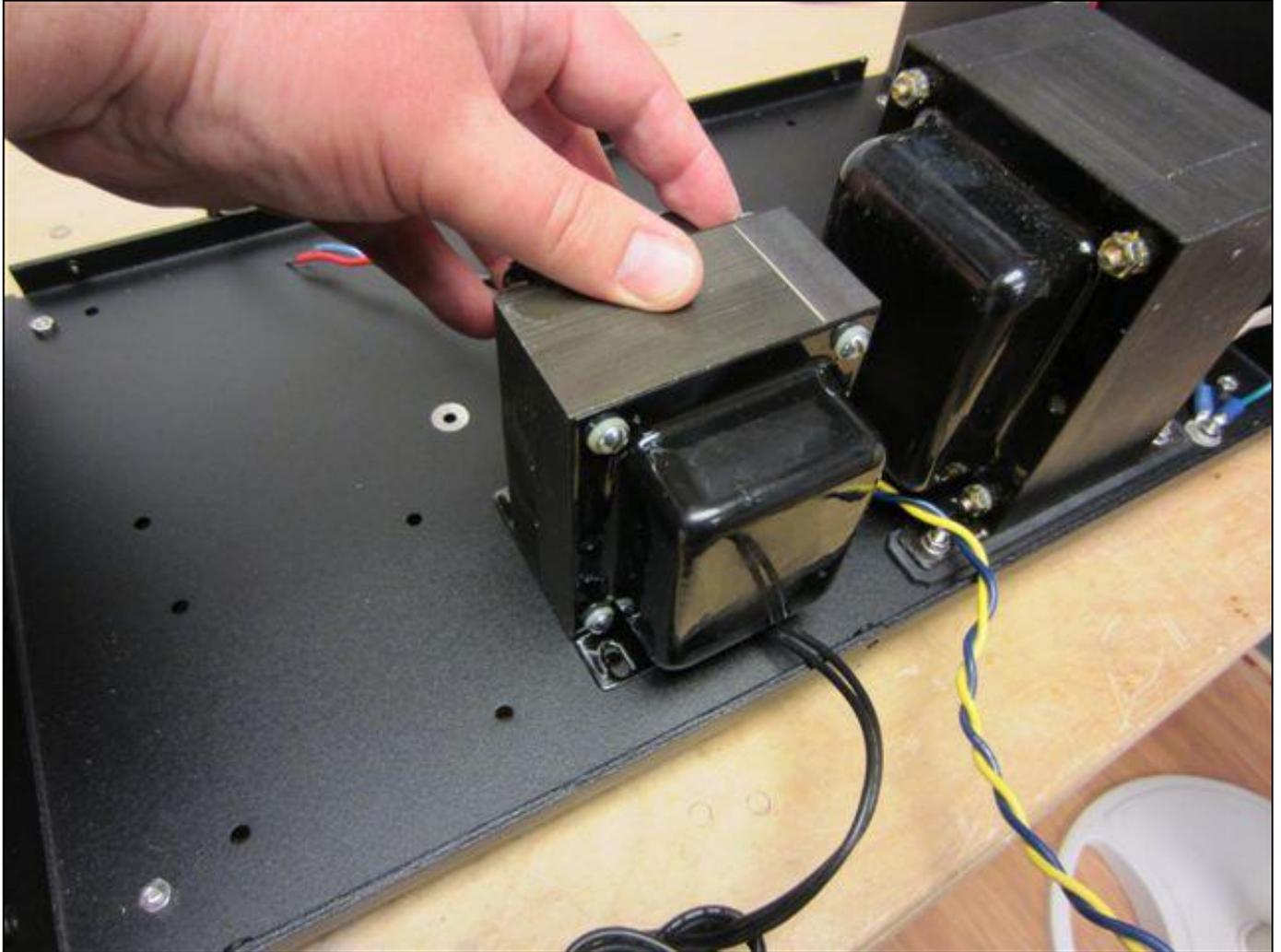
3.1 Overview

In this section we'll install the Choke, which is called the CH-40W. A choke is an inductor that is used to smooth the power supply voltage.



3.2 Installing the Choke

With the Mains installed we now want to install the CHOKE which is called the CH-40W. Position in the chassis as shown below and secure it with 4 x M4 10mm screws.



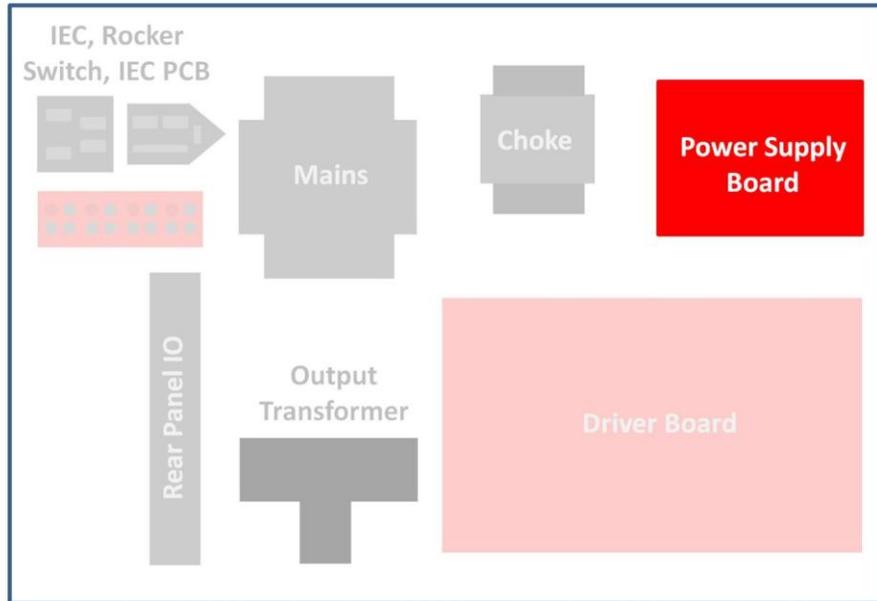
We'll connect the Choke later in the Power Supply section.

Section 4

Power Supply Installation

4.1 Overview

In this section we'll be building the Power Supply board.

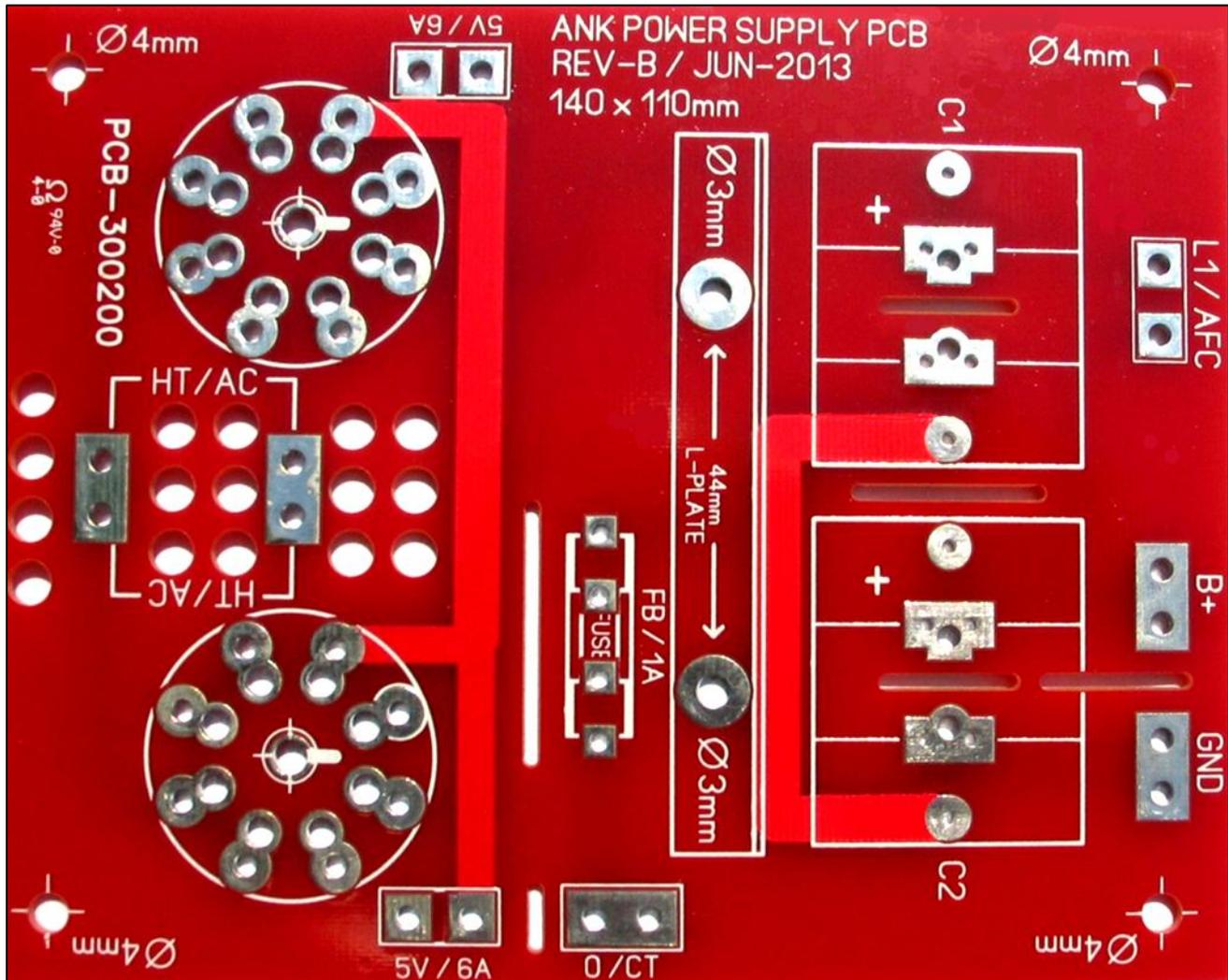


4.2 Parts List

The Power Supply PCB will be populated with the parts from the Power Supply bag.

Quantity	Type	Designator
1	Power Supply PCB	
2	8-pin valve bases	
2	30uf Mundorf polypropylene capacitors	C1, C2
1	2A fuse	FB/1A
2	fuse clips	FB/1A

4.3 Building the Power Supply PCB



- Let's start by installing the 4 standoffs provided and securing them with 4 M4 screws. From the top of the PCB, insert a screw through each of the four holes in the corners of the PCB and attach the standoffs. Hand tighten (do not over tighten, just make it snug.)
- Position and solder the 2 fuse clips.

Next, let's install the valve bases.



