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10TH ANNIVERSARY 2014

DAC5.1 Signature

Construction Manual

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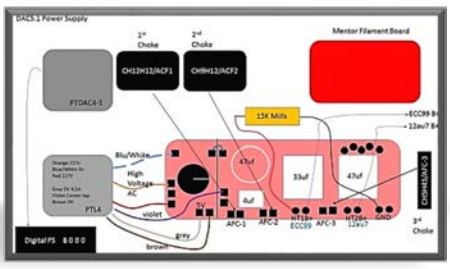

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1 - Introduction

Congratulations on your purchase of the DIY version of the ANKits DAC5.1. This is very high end and sophisticated piece of audio equipment that will surely become the showpiece of your sound system! We are excited you have chosen to join us on the path of audio superiority, and thus, we have created this manual to help guide you through each step of the assembly process with as much detail and clarity possible. To facilitate the build process, the manual has been divided into several chapters, each focusing on a separate aspect of the system; follow through the chapters in order and we guarantee 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.

Enjoy!

2 - About ANKits

AudioNote UK started out in the early 90's developing several DIY audio kits while they were building up their finished product business. DIY Audio has a long history and it was a chance for knowledgeable customers to take advantage of world class designs and components! AudioNote was focused on using the very finest materials and custom made components to their specifications across the entire product line – from customer 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, AudioNote eventually broke the kit business off into a separate division, thus in 2004, AudioNoteKits started up and was supported by a website such that customers not located near AudioNote dealers could now order kits and have them shipped direct. Kit development continued in earnest during the 2000's with development assisted by AudioNote engineering. AudioNote parts were used throughout the kits depending on the various levels and budgets. By 2013, ANK AudioKits had a strong product range covering all the areas of two channel audio: **Single Ended 300B product line, EL34 & EL34 classAB and single ended product line, Digital to Analog Converters, Pre-Amplification, Phono stages and AudioNote Speaker kits**. The end result is that customers worldwide with DIY skills can build an entire high end audio system to their liking.

With the products getting to higher and higher levels in 2013 with the release of the Level 5 Mentor and DAC5.1, some customers wanted these high end products but wanted a professional builder to assemble them. ANKits began offering this service for Level 4 & 5 products so that a significant investment in a kit could be turned into a work of art!

Since ANKits was born in 2004, over 2500 kits have been shipped worldwide to all corners of the globe. There is a good demand for high end audio kits and ANKits has been delivering the goods now for over a decade. We expect you to have a great experience building your kit and look forward to hearing from you about your experience.

Regards

Brian Smith – Director ANKits

3 - Equipment

Here is the list of equipment that will be required:

- Philips Screwdriver
- Wire Strippers
- A large, organised work area
- Soldering Iron Station with wet Sponge
- Lead Solder with Tin/Silver

*We highly recommend using **Leaded solder** with some silver content on the build. You can 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 unleaded solder for first time builders.*

4 - Tips and Suggestions

Practice soldering and soldering techniques (such as stripping and tinning) prior to starting the kit. Have an organized work area where you can work on the kit on a regular basis.

Try not to do too much in one sitting, be sure to review your previous work before moving on to make sure everything is correct.

Try to work a little bit each day on the kit, if you start to feel tired, take a rest.

If you have any questions, please contact audionotekits@rogers.com*.*

5 - Skills / Prerequisites

We have learned a lot over the last decade from customers and here I would 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 is ahead and ensure your success!

5.1 Hardware/Mechanical

Not all of us are mechanically oriented, that is fine. The kit is quite well laid out such that all the hardware is provided and bagged in individual sections so everything should make sense. Start thinking mechanically because 30% of the kit is mechanical.

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!!

A few things we must understand first are:

I. We use the 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 ¾ inch). Familiarize yourself with some of the hardware in the kit.
II. The screws will be called M3 or M4 and this is the diameter of the shaft. The length of the shaft will be in millimeters, so you would need an M4 screw 16mm and then the option is a PAN head which is a round spherical head or a COUNTERSUNK or FLAT head. This would be used when a screw head needs to be flush with a surface (for example under a transformer!).
III. So if you are asked to use an M3 16mm CSK screw, this is a 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 countersunk or FLAT head.
IV. Once you have the screws handled, we can look at the matching nuts such as M4 nut or M3 nut and corresponding washers.
V. Standoffs are common in the kits (again, they are either M3 or m4 size). They are threaded typically so the screw goes into them; we use several different lengths in the kit.
VI. If any of the hardware is confusing or something is not fitting right, please email us.

Tool: A little patience

5.2 Wire – stripping / tinning

When it comes to wires, we use typically 18gauge (thicker) and 22 gauge in the kits. Its PTFE Teflon silver plated copper wire, but in some other kits, we will use a solid silver 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 would be called shielded cable like an AN-A (AudioNote) or AN-V. This is where you have two conductors for signal and then a big ground braid wrapped around; this is called shielding and allows the cable to not pick 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 can be burned off and then allows for easy soldering to a PCB or an RCA or a transformer terminal. So it is a good idea to practice this a little before starting on the kit.

Tool: Wire strippers & solder

5.3 Ohm Meter / Resistors

Using the ohm setting on your multimeter is VERY useful when building a kit. First of all, you can measure resistors (much easier than reading the color codes on the side), the color codes with practice can also be a good way but the multimeter in OHM mode is the fastest way for a new builder (and an experienced one).

Tool: Multimeter

5.4 Soldering

We suggest you practice your soldering before embarking 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 reasonable soldering station with sponge, the right temperature, and a good size tip. Also, tips can wear out so make sure your tip is working. Check out YouTube videos for soldering examples. The solder should flow freely, if it's forming balls then there is a problem with the tip or the temperature or sometimes the surface. Feel free to contact us for HELP!!

5.5 Capacitor Orientation

Any audio circuit is going to be composed of resistors and capacitors. For those who have not built before, here is a little lesson on capacitors. There are basically two types of capacitors that we use in the kits, Electrolytic capacitors with PLUS and NEGATIVE side and typically have values of 100uf 450v, 10uf 160v, or 470uf 35v. These caps have a stripe down one side and that

would designate the negative side of the cap. The cap has to be installed in the correct orientation or it will possibly explode at some point!

The other caps we use we call Signal caps. These capacitors have audio signals going through them and they have values like .1uf 600v, .22, or .47uf. These are not “polarized” in that they don’t have a direction. Some manufacturers will recommend an input and output side for sonic purposes but there is no harm installing either way from an electrical standpoint. When working with the kit, make sure you identify the Electrolytic and Signal capacitors!

5.6 Voltage Checks

There are a couple of voltage basics that can really help the cause. There are two types of voltage: DC and AC. DC is a constant voltage, for example the High Voltage in a 300B amplifier is typically 425v DC, so when you measure from the high voltage point to any ground in the circuit (even the chassis), you will measure 425v DC.

The other type of voltage is AC voltage, this is basically a voltage that is constantly changing in the form of a SIN wave. The filament voltages on an EL34 are 6.3V AC or alternating voltage. With your handy voltmeter, you can measure DC or AC and makes troubleshooting straightforward. The other key tool on your meter is the OHM meter, you can take a resistor and measure the resistance in Ohms. For example, you pick up a resistor, put a probe on each end and set your meter to OHMs and measure 1000 ohms for example, this is then a 1K resistor. Just as important as resistance, being able to measure continuity is one of the most powerful debug tools, in other words, is there zero ohms or a straight connection between this point in the amp and another point? Ask us some questions about this if you don’t understand!

6 - DAC5.1 History & Technical Overview

The DAC5.1 Signature has grown out of over 12 years of DAC research and development at AudioNote and ANKits.

The DAC1.1, released in 2001, incorporated a solid state power supply and a single 12au7 output tube. Designed using the audio note resistor ladder architecture, this made it a powerful and cost effective option. The kit business started to gain a lot of traction around 2003 as ANKits and in 2007, the DAC2.1 was released. The old power supply was retired in favor of the new M2 Power Supply which was both tube rectified and tube regulated. The line stage was a dual 6922 output which made for a much lower output impedance than the DAC1.1. IV transformers were introduced into the kits for the first time and it was a great success!

In 2009, the DAC3.1 was launched where we moved to the transformer coupled output stage. In 2011, based on customer demand and feedback, the DAC4.1 was launched and it became ANK's most successful product to date, also launching the triple C core output transformers. Since 2011 we have been looking at DAC architectures and trying to track the ever evolving industry. We settled on architecting and developing the DAC5.1 where we took a fresh look at not only all the digital aspects of this new DAC, but also the analog aspects as well. The list of advancements in this DAC is quite extraordinary, as you can see below:

New Shunt Based Power Supply incorporating the WE 274B rectifier (5U4G)
New Digital Board with new on board Power supply for quiet operation
Super Regulator Board introduced using latest regulator technology
New Large Can IV transformers for interface between digital and analog domains
New 12au7 – ECC99 Line stage
Triple C core output transformers
WBT 75Ohm RCA input

7 - DAC5.1 Assembly

In this section we are going to have an overview of the building of the DAC5.1; this will help familiarize you with the overall build so you can plan accordingly. Below is our latest version chassis (*Figure 1*); we have drilled a few holes to accommodate new layouts for the mains and chokes.

7.1 Install the Feet

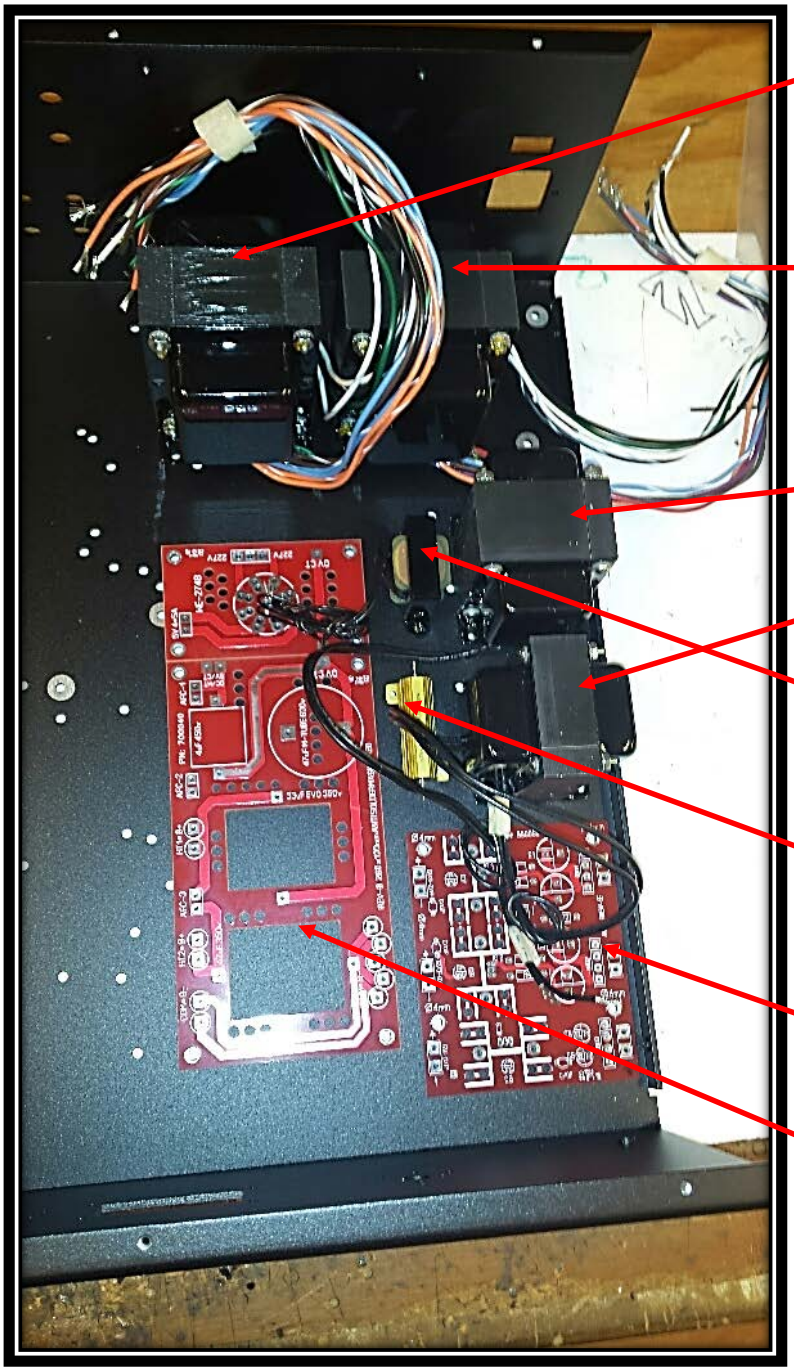
The 4 large feet will be installed in the corner holes of the chassis. Use the M4 20mm Pan screws provided with washers and secure with the nut on the inside of the chassis.

Figure 1 - Latest Chassis

7.2 Install the DAC5.1 power supply

The heart of the DAC5.1 is a very sophisticated power supply with 2 Mains transformers along with three substantial chokes.

This highly sophisticated SHUNT power supply is comprised of the following Mains transformers, chokes, PCB's and SHUNT resistor.



Mains for HT (PTL4)

Mains for Filaments (PTDAC4.1)

Choke 1 CH12H12

Choke 2 CH9H12

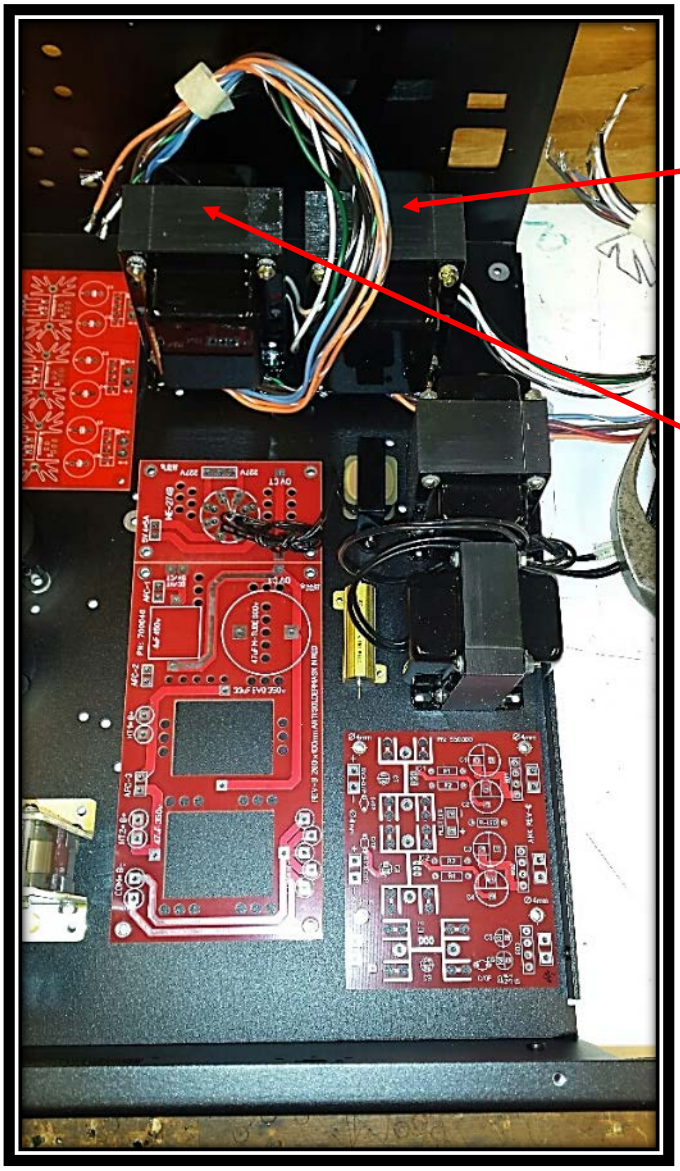
Choke 3 CH5H45

10K 50W SHUNT resistor

Filament board to supply Line board filament supplies

DAC5.1 Power Supply PCB

In this first section, we are going to get two mains transformers positioned into place and make connections for the IEC, Rocker Switch, and Mains primary sections. This is where the wall electricity will be coming into the DAC and into the primary of the dual Mains transformers.



7.3 Install the Mains Transformers

The DAC5.1 utilizes two Mains transformers, one supplies the high voltage taps and the other supplies all the filament and digital voltages. We separated these up for ultimate sonic reproduction. *See appendix for the wiring information for these transformers.*

Position the PTDAC4.1 Mains transformer into position as shown on previous page and then the PTL4 transformer. The primary side of these transformers is the one with the white black white-grey black-grey and green wires, make sure this "primary" side is facing the back of the chassis. No need to secure these yet at we have to hook up the primaries and sort out the IEC section and Rocker section prior to securing these into place, just place them in their approximate location.

7.3.1 Securing the PCB onto the chassis

You will notice in your IEC kit bag you will find a rectangular PCB as shown in *Figure 2* below. We call this the IEC PCB and we will be connecting the wires from the primary of the mains to this board.

Go ahead and secure this PCB to the rear of the chassis using the supplied M3 standoffs found in the Hardware Bag (IEC). Make sure the "white" is at the top as shown in the picture. The next step is to wire up these components, it makes sense to wire this section up before we actually secure the mains transformers as it will be difficult to get to the IEC section once the transformers are secured. This graphic series can also be found in *NEW IEC.pdf* file in higher resolution.

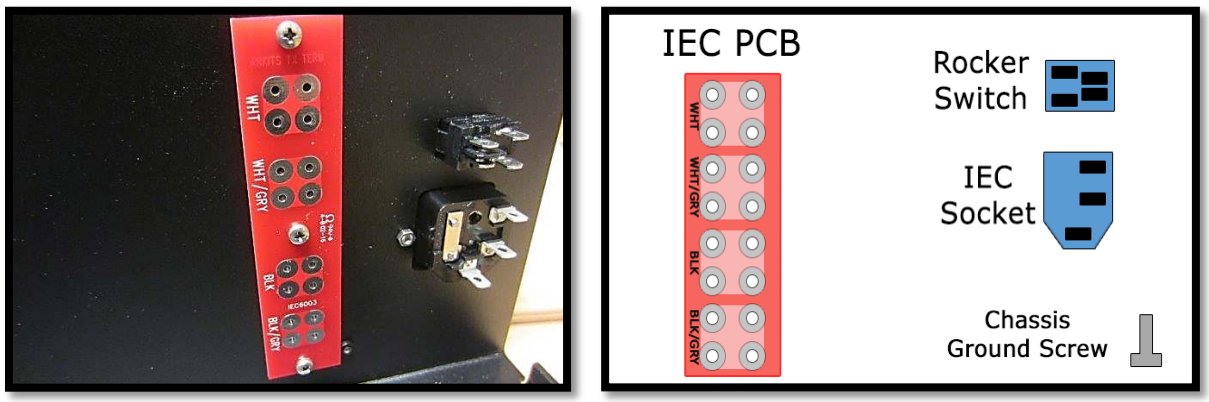


Figure 2 - IEC PCB, Rocker Switch, and IEC Socket

7.3.2 Connecting the White wires

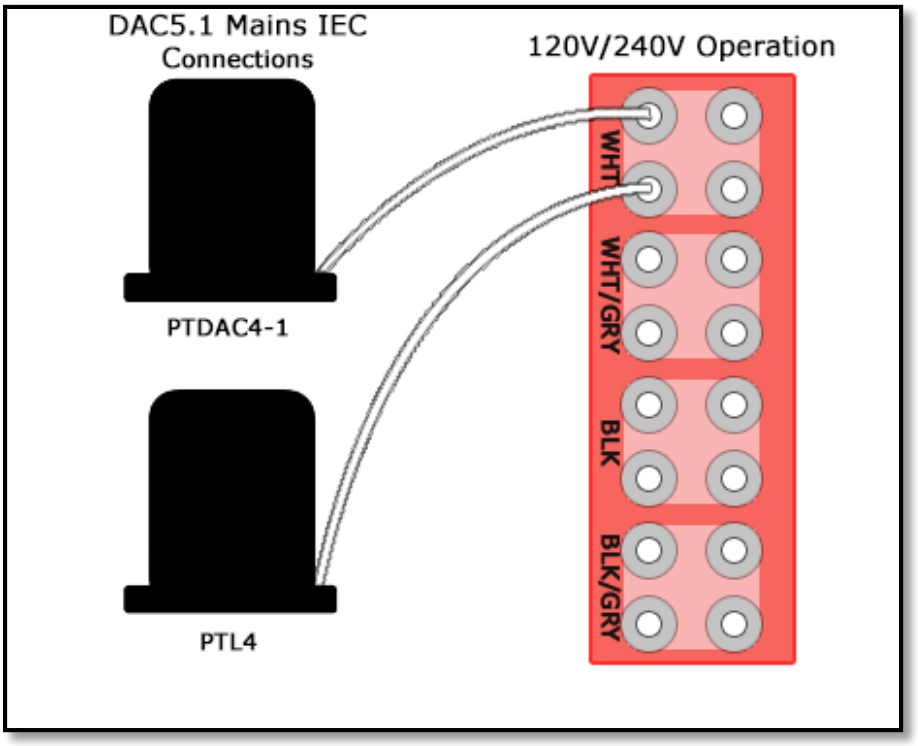


Figure 3 - White Wires to PCB

Take the white wires as shown from each mains and wire to the PCB – We suggest that you strip the end of the white wire to an appropriate length. Give yourself a little slack and then tin the end of the wires by adding solder to the exposed wire so that the solder melts to it, then clip the tinned wire to a length of maybe ¼" so that it can fit through the hole and then SOLDER from the bottom of the board. You might have your own system but that should be the best way to go. Obviously you will want to make these connections while the Board is NOT secured to the rear of the chassis. We would also recommend that you solder on the top as well, make sure that you leave 1-2mm of room for the exposed tinned wire to be visible so that the solder will stick to it.