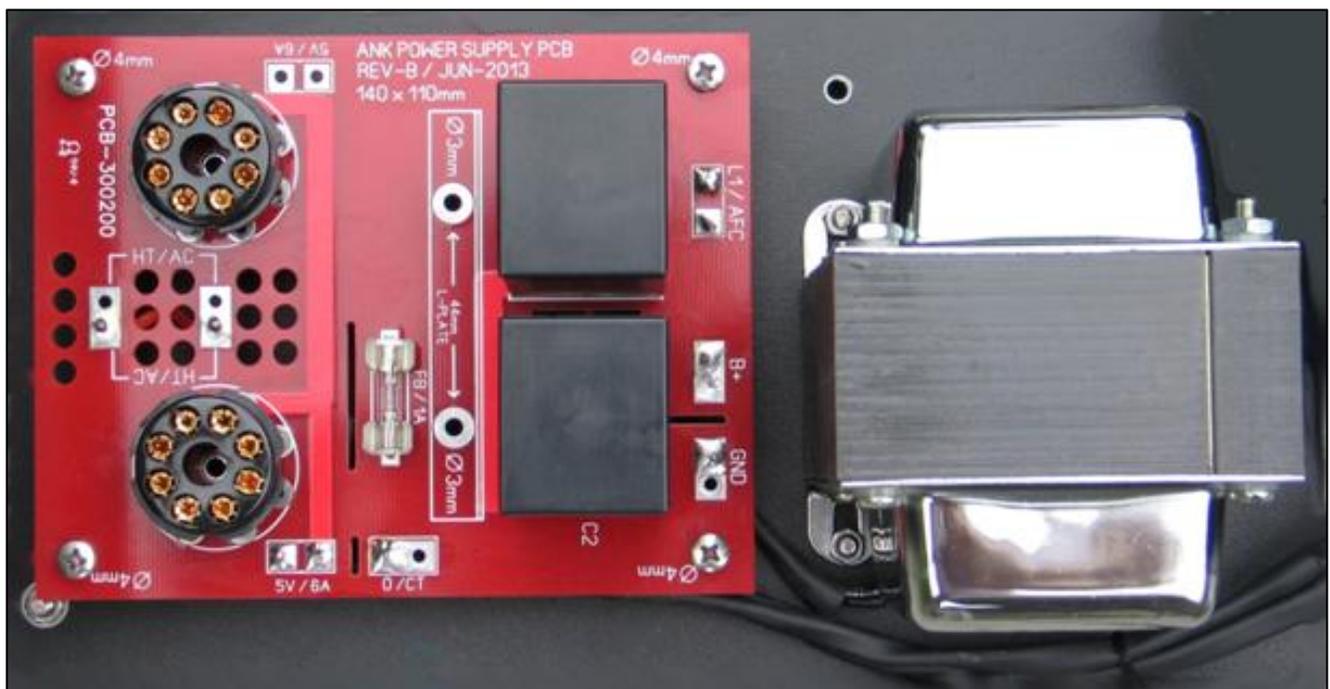
Use some masking tape to secure the valve base to the board prior to soldering. *The key is to make sure the valve base is level:* if your base is soldered on an angle then your tube will lean over! You'll want to solder from the underside of the board. We suggest that you use just a little solder to secure

each pin to the board: perhaps just start with two pins which are opposite to each other to make sure the base stays level — then you can add more solder to the pins. In the end you can fill up the entire valve base hole.

➔ *Be very careful not to let any solder bridge to the next pin as this will cause a short and your Power Supply will need some serious debugging or resuscitation!*

- The 8-pin valve bases are keyed and must be installed in the correct orientation with the notch lined up with the White stripe on the board. Position and install the valve sockets, keeping them level. These require a good bit of heat and solder. Hint: orient your soldering iron tip vertically so that you're heating both the socket pin and the solder lug. When you're done, examine the connections carefully to make sure there are no cold solder joints; resolder if you're in doubt.
- Position the 2 square Mundorf 30uf capacitors with the lettering facing the tube sockets and solder them in place. These capacitors are non polarized so you may safely ignore the + markings on the board: these are polypropylene capacitors and can in fact be installed in either orientation.
- Install one of the supplied fuses at FB/1A.

Great start! You've now completed the Power Supply PCB. Here's a picture of the completed board:

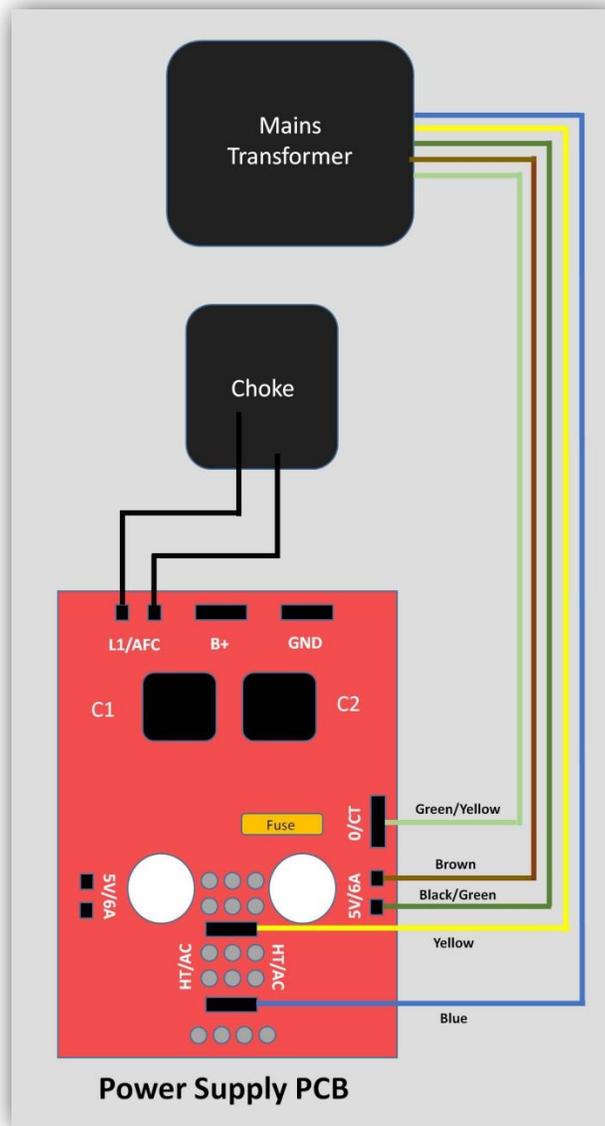


4.4 Initial Power Supply PCB Interwiring

We'll now complete the initial Power Supply PCB Interwiring, particularly the wires coming from the Mains Secondary and the Choke.

You should measure the lengths of all the wires shown in the diagram below to make sure that they are not too long or too short. We recommend an extra 6 cm from what is needed to actually reach where it will connect. Then, if you want to use heatshrink, adjust the heat shrink to what you feel will give you the look you're after, and apply heat.⁴ Finally, strip and tin the ends of the wires.

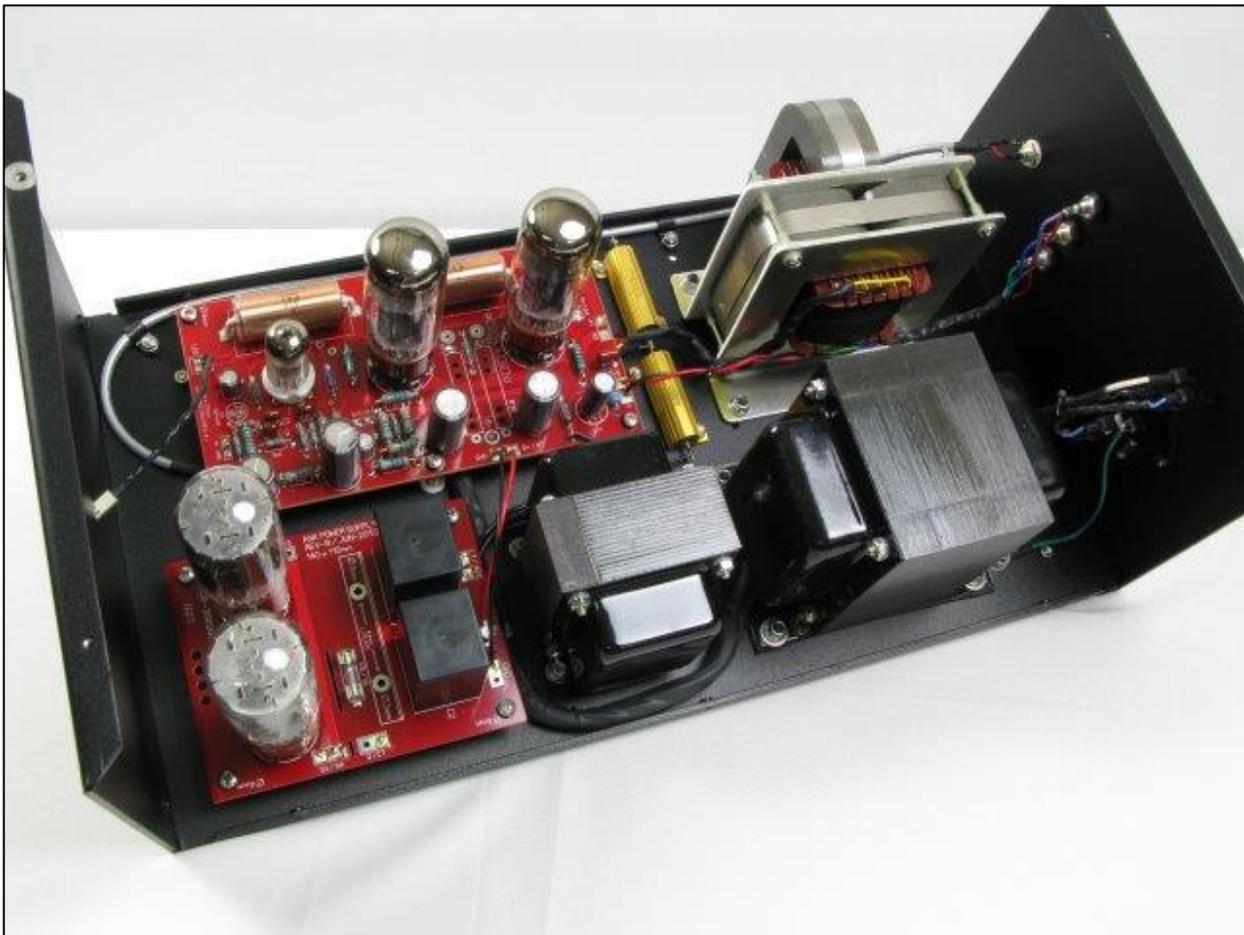
Have a look at the following wiring graphic:



⁴ I recommend a heat gun set at about 500 degrees (F). Morgan Jones' very good advice is to "move the gun continuously around the work to heat it evenly from all sides." He also recommends using aluminum foil to protect other nearby components, especially electrolytic capacitors, from heat damage.

- Take the Blue and Yellow wires from the Mains Secondary, twist them together, and route them along the edge of the chassis (as shown below) and wire them to the locations on the board as shown in the graphic. Orientation does not matter: either wire can go to either location, as its AC.
- Connect the Green/Yellow wire from the Mains Secondary to one of the 0/CT tabs as shown.
- Connect the Brown wire from the Mains Secondary to one of the 5V/6A tabs as shown.
- Connect the Black/Green wire from the Mains Secondary to the other 5V/6A tab as shown.
- Connect the 2 Black wires from the Choke to the L1/AFC tabs as shown; again, orientation does not matter.