A common beginner mistake would be to push the wire into the hole but then the insulation of the wire is pressing against the pad, this is bad form so take our advice and have a really good smooth solder connection on top and bottom of the board for these mains primary wires.

7.3.3 Connecting the White/Grey wires

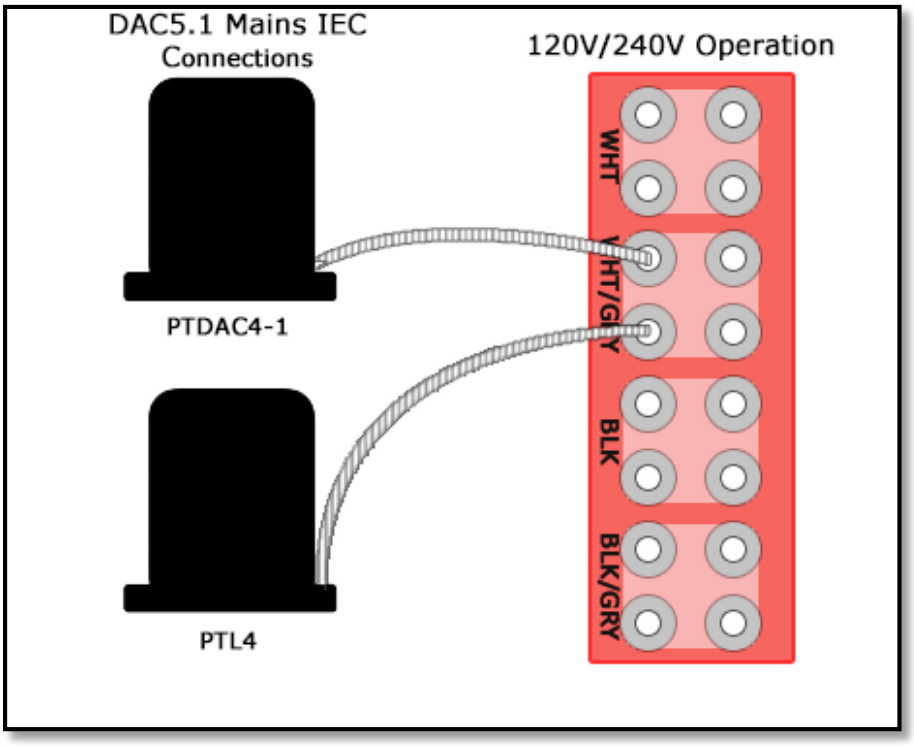


Figure 4 - White-Grey Wires to PCB

Once you have the first two mastered, then try with the White-grey wires as shown above.

7.3.4 Connecting the Black wires

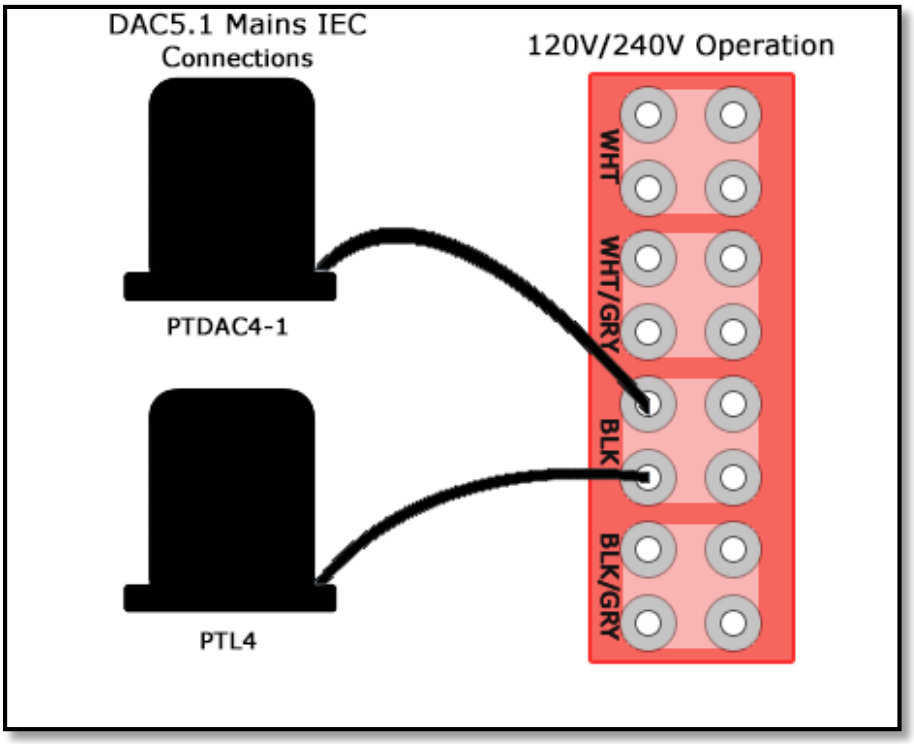


Figure 5 - Black Wires to PCB

…Followed by the Black wires…

7.3.5 Connecting the Black/Grey wires

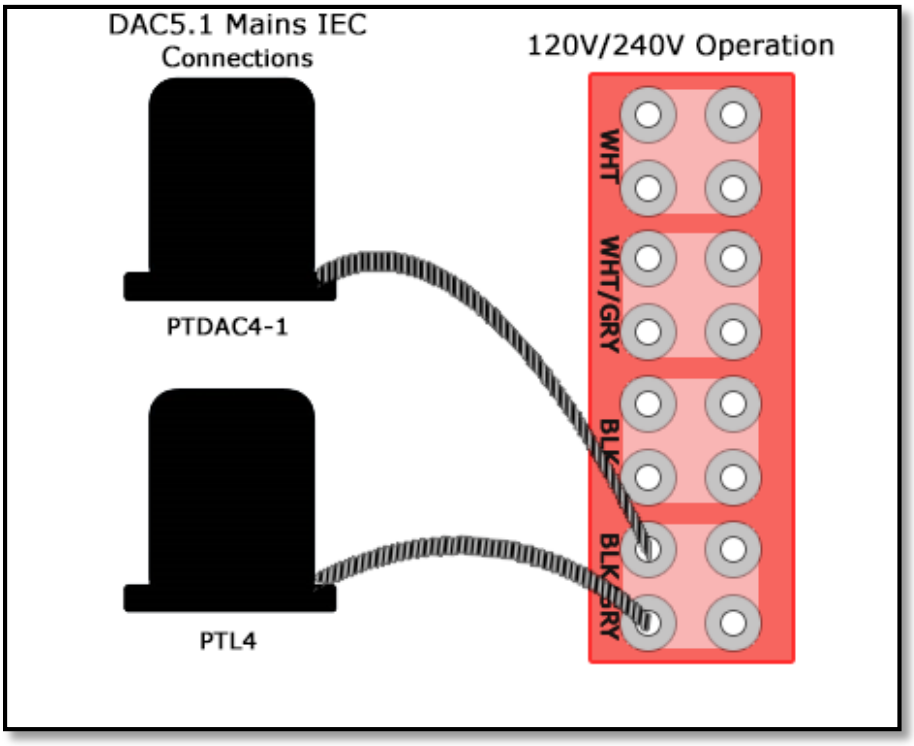


Figure 6 - Black-Grey wires to PCB

…And finally the black-grey wires.

7.3.6 Connecting the jumper cables 120V ONLY

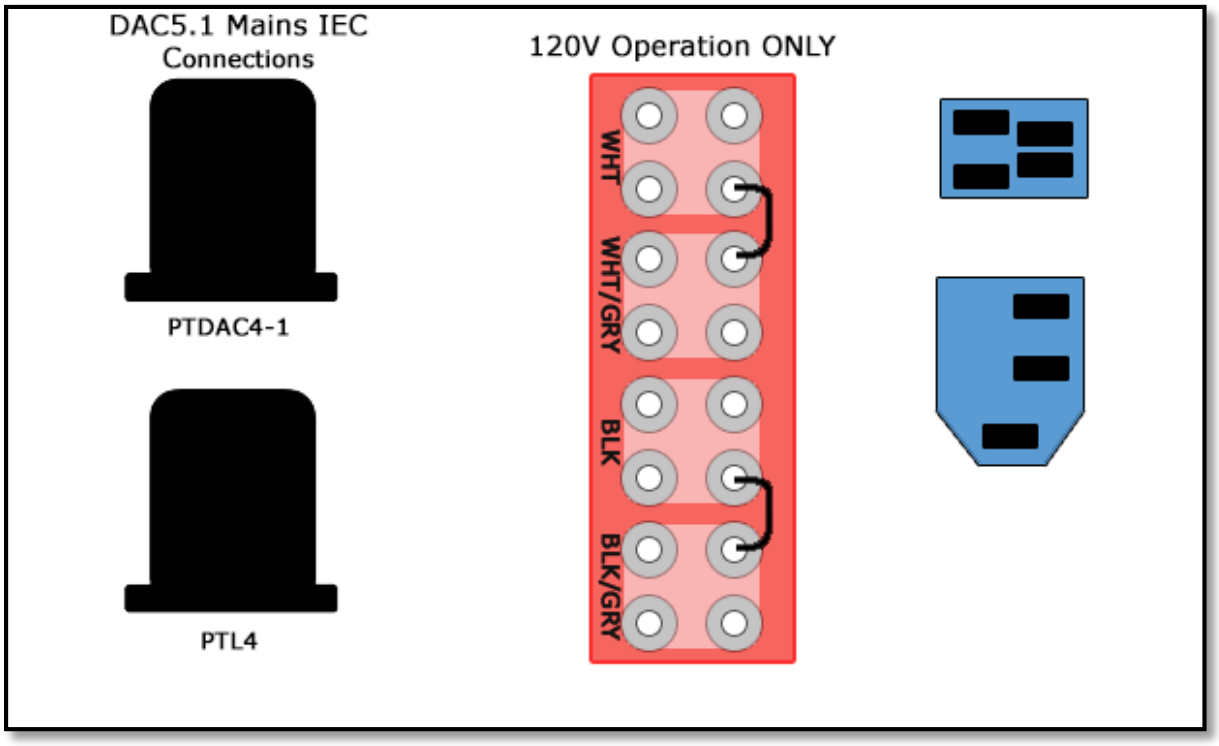


Figure 7 - Jumper placement for 120V ONLY

Ok with this part of the IEC strip configured. we are now going to put in the jumpers required for 120V operation. As you can see in *Figure 7*, you will solder an 18g wire from the white to the White/Grey pad, then also do a Black to Black/Grey pad.

NOTE: This step is only for 120V, see next step if you are running a 240V system

7.3.7 Connecting the jumper cables 240V ONLY

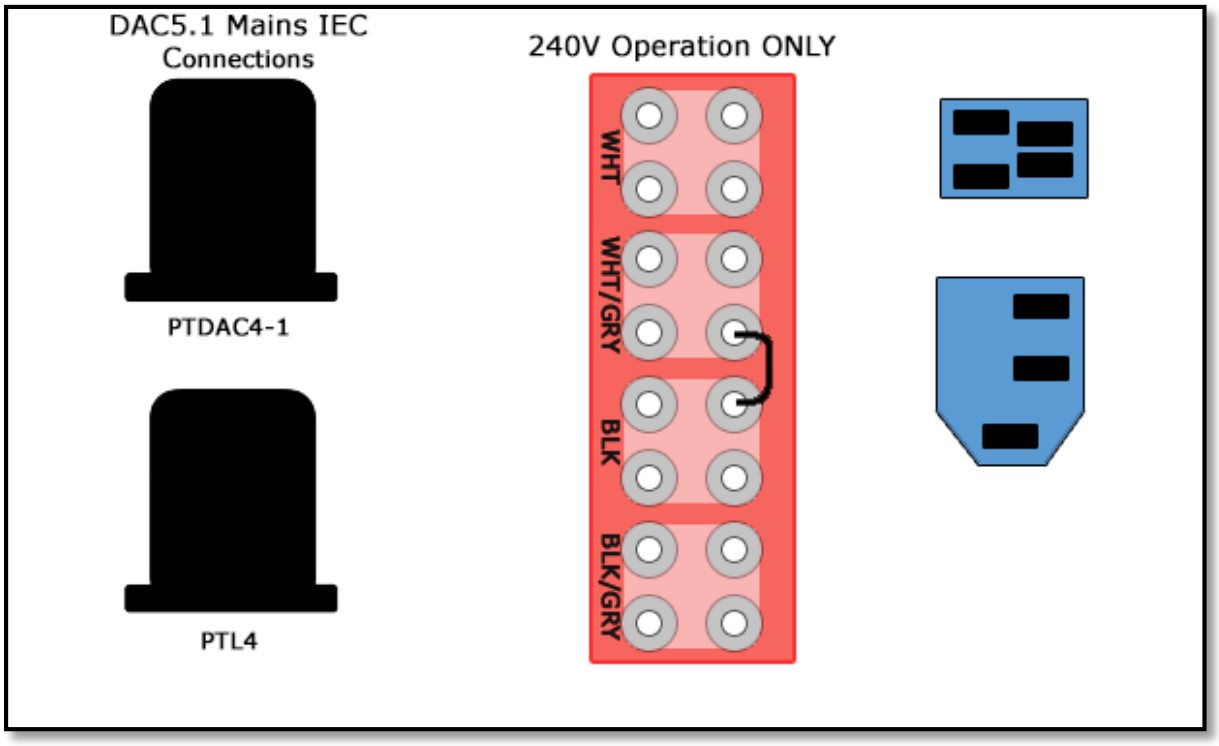


Figure 8 - Jumper placement for 240V ONLY

For 230V or 240V operation just position the one wire as shown between the White/Grey and the Black pads, as seen in *Figure 8*.

NOTE: This step is only for 240V, see previous step if you are running a 120V system

7.3.8 Connecting the PCB to the Rocker switch

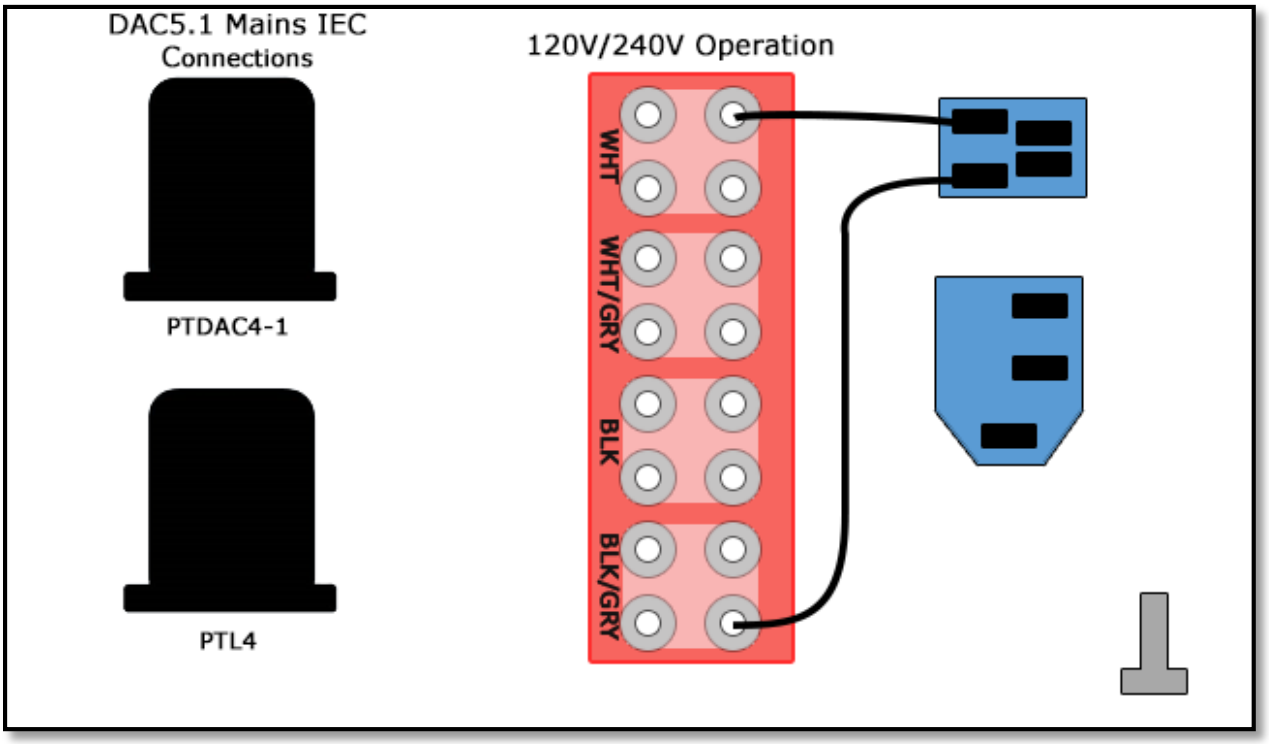


Figure 9 - Black Wires from the PCB to the Rocker Switch

The jumper difference between 120V and 240V are the only differences between the two world voltages. Next take the supplied wire with CRIMP on the end found in the IEC kit bag and wire from the top corner of the WHITE section and connect to the rocker switch. Do the same with the other crimp wire to the bottom of the IEC PCB in the Black/Grey section.

7.3.9 Connecting the Rocker switch to the IEC

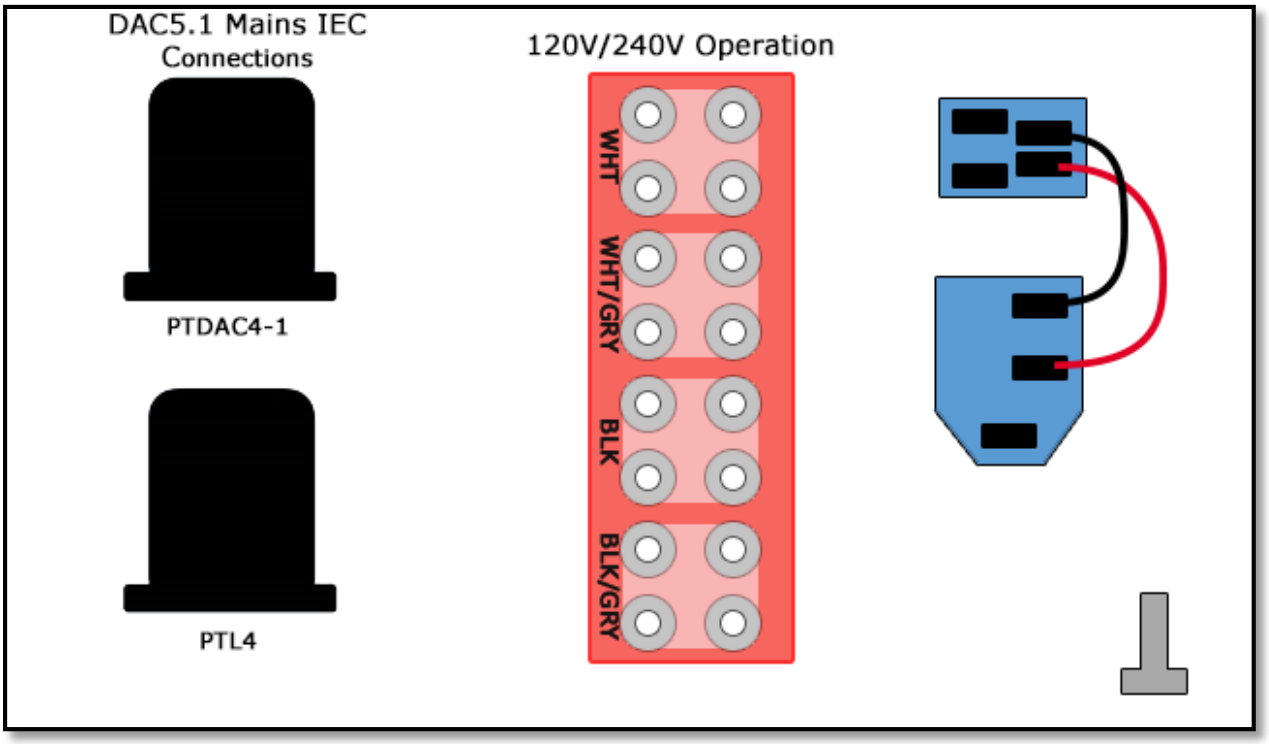


Figure 10 - Wires from the Rocker Switch to the IEC

Add the prepared Red-Black twisted cable as shown and connect between the Rocker Switch and the IEC plug. You will notice there is a flat side to the CRIMP and a rounded side. When connecting to the Rocker Switch, make sure the FLAT side is facing the center of the Rocker Switch. It doesn't really matter but gives you a little more room for inserting the crimped wire on the Rocker Switch.