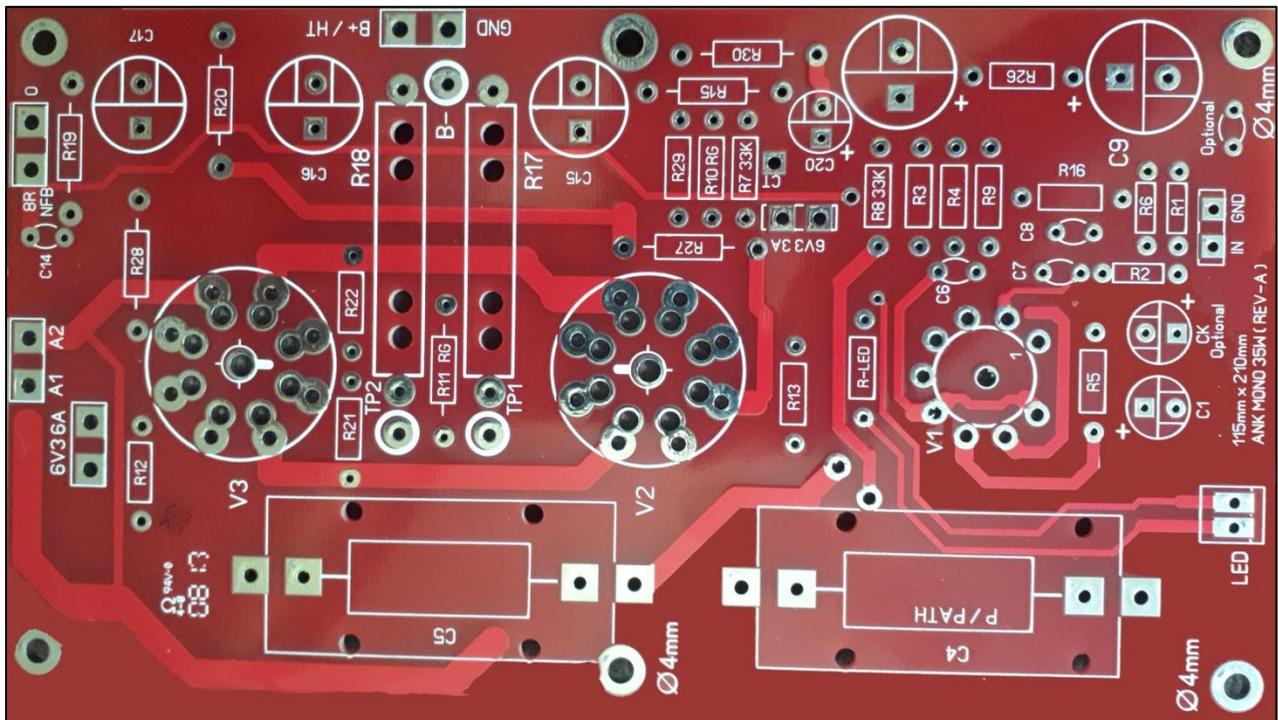
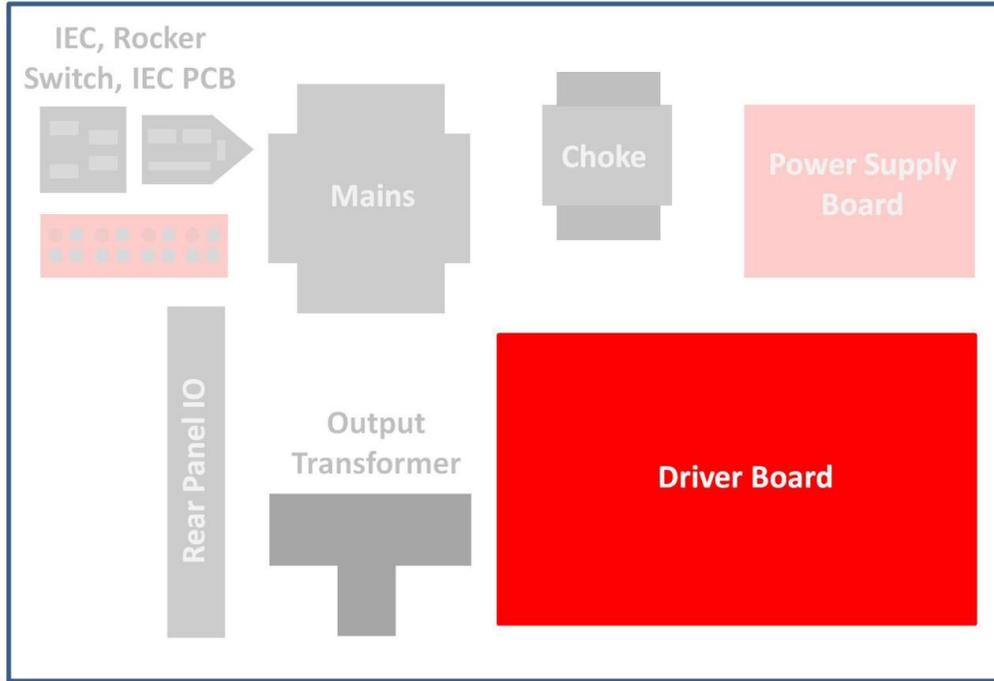
At this point we have the Power Supply section completed and we are going to start the EL34 driver board. The picture below shows the completed board in position:



Section 5

Driver Board Installation

5.1 Overview



5.2 Installing the Valve Bases

- The first step is to install the 6 standoffs for the board itself. Don't attach the PCB to the chassis yet; we have a lot of work to do before that!
- Using the tips in the Power Supply section regarding making sure that the valve bases are level, solder the 9-pin valve base to the board at V1.
- Similarly, solder the two 8-pin CMC valve bases to the board at V2 and V3. Be sure to line up the key with the notch on the PCB.

5.3 Installing the Resistors

Parts List⁵

Quantity	Designation	Value	Wattage
1	R1	470K	1/2W
1	R2	10K	1/2W
1	R3	330K	1/2W
1	R4	100k	1/2W
1	R5	470r	1/2W
1	R6	100r	1/2W
1	R7	33K	1W
1	R8	33K	1W
1	R9	22K	1/2W
1	R10RG	270k	1/2W
1	R11RG	270k	1/2W
1	R12	10K	1/2W
1	R13	10K	1/2W
1	R15	3K9	1W
1	R16	1K8	1/2W
1	R17	390R	10W
1	R18	390R	10W
1	R19	10R 3W	3W
1	R20	470R 3W	3W
1	R26	47K 1W	1W
2	R27, R28	220R 1W	1W
1	R29	330K 2W	2W
1	R30	47K 2W	2W
1	R-LED	1K	1/2W

⁵ R21 and R22 are not filled.

A quick lesson about resistors:

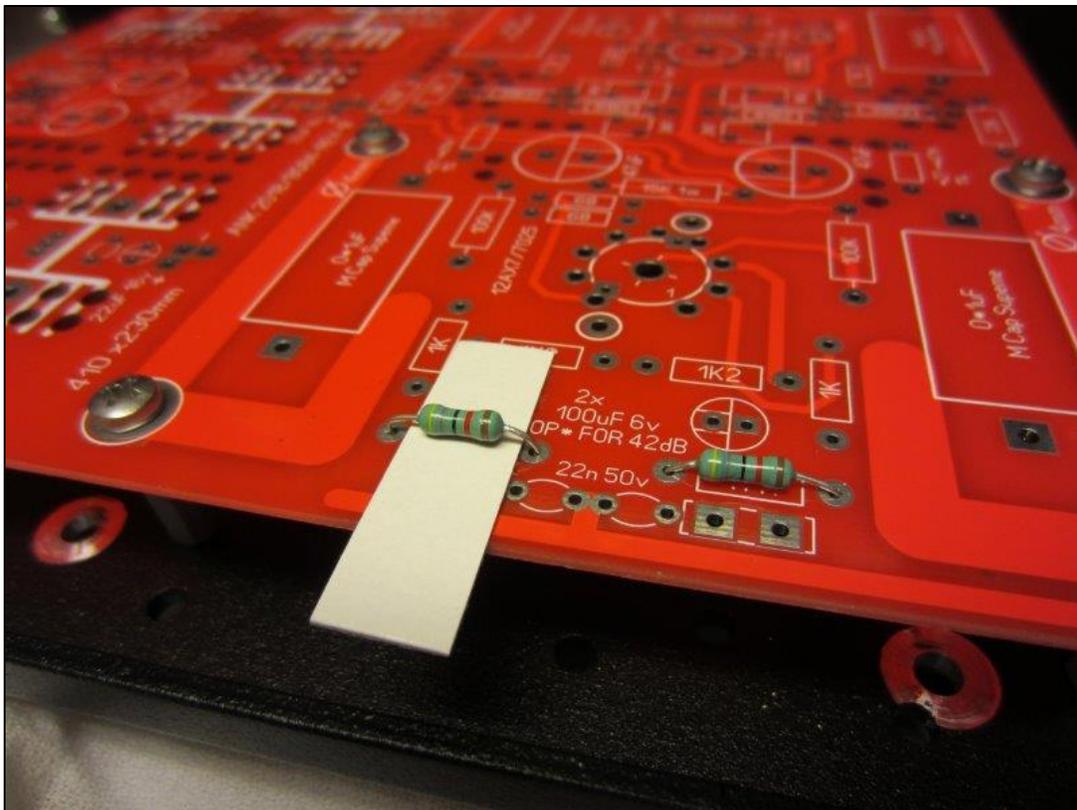
- ❖ A resistor that reads 100R means that it is 100 ohms; the 'R' stands for resistance
- ❖ A resistor that reads 2K7 means it is 2700 ohms ; the 'R' is assumed and the K (which stands for Kilo or 1000) is positioned like the decimal place, so it's like reading 2.7K ohms (K = multiplied by 1000) — but it's shortened to 2K7
- ❖ Another example like this is the 1M resistor, which is 1 Mega ohms

Use an ohmmeter to measure each resistor to verify its correct value. There's a resistor calculator chart on the audionotekits.com website and we've included a chart in Appendix A.1.



It's a good idea to orient your resistors so that the color codes can be read from left to right; it makes it easier to spot any issues.

It's also a good idea to not have the resistors installed right against the board, for a couple of reasons: 1) it's better for heat disposition, and 2) in some cases there are circuit traces running under the resistors and we really don't want resistors touching them. So, as shown below (on a board from a different kit), we use a narrow piece of cardboard cut to size as a 2–3 mm spacer: this will still let you solder while ensuring that the resistor is not pressing against the board.



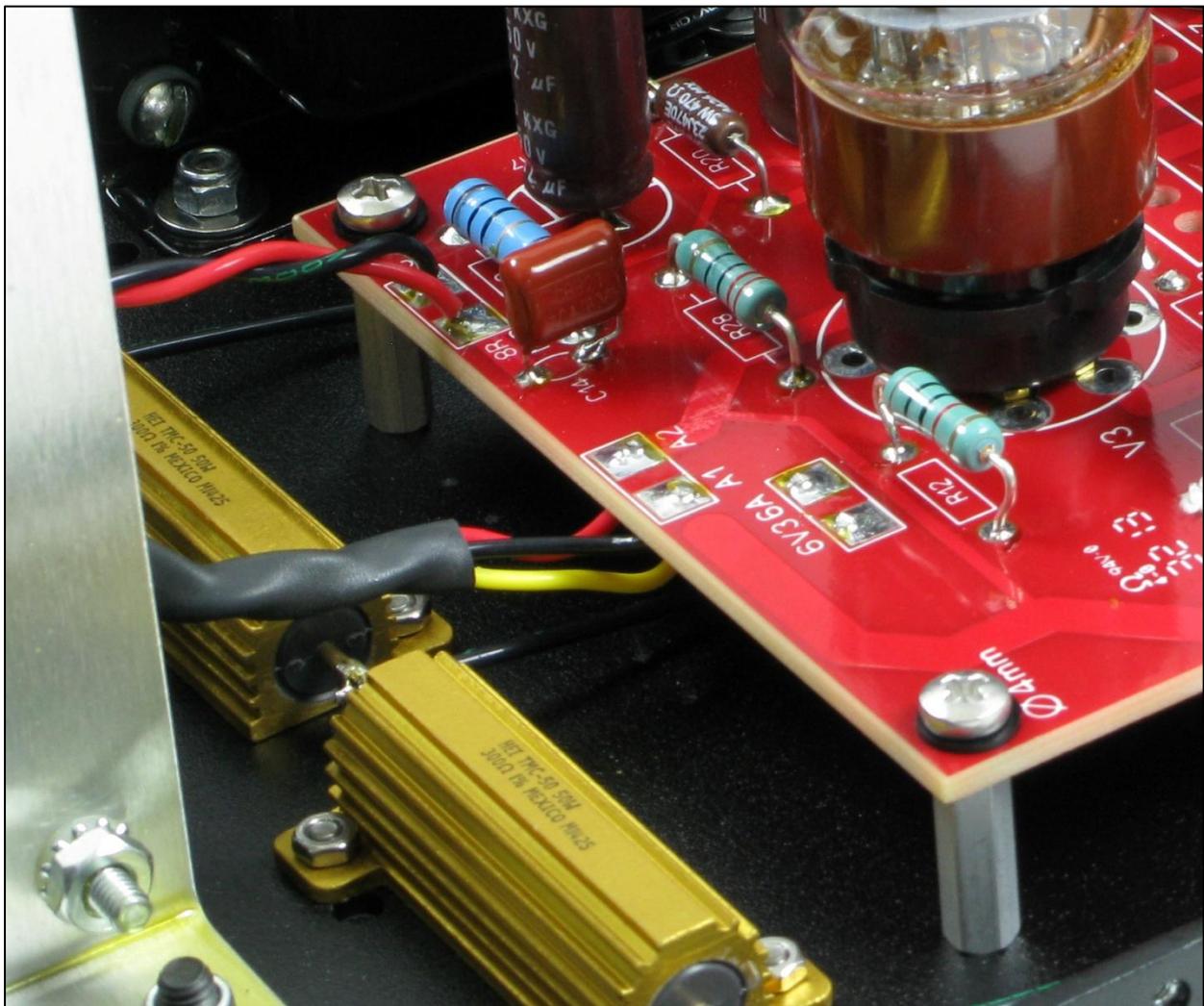
Also, be sure to solder on the underside of the board and check that you have nice little “volcanoes” on each solder joint. And, when you go to clip a lead be sure to clip above the volcano so that you don’t slice off this nice joint.