7.3.10 Connecting the IEC's to the ground

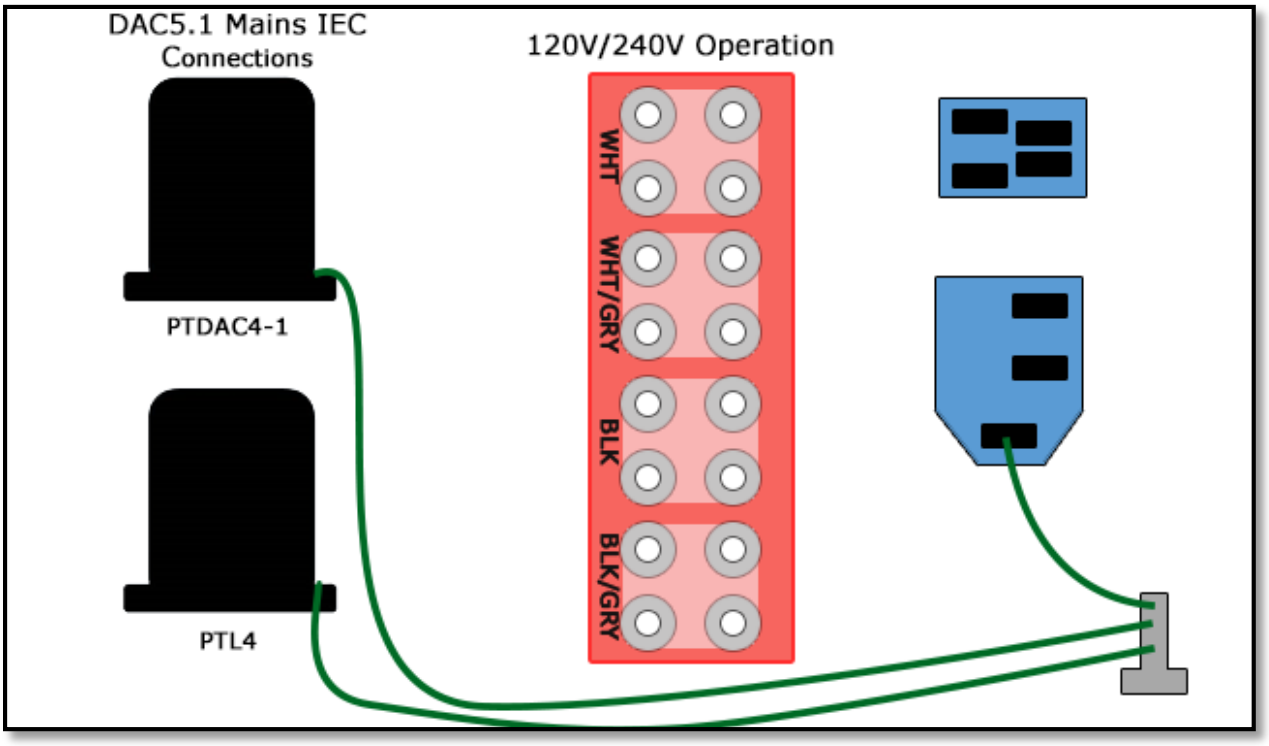


Figure 11 - Attach Wires from the IECs to the ground

Next step is to take the green wires from the Mains primaries and add the ground crimp to the end of the wire. Just trim the insulated wire at the end exposing some wire (½") then TIN this and cut the tinned wire to about ¼ of an inch or whatever you feel is comfortable for then inserting into the GROUND lug. Solder this ground lug to the wire and do this for each Mains transformers.

View next page for the final schematics for the 120V and 240V circuits, double check your results before moving on.

7.3.11 Final schematics of the 120V and 240V circuits

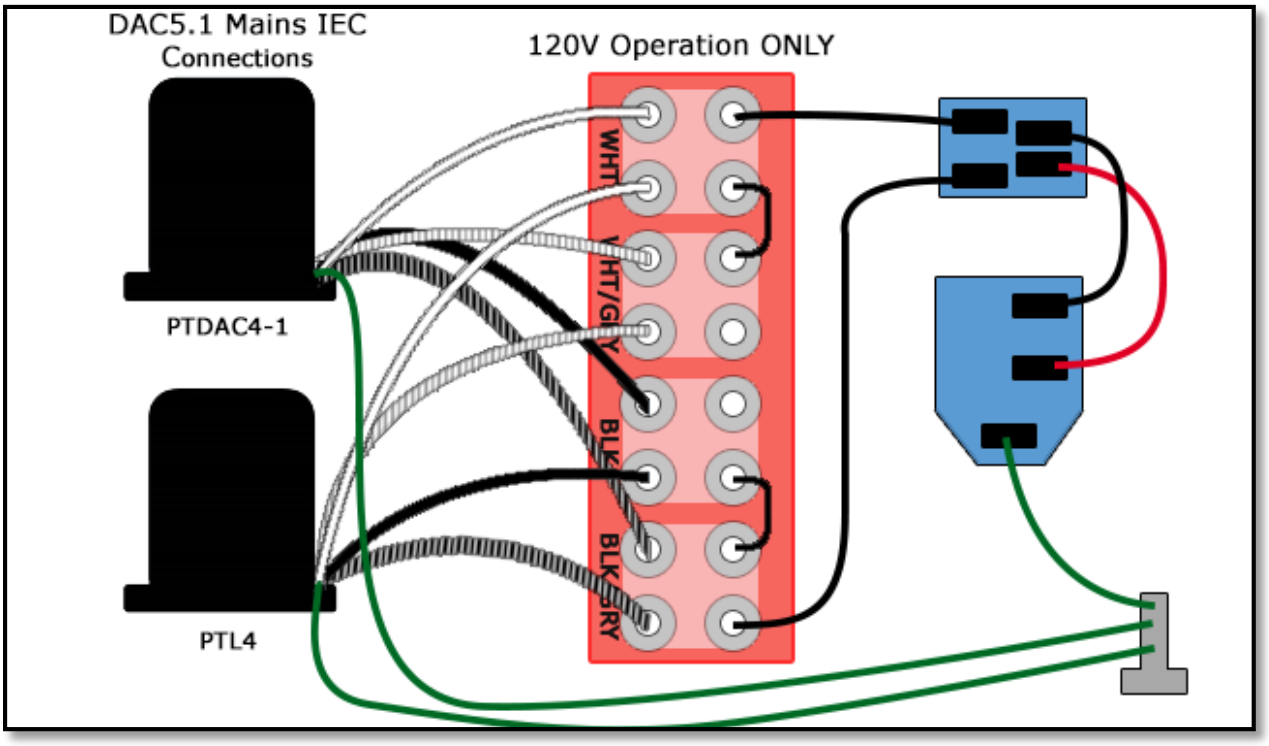


Figure 12 - 120V circuit, Final

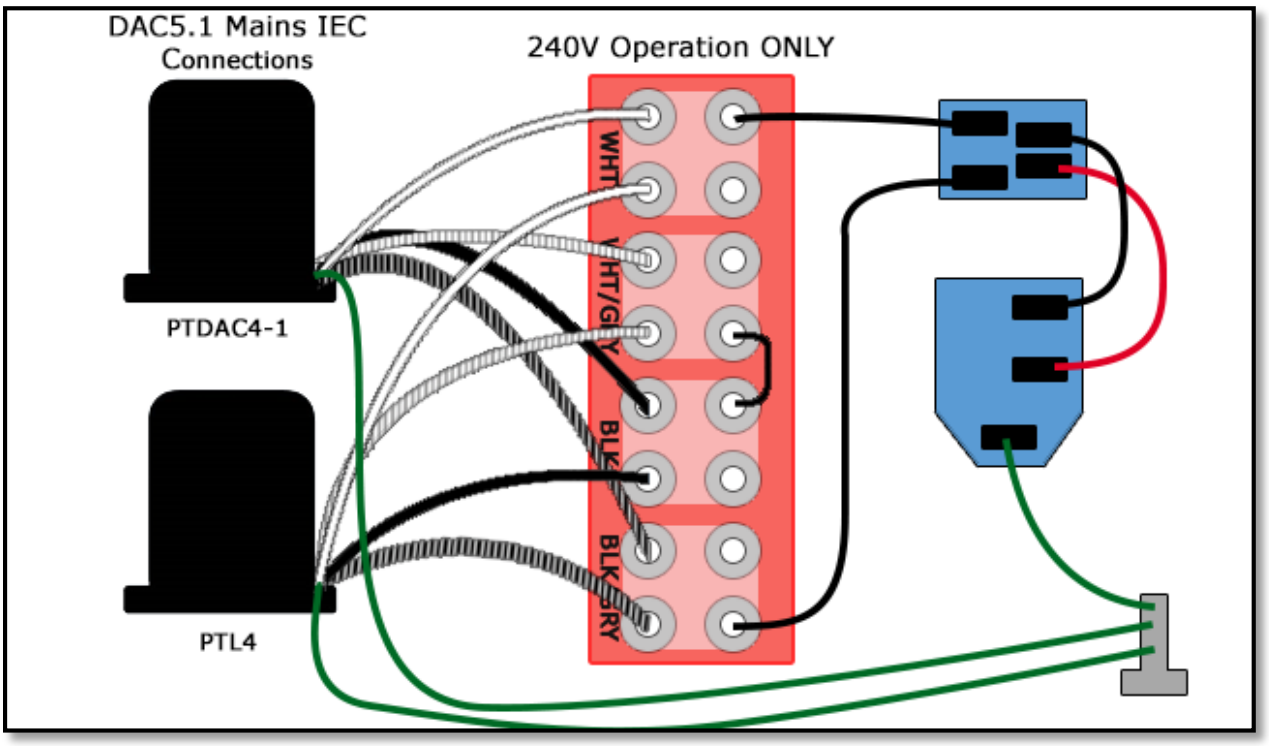


Figure 13 - 240V circuit, Final

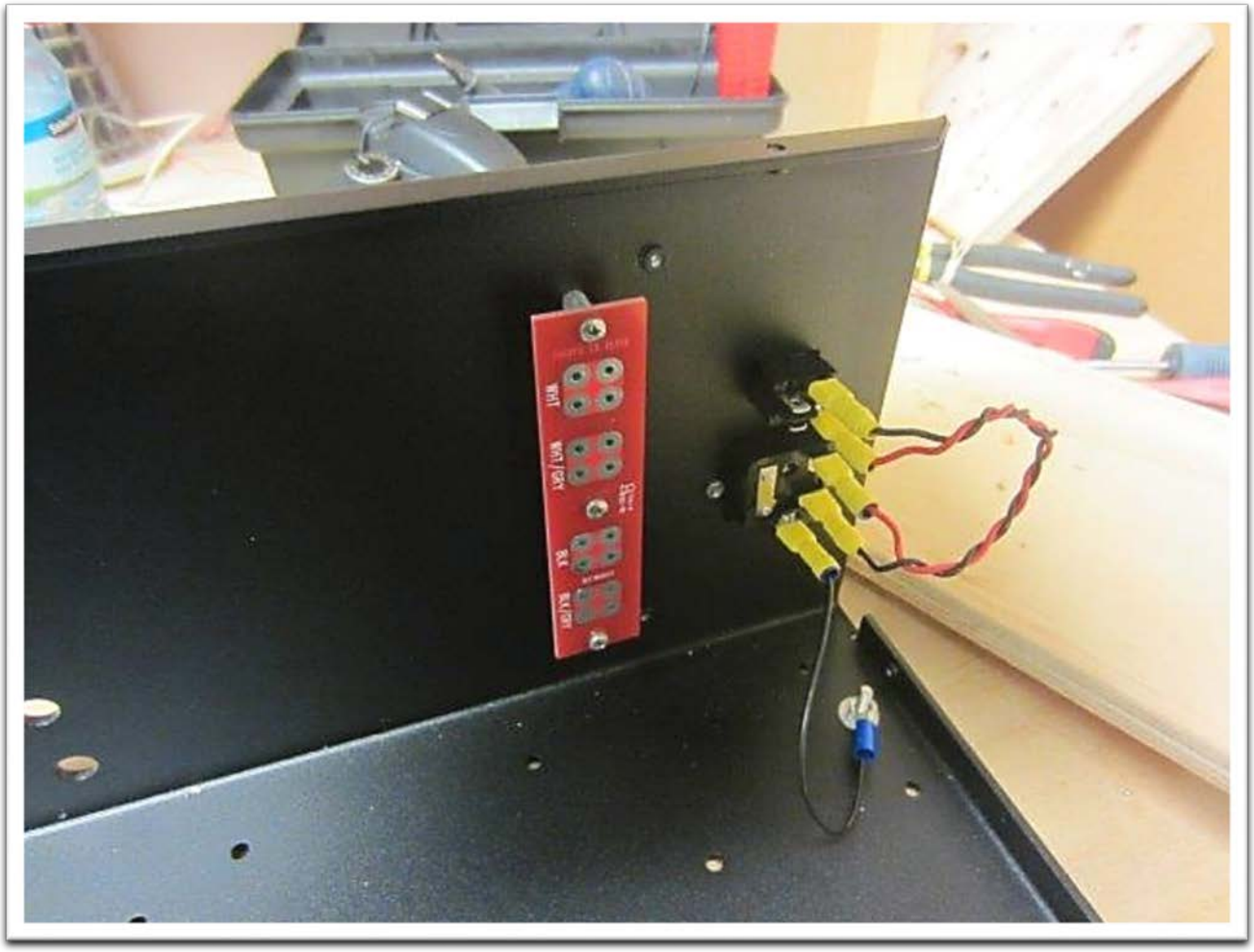
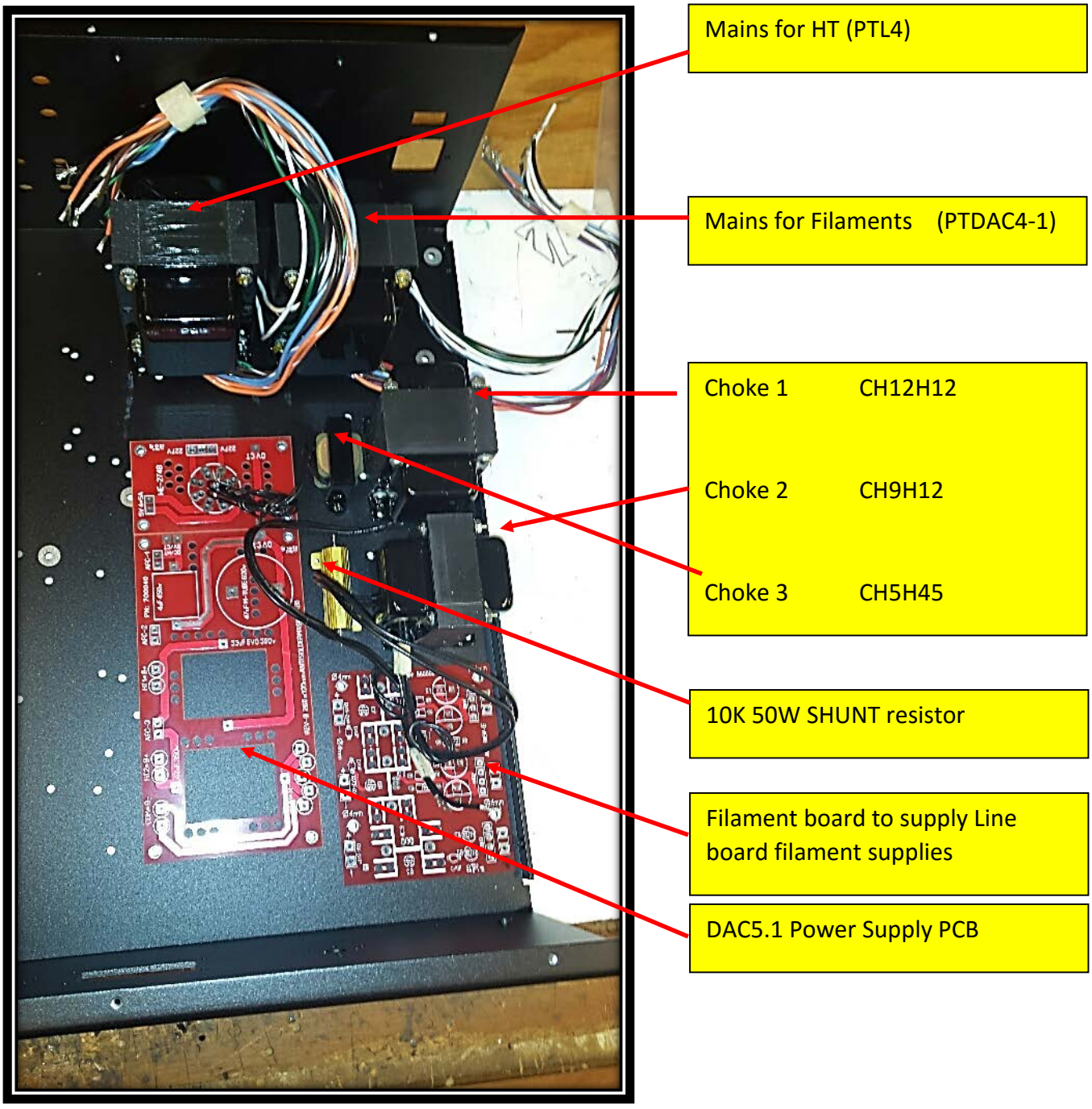


Figure 14 - The PCB in position and the prepared wires attached to the rocker and IEC section!

Take a deep breath – the IEC section is complete!

7.3.12 Mount the Mains Transformers into the chassis

With the IEC section completed you can go ahead and secure the two Mains transformers into the chassis with the 4 M4 screws provided.



You can position the PCB's onto the chassis and it should look like the above pic.

8 - FILAMENT BOARD

In this section, we will prepare the FILAMENT Board. This board will take the Mains secondary AC and create the 6.3V DC levels that are used for the FILAMENT supplies on the two driver tubes on the line board (ECC99 & 12au7).

As seen in *Figure 15*, this board has three sections, the third section will remain unused. The top two sections you will be using are identical, they accept an 8V AC input and they go into a Bridge rectifier which makes a for a DC signal that is then fed to the LM1084 adjustable regulator. The regulator is set to 6.3V output based on the values of the two resistors. The output of 6.3V DC for each section is fed to the filament supply on each Line stage tube (12au7 & ecc99).