- Populate the Driver board with the resistors, first checking the value and then installing them into the correct designation (R1, R2, etc. as shown on the board). Then bend the legs *slightly* once they are in the board to secure them; this way they won’t fall out and you can check your work again prior to soldering. Once all the resistors are in and you feel confident then you can start soldering from the underside of the board.

Once the resistors are soldered into position clip the leads.

5.3.1 Installing the Chassis Mounted Resistors

- Using the hardware, install the 2 Gold 300R 50W chassis mounted resistors as shown in the picture below.



5.4 Installing the Capacitors

Next we'll install the capacitors.⁶

Electrolytic Capacitors

Quantity	Designation	Type
1	C1, C20	10uf 160V
1	C3 ⁷	100uf 450V, tall, thin style
1	C9	33uf 350V
2	C15, C16	220uf 100V
1	C17	22uf 450V

We'll start with the electrolytic capacitors. These are the type of capacitors like, for example, the 10uf 160V capacitors at C1 and C20, which have a stripe down one side. You'll remember from the Introduction to the manual that the stripe denotes the NEGATIVE side. On the board you'll see a + sign which denotes the POSITIVE side. Be sure to align the capacitors correctly into position.

- Install the electrolytic capacitors at the designated positions, taking great care with their orientation.

Non-Polarized Capacitors

Quantity	Designation	Type
1	C6, C8	100pf Silver Mica
1	C7	220pf Silver Mica
1	C14	.1uf 630V Mylar
2	C4, C5	.22uf 630V AN ⁸ Copper Film Capacitors

- Install the non-polarized capacitors at C6, C7, C8, C14, C4, and C5. Their orientation does not matter.
- Install the two .22uf 630V AN Copper Film capacitors at C4 and C5. Film capacitors do not have a specific orientation: they can be installed in either direction. Some audiophiles believe that the best performance is achieved if the outer foil of a capacitor is connected to the lowest impedance, usually the signal source, though there's debate among DIYers about this. We've chosen to install them as you see in the picture below; again, you can choose to do it differently if you'd like.

⁶ There are 2 capacitors on the board marked Optional (1 is marked 'CK', the other unmarked). These will not be filled; they were used in the development of the amplifier.

⁷ C3 is unmarked on the PCB. It's adjacent to C20.

⁸ We supply the kit with AN Copper Film capacitors by default. If they're not available, we will use suitable equivalents, such as V-Caps. Some pictures show the Driver board with V-Caps installed.

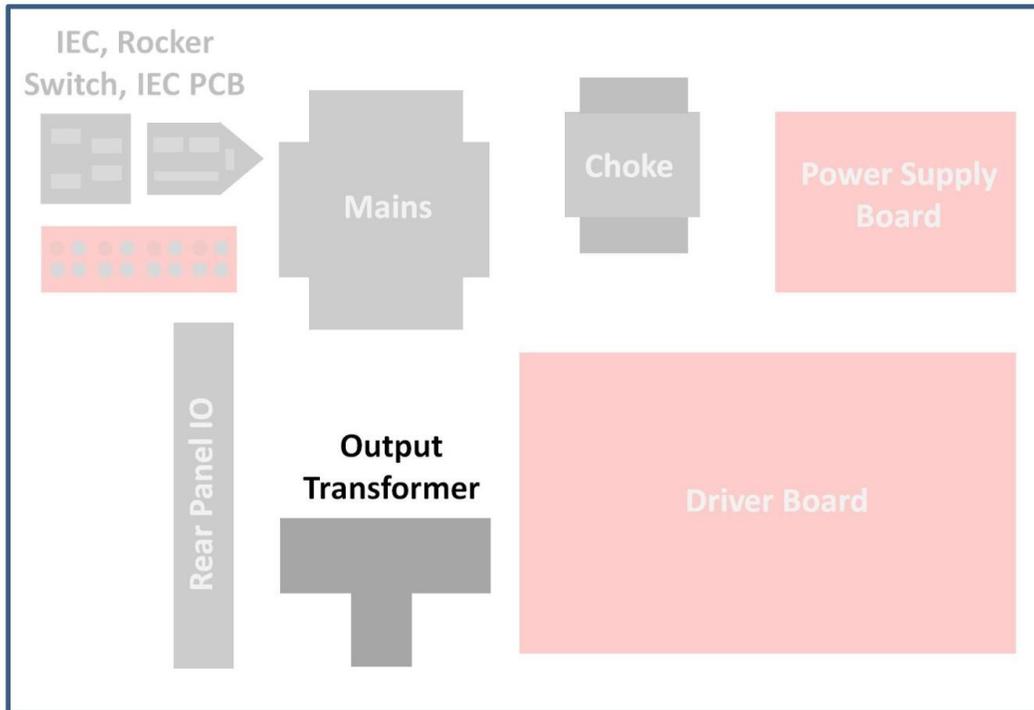


Completed Driver board

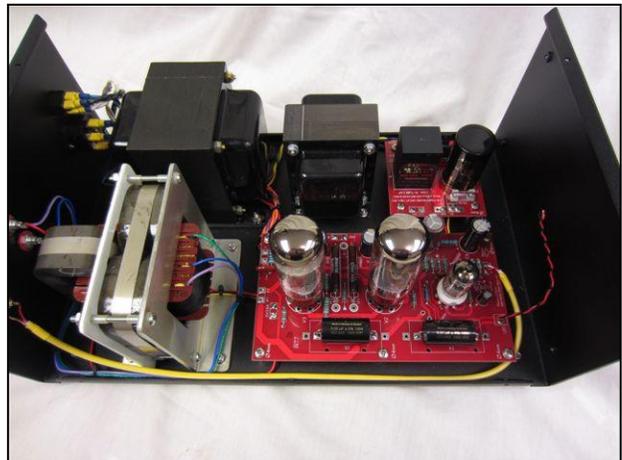
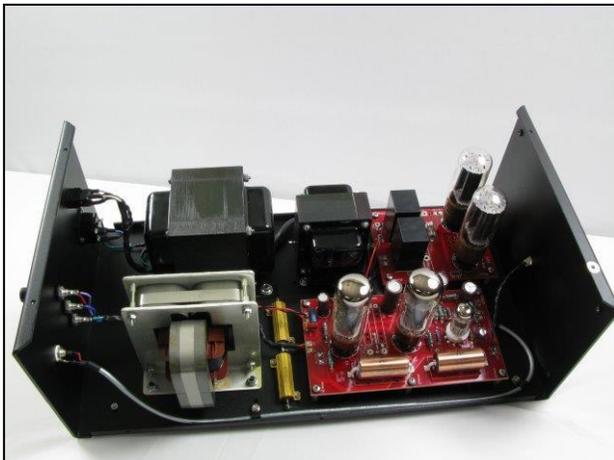
Section 6

Output Transformer Installation

6.1 Overview



- Using the hardware in the C-Core Transformer bag, position and install the output transformer, oriented, as you please, in one of the two ways shown in the pictures below. The chassis is drilled for the orientation in the picture on the left. but if you want to turn it the other way and drill the necessary holes, that's fine too. There is no sonic difference.



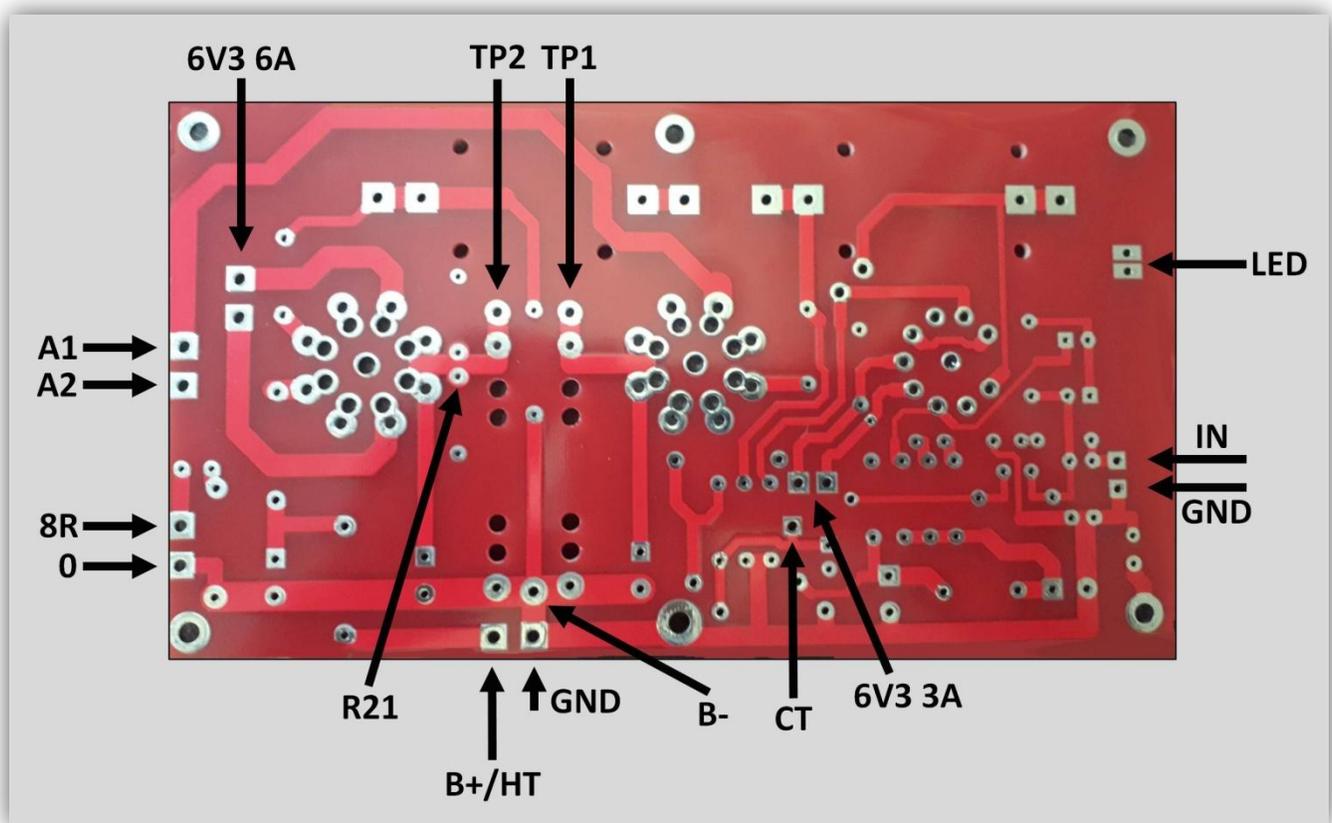
Section 7

Interwiring

You've certainly accomplished a great deal to get to this point!