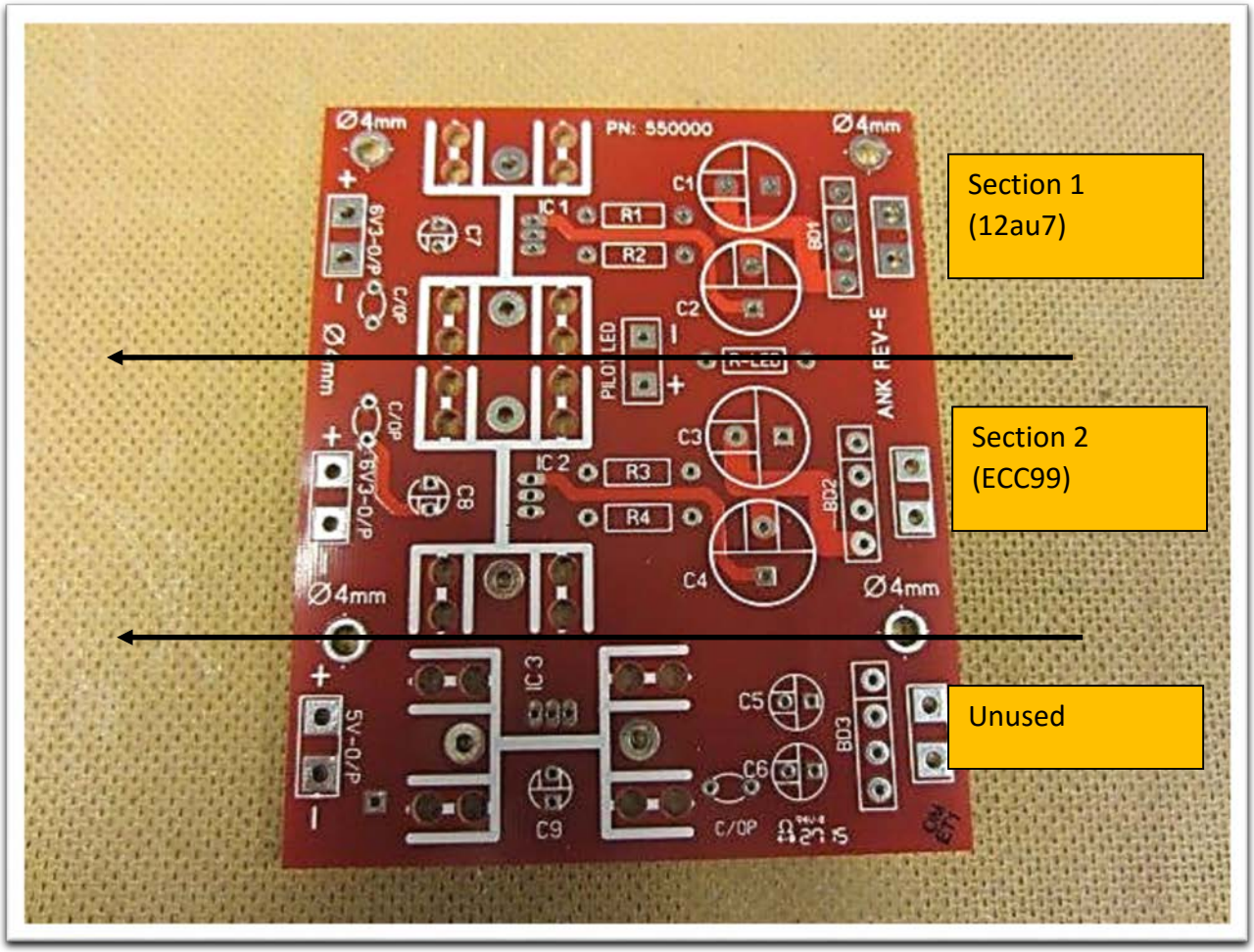


Figure 15 - Filament Board, 3 distinct sections

Ok, let's start with the build of this filament board.

8.1 Building the Filament Board

Locate the bag labelled **FILAMENT** and obtain the parts listed in *Table 1*.

FILAMENT BOARD PARTS LIST

QTY	Item	Location
1	Level 5 Filament PCB	ANK REV-E
2	Heat Sinks	c7 c8
4	4700uf 16v	C1 C2 C3 C4
2	LM1084 ADJ	IC1 IC2
2	Bridge Rectifiers	BD1 BD2
2	390R	r2 r4
2	100R	r1 r3
2	FC 470uf 16v	c7 c8
1	1K	R-LED
1	LED Harness	LED

Table 1 - Filament Board Parts List

The Filament board is pretty straightforward, the only tricky part would be to make sure the screw on the heat sink regulator is oriented so that you can get to it with a screwdriver to tighten up. Also the 3 regulator pins are quite close together on the underside of the board, it is recommended that you usually solder the outside pins first and then the middle one last.

Note: very little solder is required, if you bridge the solder over between pins then get a solder sucker and maybe use an ohm meter so make sure they are not connected!

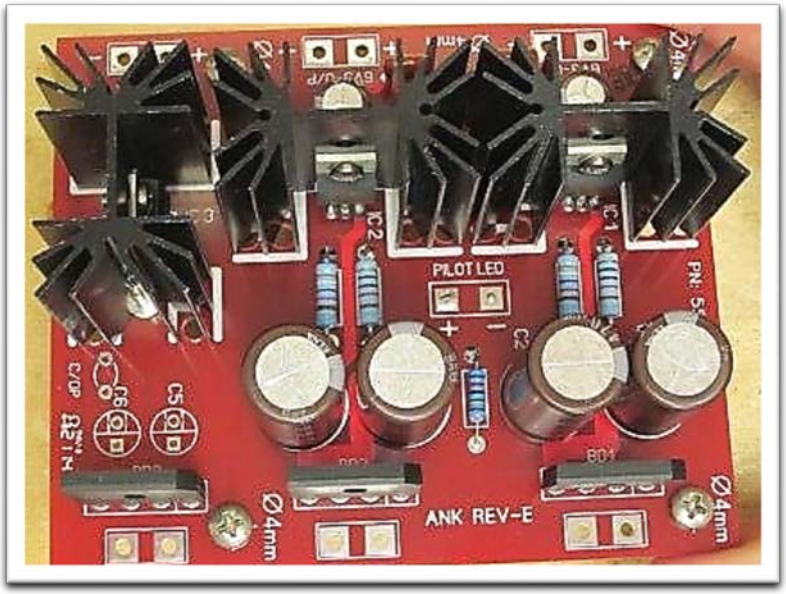


Figure 16 - Completed Filament Board

8.1.1 Mount the Filament board into the Chassis

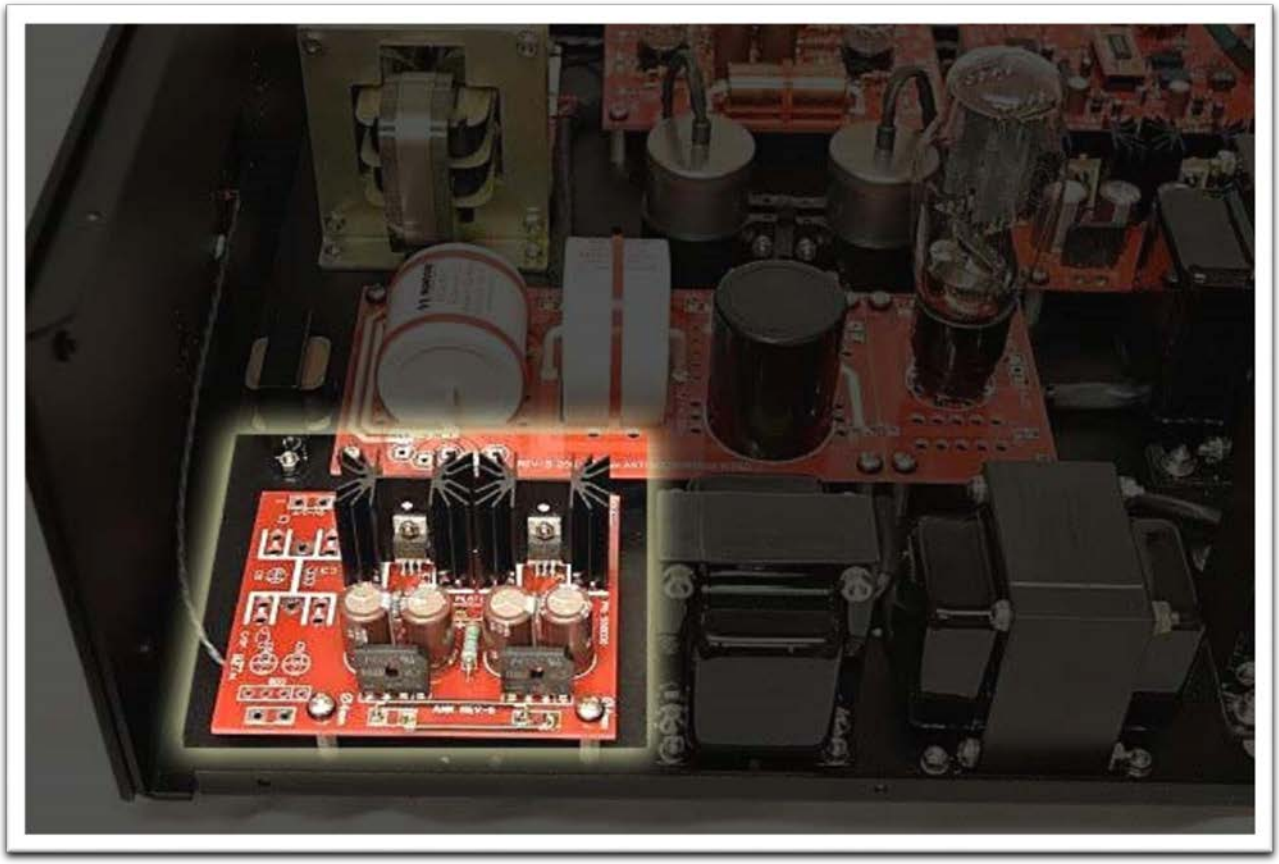


Figure 17 - Location of the Filament Board within the Chassis

Position the completed Filament Board as shown above in *Figure 17*.

8.2 Power Supply PCB

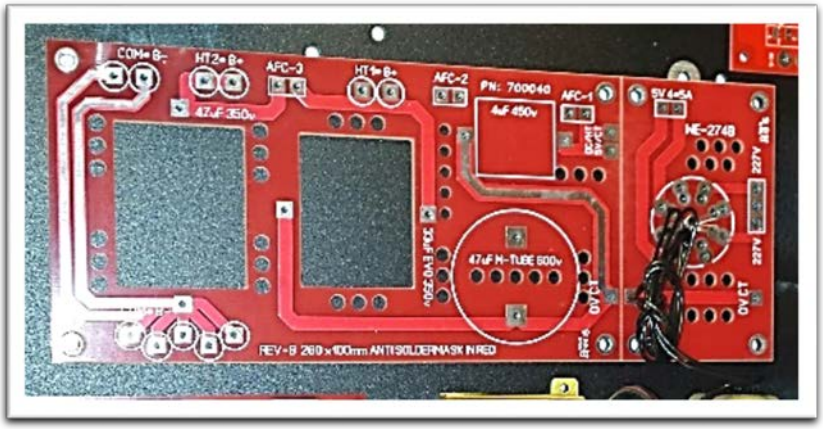


Figure 18 - Power Supply PCB

Identify the Power Supply parts bag and arrange the components. In the bag there is a parts list which is also repeated below in *Table 2*. Also, on the next page in Figure 19, you will find a schematic of the Power Supply PCB.