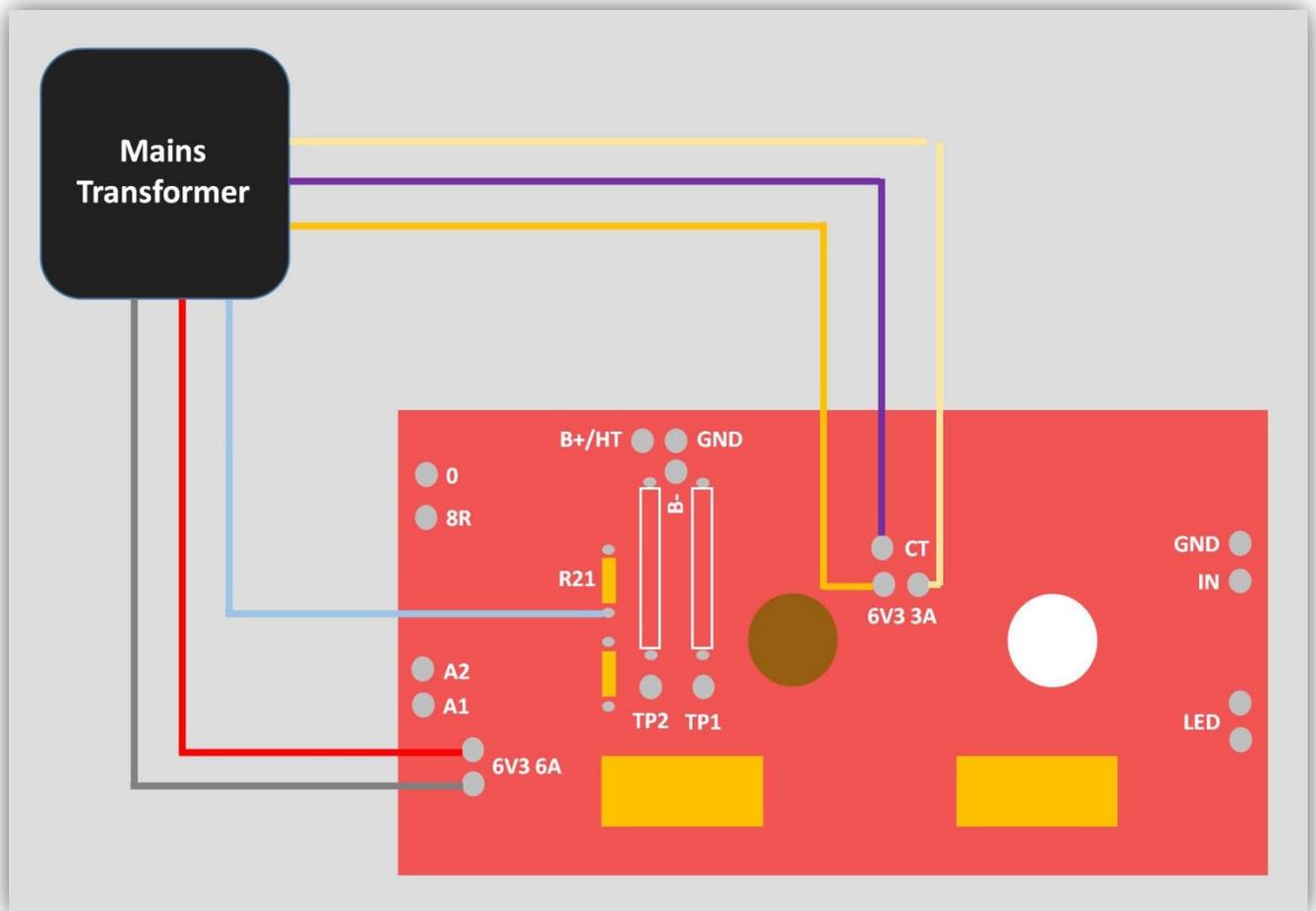
Now, we'll tackle the interwiring: here's where we make the connections from the Mains transformer Secondary and the Power Supply PCB to the Driver PCB — and from the Driver PCB to the chassis mounted resistors, the output transformer, the RCA jack, and the speaker posts. It's complicated, so go slowly and take breaks as needed.

In as much as much of this wiring will be done from the underside of the Driver board, use the following graphic as a reference throughout this section:



7.1 Wiring the Filament Wires from the Mains Transformer

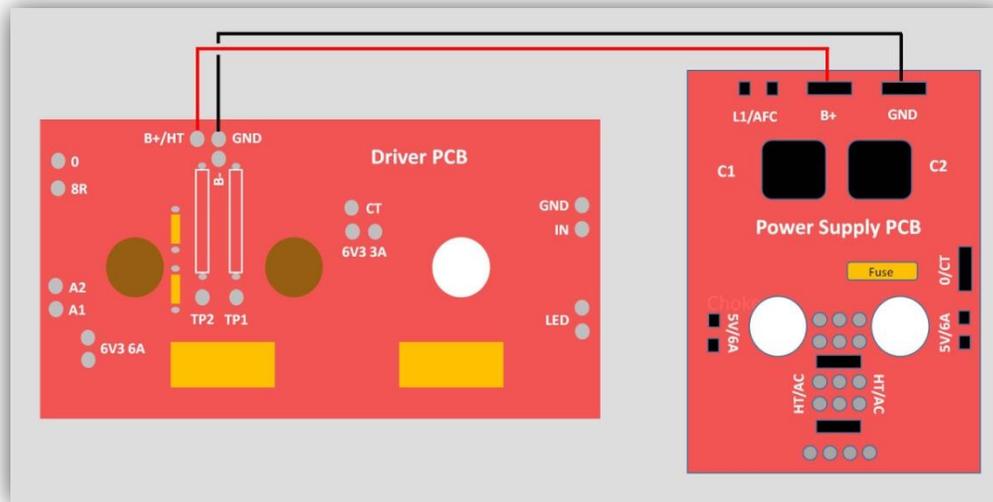
Have a look at the following graphic:



- Connect the Grey and Red wires from the Mains transformer Secondary to the 6V3 6A solder tabs on the Driver board. Connect the Blue-White wire to the CT solder tab. These are the EL34 filament wires; the orientation does not matter. Route the wires under the board, through the holes from the underside, solder on top, and cut off the excess wire.
- Connect the Orange and Orange-White wires from the Mains transformer Secondary to the 6V3 3A solder tabs on the Driver board. Connect the Violet wire to the CT solder tab. These are the ECF80 filament wires; the orientation does not matter. Again, route the wires under the board and solder on top.

7.2 Wiring the HT Wires from the Power Supply PCB

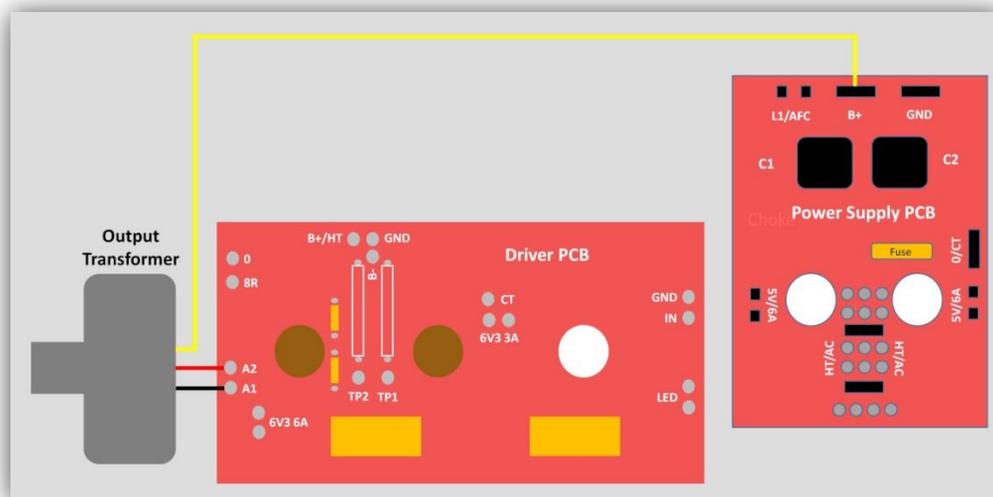
Let's look at how the HT is wired from the Power Supply board to the Driver board:



- Connect a Red wire from B+ on the Power Supply board to B+/HT on the Driver board, as shown.
- Connect a Black wire from GND on the Power Supply board to GND on the Driver board, as shown.

7.3 Wiring the Output Transformer Primary

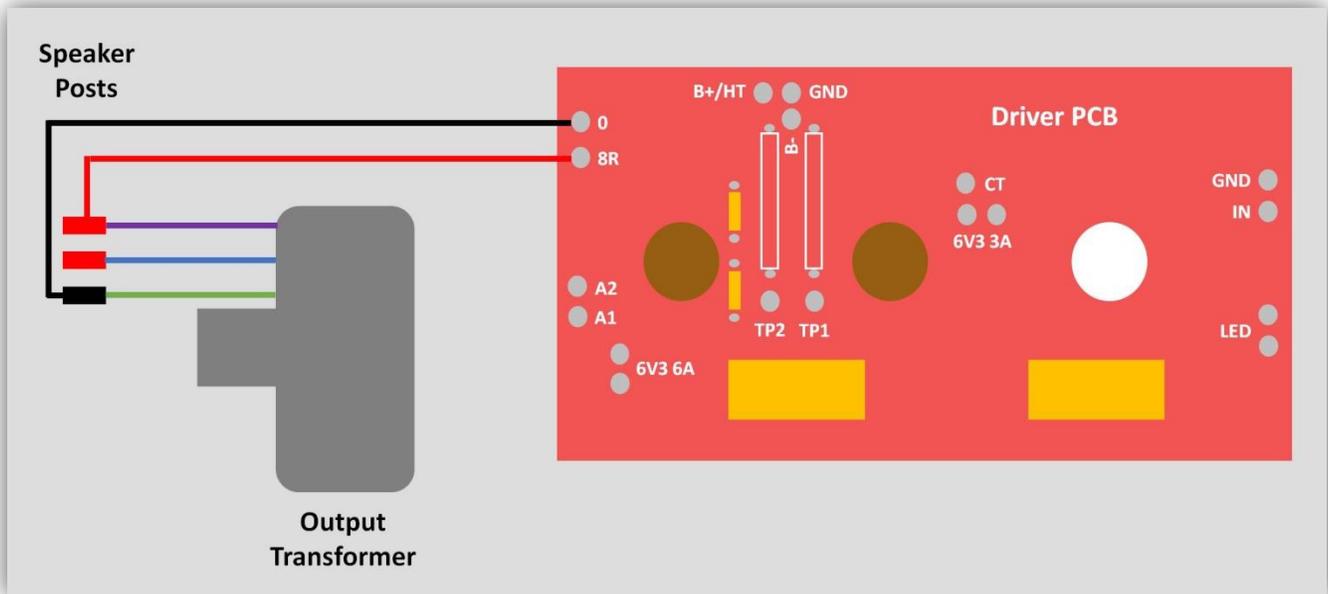
On the Primary of the output transformer are three wires: Red, Black, and Yellow. Using the following graphic:



- Connect the Yellow output transformer Primary wire to B+ on the Power Supply board, as shown.
- Connect the Black output transformer Primary wire to A1 on the Driver board, as shown.
- Connect the Red output transformer Primary wire to A2 on the Driver board, as shown.

7.4 Wiring the Output Transformer Secondary and Speaker Posts

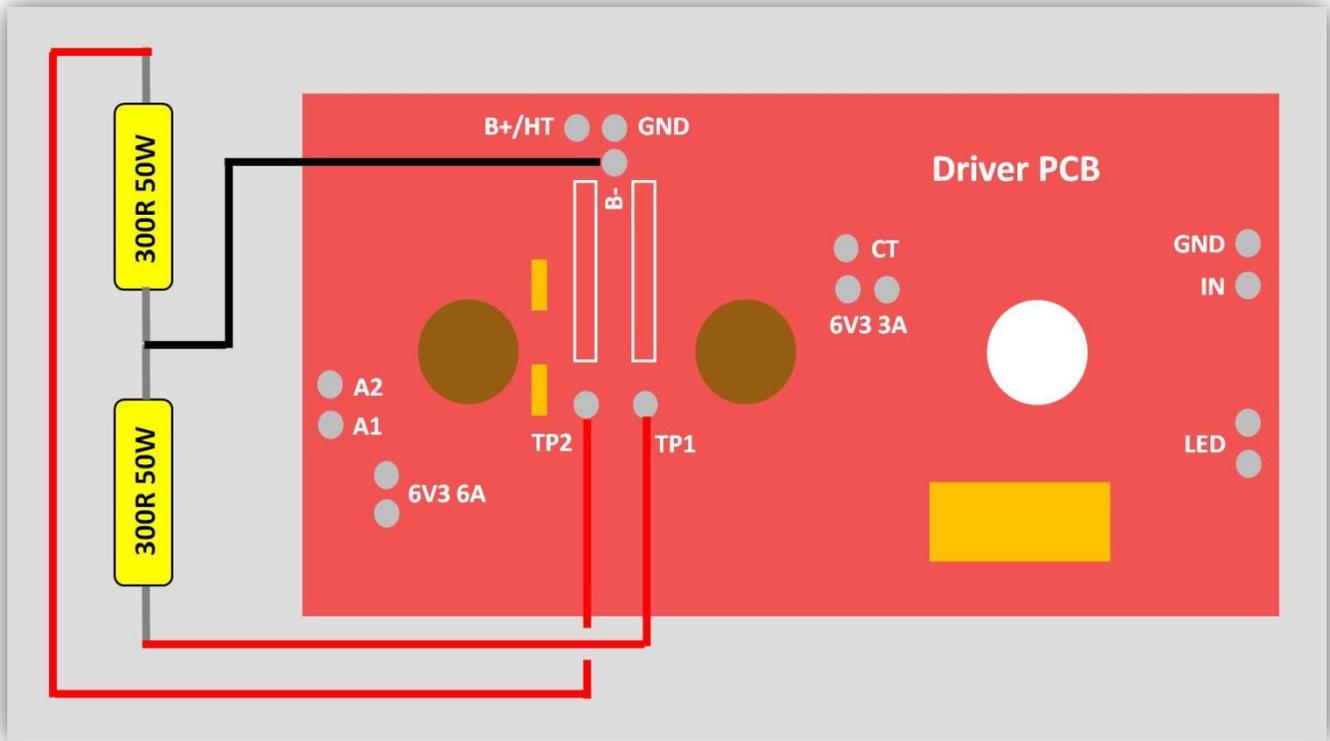
The output transformer Secondary has three wires: Green, Blue, and Purple. Have a look at the following graphic:



- Twist together the Purple output transformer Secondary wire and one end of a Red wire — and connect them to the top Red speaker post, as shown.
- Connect the other end of the Red wire to '8R' on the Driver board, as shown.
- Connect the Blue output transformer Secondary wire to the middle Red speaker post, as shown.
- Twist together the Green output transformer Secondary wire and one end of a Black wire — and connect them to the Black speaker post, as shown.
- Connect the other end of the Black wire to '0' on the Driver board, as shown.

7.5 Wiring the Chassis Mounted Resistors

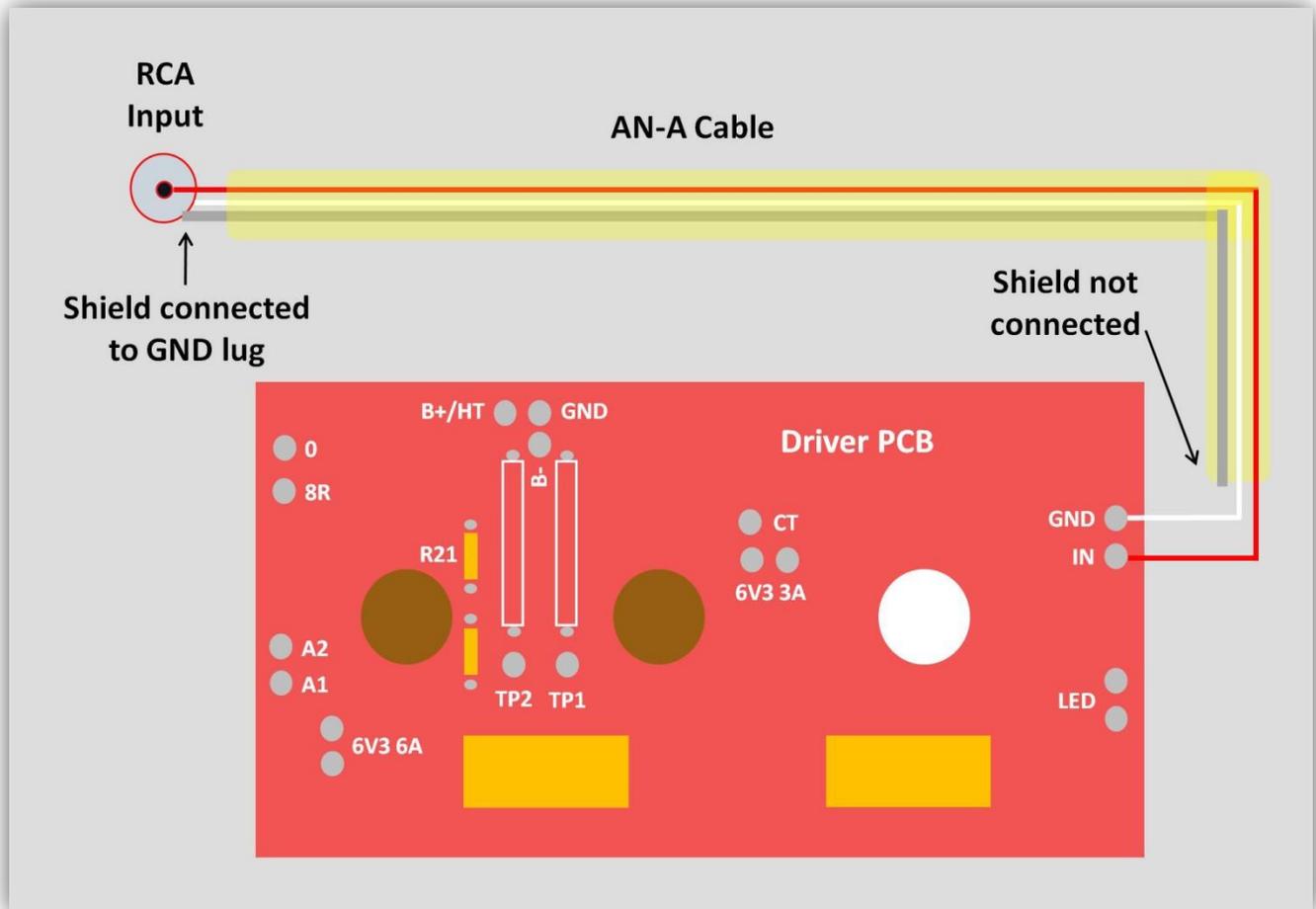
Now we'll wire up the two large Gold 300R 50W chassis mounted resistors.



- Connect a Red wire between TP1 on the Driver board and the lower lead on one of the 300R resistors, as shown.
- Connect a Red wire between TP2 on the Driver board and the upper lead on the other 300R resistor, as shown.
- Connect a Black wire between B- on the Driver board and the middle of the two leads (to both, actually) of the 300R resistors, as shown.

7.6 Wiring the RCA Jack

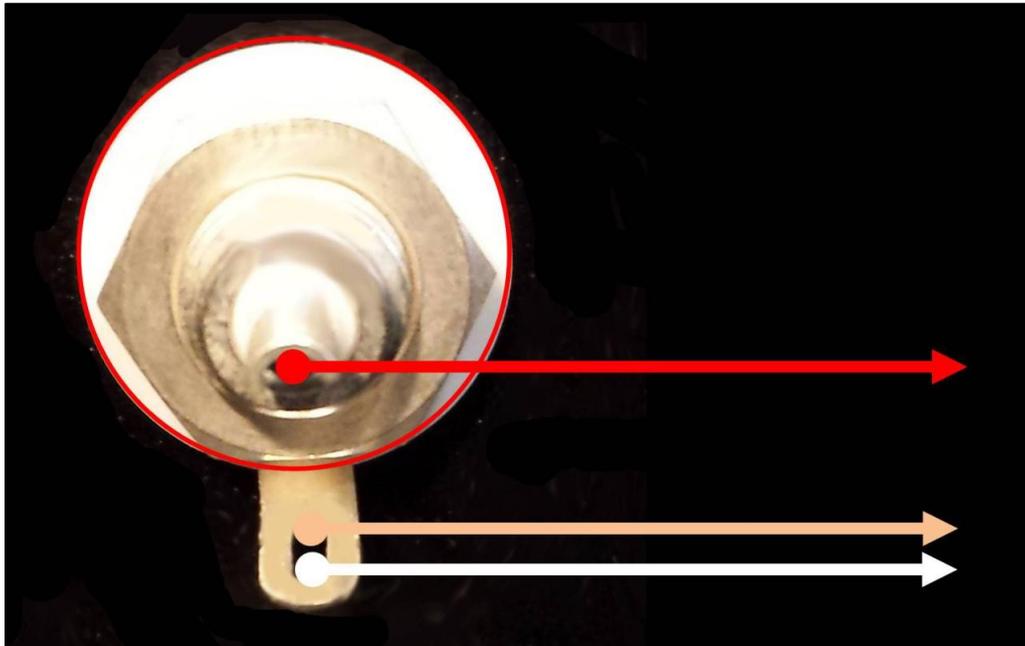
The final interwiring connections involve connecting the prepared Yellow AN-A shielded cable from the RCA jack to the IN and GND solder tabs on the Driver board. Here's the plan:



At the RCA jack:

- Tin the AN-A Red (Signal) lead.
- Twist the AN-A White (Ground) lead and shield together and tin them.
- Put a puddle of solder in the center of the RCA jack.
- Heat the solder puddle and slide the Red tinned lead into the center of it.
- Heat the tinned White/Shield lead as it makes contact with the ground tab on the RCA; it will usually adhere immediately.

Here's a close-up of the RCA connections:



On the Driver PCB:

- Tin the AN-A Red (Signal) and White (Ground) leads.
- Neatly cut off the shield. It isn't connected at this end.
- Connect the Red (Signal) wire to IN.
- Connect the White (Ground) wire to GND.

7.7 Wiring the LED

- Connect the two LED wires to the LED solder lugs near C4, on the right side of the board. The LED uses AC, so it can be installed in either orientation.

7.8 Final Step

- Secure the Driver board in the chassis with 6 M4 screws, from the underside.

And here we are, all wired up!



Another cup perhaps?



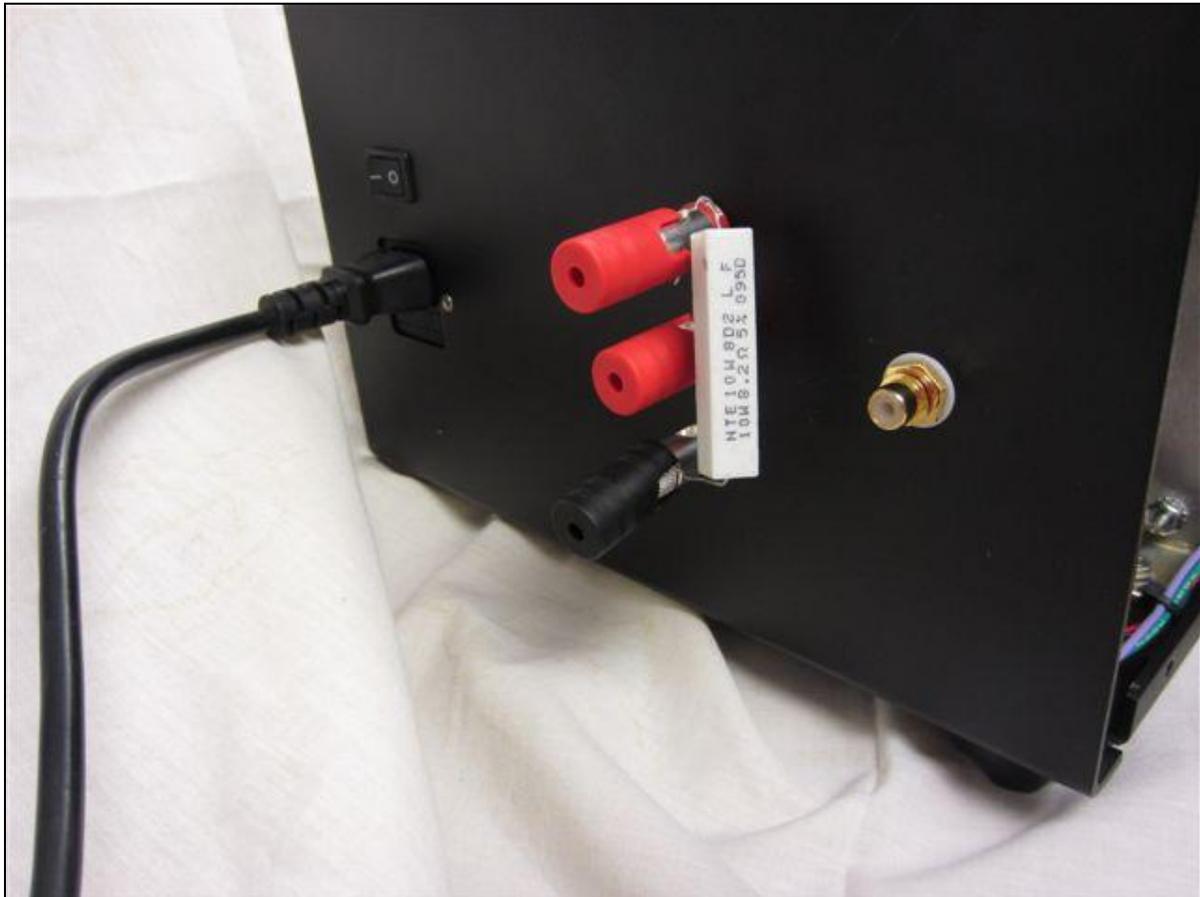
Before we go to the next section, where we're going to power on the amplifier and do some voltage checks, it's a really good idea to check over your work, particularly this last section, the interwiring.

Section 8

Turn-on Procedure and Testing

8.1 Turn-on

- Install a fuse into the fuse drawer in the IEC drawer. You can use the 2A fuse supplied (Slo-Blo).
- Install the 2 5U4G rectifier tubes on the Power Supply board.
- Install the ECF80 tube on the Driver board.
- Take the dummy load that is supplied (this is basically an 8 ohm 10W resistor) and connect it to the 0 and 8 ohm speakers posts as shown below.

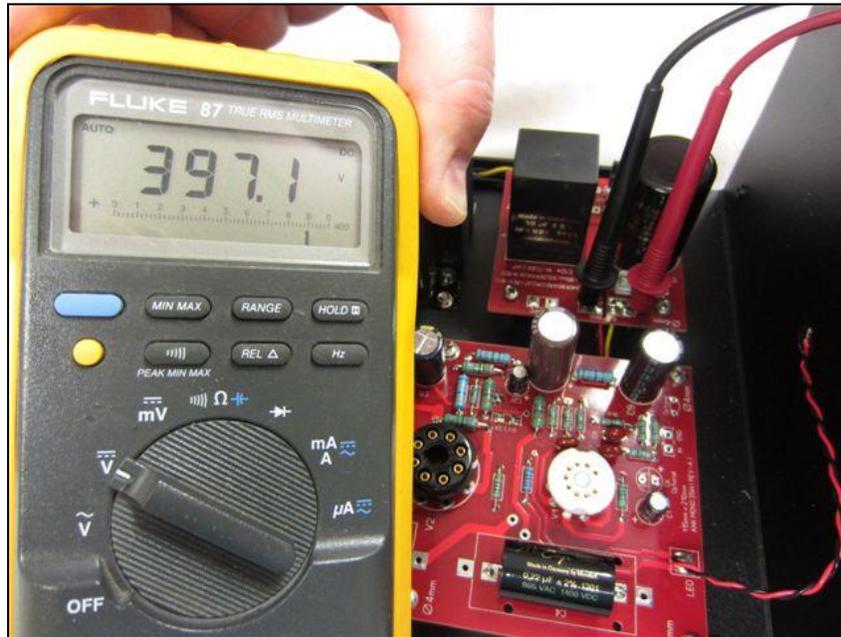


- Turn the unit on via the Rocker Switch on the back of the chassis.

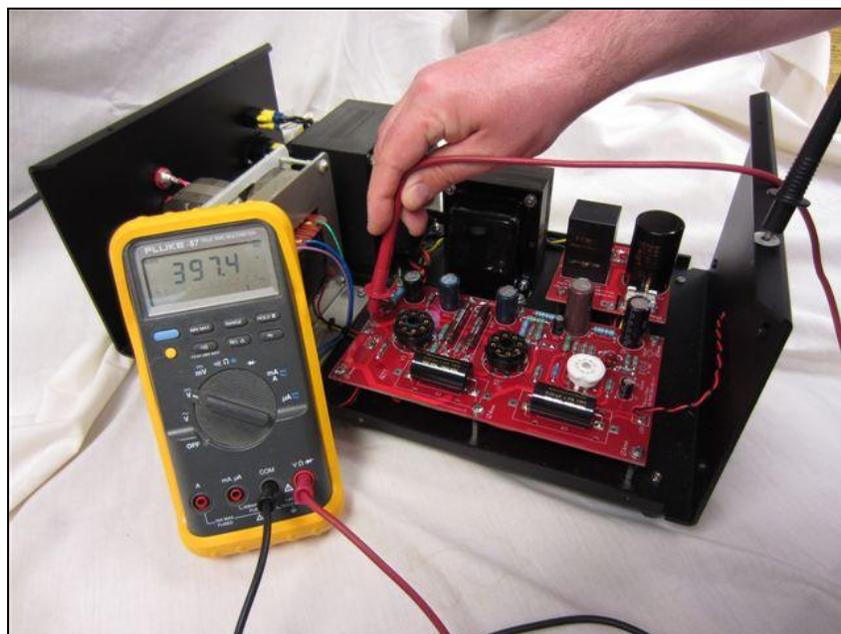
8.2 Measuring the HT Voltage

Now, with the power on, a good first test is to measure the HT (high voltage DC).

- On the Power Supply board, measure the HT by using the Red probe on the B+ and the Black probe on GND. You should get a reading in the 400V DC range, as shown below.

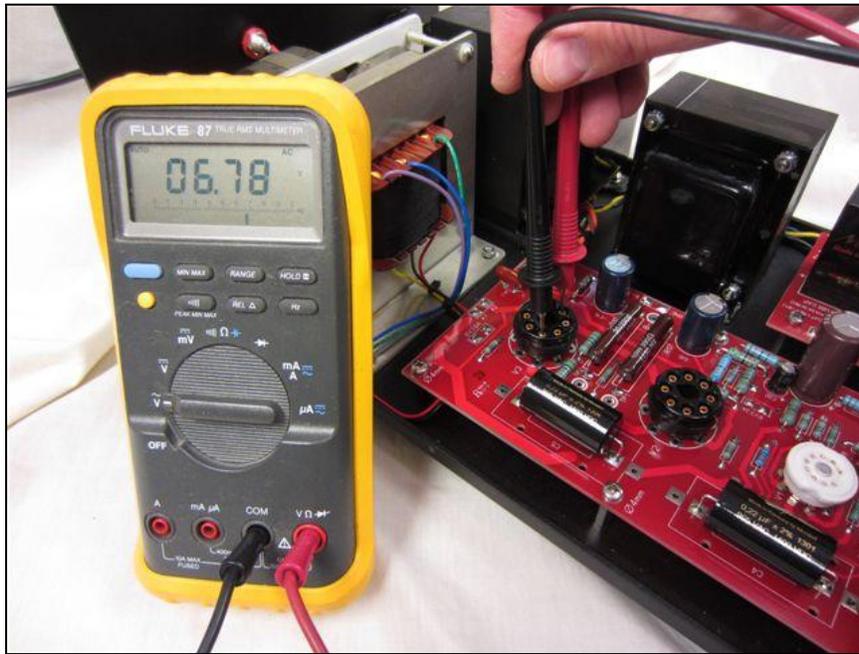


- Next, do a check of the HT on the Driver board (again using B+ and GND; you can use an unpainted area on the chassis as GND). Again, you should get a reading in the 400V DC range, as shown below.



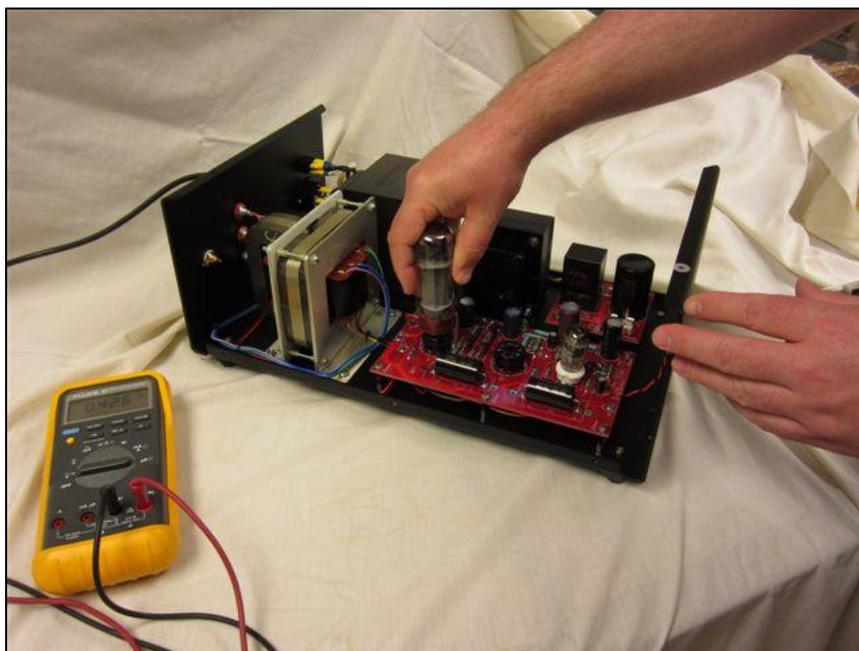
8.3 Measuring the Filament Voltages

- Next, we'll check the AC filament voltages that go to the EL34 tubes. Put your meter on AC and measure between pins 2 and 7, as shown. You should see around 6.7 volts. This is a "loaded" value; once the tube is in, it will settle down to about 6.3V AC.

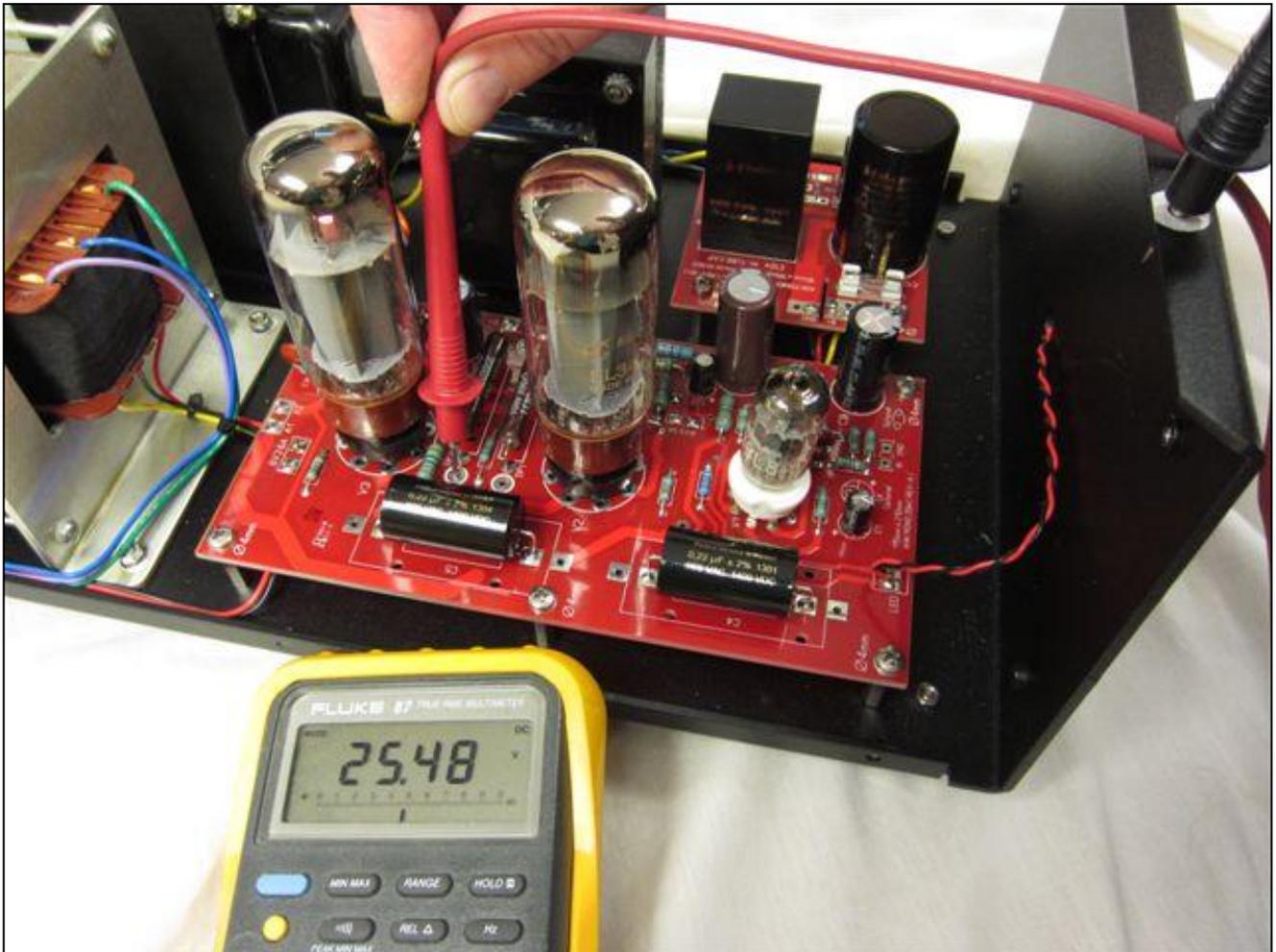


8.4 Measuring the CATHODE Voltages

- Power off the unit and install the EL34 tubes.



- Power the unit on, put your meter on DC, and measure the two test points, TP1 and TP2, to GND. These are the CATHODES of the EL34s and, if you get a voltage here in the 22V DC range (the 25.48V DC in the picture below is fine!), you can be confident that the amplifier is 99% working.



If all these voltage checks are good you can try hooking up a set of speakers to test for sound or music. (You may want to use some inexpensive speakers for this, just in case.) Check for any hum or noise. FYI, the amplifier likes a good ½ hour of warm up.

If you have any issues at this point that you can't resolve, please feel free to call us at (613) 822-7188 or contact us via email at audionotekits@rogers.com.

Section 9

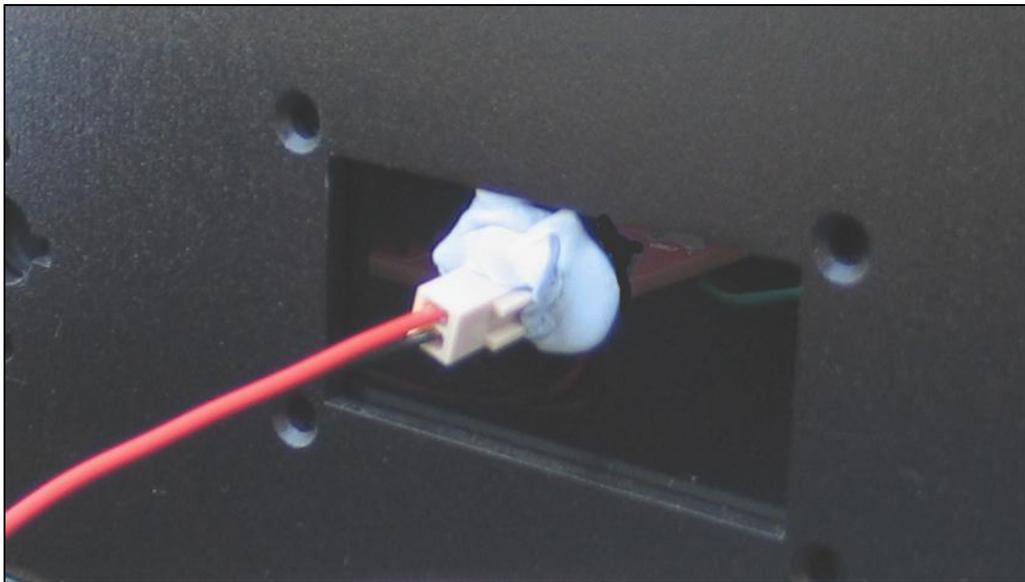
Finishing Touches

9.1 Installing the Front Faceplate

- Remove the protective films from the front and back of the front faceplate.
- Install the front faceplate using four Black M4 CSK flat head screws.

9.2 Installing the LED

- Carefully trim the LED leads so that they are not exposed.
- Glue or attach (with some Blu Tack) the LED holder to the front panel so that the LED protrudes through the designated hole, as shown below:



9.3 Installing the Chassis Top

- Install the chassis top using the provided hardware.

Section 10

Final Thoughts

10.1 Congratulations

If you've made it to this point then CONGRATULATIONS! — you are ready to insert your amplifier into your system and enjoy it.



10.2 Cables

In our experience, a high quality power cable and good interconnects should make a noticeable improvement to the sound.

10.3 Tube Rolling

10.3.1 ECF80

We feel that the sound of the ANK Audio Kits EL34 Triple C-Core Monoblock – "The Artiste" is truly sublime. It provides a highly detailed and transparent presentation with gorgeous sonics. Rolling some quality new production tubes and/or some nice NOS tubes in the ECF80, EL34, and 5U4G positions will allow you to tailor the sound to your particular preferences. The ECF80 triode/pentode can be substituted by readily available NOS 6BL8; our experience with 7643 tubes has been mixed, so we are not recommending them.

10.3.2 EL34/6CA7

There are many NOS and new production EL34/6CA7 types available, many at reasonable prices. There are also still some legendary NOS tubes available, but the prices can be other worldly.

10.3.3 5U4G

There are still NOS 5U4G rectifiers available, albeit mostly quite expensive. There are also a number of fine new production replicas. The use of dual rectifiers in parallel in the Power Supply reduces sag and increases current capacity. In a way, it's like turning on two taps in a sink! Along those lines it's worth mentioning that the unit will run just fine with only one rectifier installed (in either tube socket) and that it isn't necessary to have matched tubes or even tubes from the same manufacturer.

There are a number of 5V rectifier tubes (both NOS and new production) and a wealth of free advice on various websites. *Do not substitute any other 5V rectifier for the 5U4G type for which this amplifier was designed.* There are some significant differences between the 5U4G and other 5V rectifiers, particularly with respect to voltage drop and current specifications, and the result of a substitution is unpredictable and could possibly damage your amplifier. As to whether to invest, for example, in very expensive Mullard, Amperex or other NOS tubes, I'll leave that to you.

10.4 Thanks

Thank you for investing in the ANK Audio Kits EL34 Triple C-Core Monoblock – "The Artiste" and congratulations on working your way through the build. Please email us at audionotekits@rogers.com and let us know how everything went: were there any errors in the manual or instructions, parts lists, etc.? Your ideas regarding greater clarity or tweaks will also be truly appreciated.

If you have some suggestions that you feel would help other kit builders please also let us know. We can put them on a support page for other users. We'd also like to see some great pictures of your build process or your final build. We can post them on our website or on our Facebook page. And we'd love a review from you regarding the sound.

We hope the unit brings you many years of joy and we look forward to hearing from you.

Appendix

Resistor Color Codes (5 band)

	Black	- 0
	Brown	- 1
	Red	- 2
	Orange	- 3
	Yellow	- 4
	Green	- 5
	Blue	- 6
	Violet	- 7
	Grey	- 8
	White	- 9

Resistor color codes are read from the color that is nearest the edge of the resistor - that is treated as the first column.

The first column of a 5-band resistor is the 100's column, followed by a 10's column, followed by a units column.

The fourth band is a multiplier (or decimal point shifter). The multiplier can use the additional colors silver and gold. These are used for very small values and turn the multiplier into 0.01(silver) and 0.1 (gold). For the standard colors, it determines how many times the column value is shifted to the left (i.e. multiplied by 10)

The fifth column is a tolerance value. These can be quite complex but we will not concern ourselves with these.

Examples

100R				
	1	0	0	x 1
680R				
	6	8	0	x 1
820R				
	8	2	0	x 1
1K				
	1	0	0	x 10
2K2				
	2	2	0	x 10
2K7				
	2	7	0	x 10
3K3				
	3	3	0	x 10

10K				
	1	0	0	x 100
68K				
	6	8	0	x 100
82K				
	8	2	0	x 100
330K				
	3	3	0	x 1,000
220K				
	2	2	0	x 1,000
470K				
	4	7	0	x 1,000
1M				
	1	0	0	x 10,000

You can also find an 'Interactive Resistor Color Code Calculator' on our website (available from the [Links](#) page).