POWER SUPPLY PCB PARTS LIST

QTY	Item
1	47uf TUBE cap 600v
1	3.9uf 450v EVO Oil Film cap
1	33uf EVO Oil 350v
1	47uf EVO Oil
1	8 pin cmc valve bases
1	5U4G Tube
1	WE 274B
1	PCB DAC5.1 REV-B
1	10K Mills resistor 50W

Table 2 - Power Supply PCB Parts List

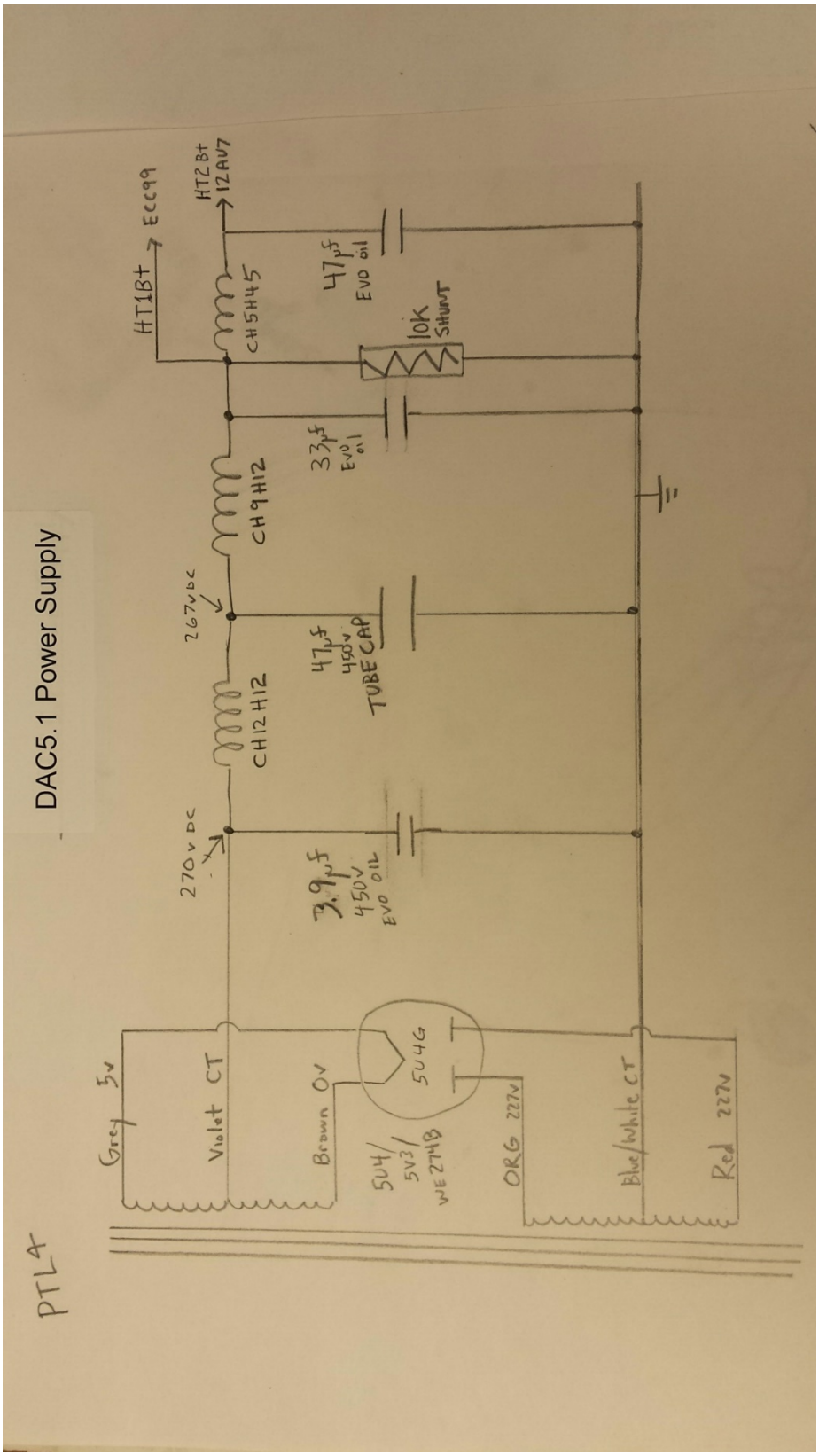


Figure 19 - Power Supply PCB Schematic

8.2.1 Install a bridge

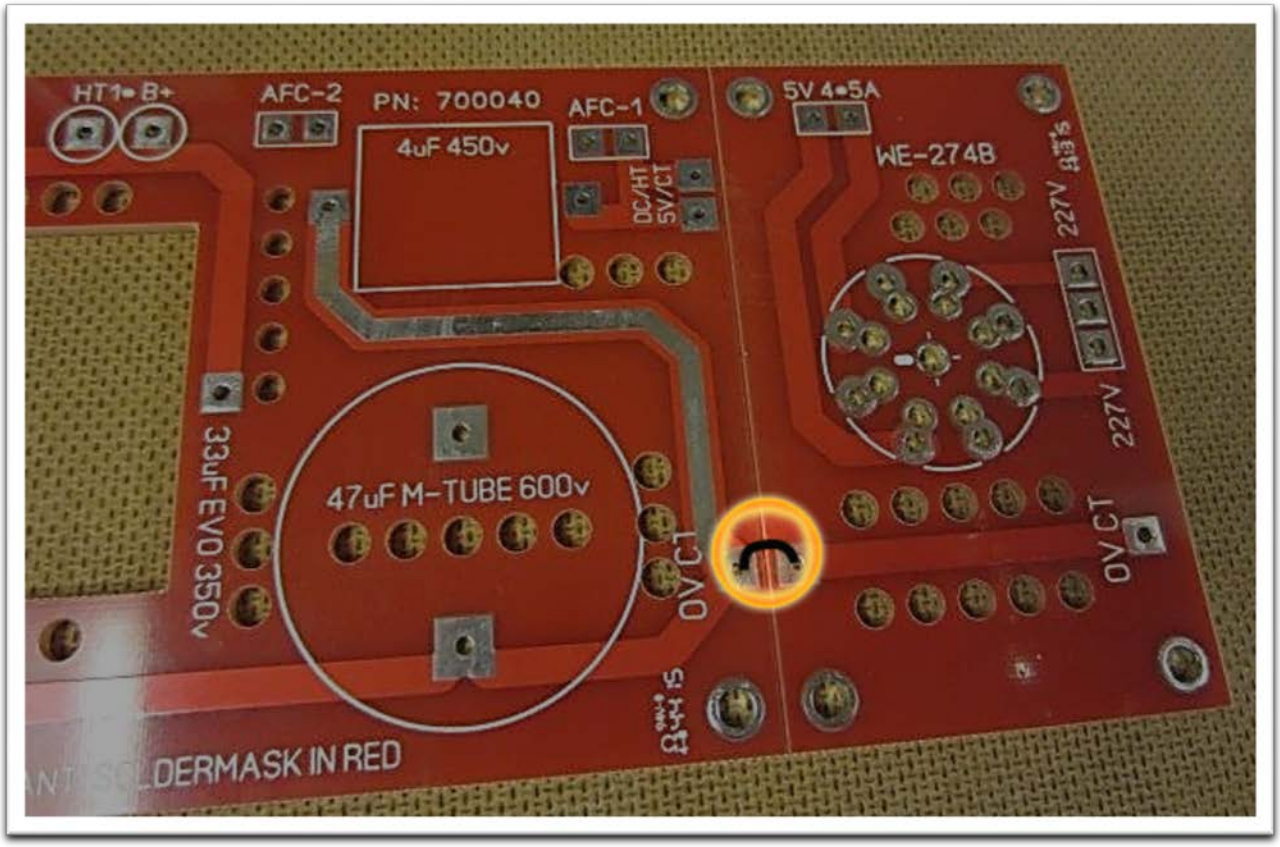


Figure 20 - Where to install the Bridge on the Power Supply PCB

The first thing you need to do is add the bridge between the two boards as seen in *Figure 20* using a small piece of 18G wire.

8.2.2 Install the 8-Pin Valve Base

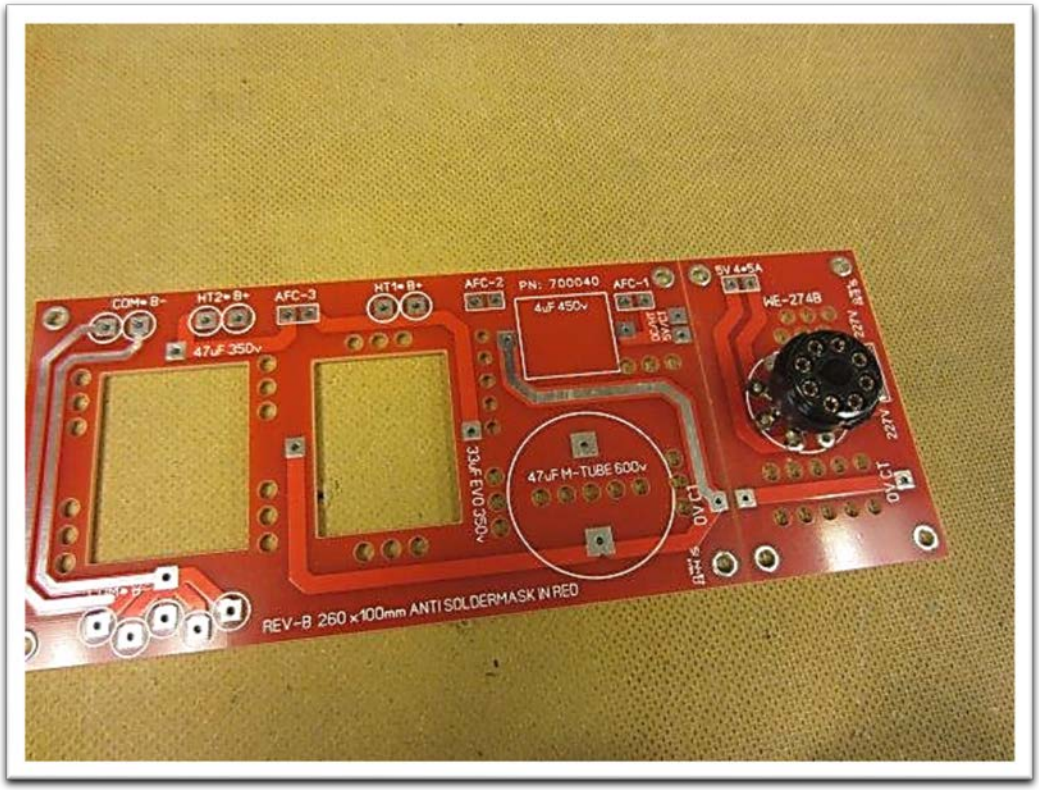


Figure 21 - Installing the 8-pin Valve Base

Install the 8 pin black Valve Base first; the trick to Valve Bases is to make sure they are flat so you don't have a tube that will be on an angle. First of all make sure the Valve Base is keyed to the stencil such that the notch on the valve base matches the notch on the stencil of the PCB. This is to ensure the 8 pin Valve Base is oriented correctly. You can use some tape to secure the Valve Base while you solder on the bottom side. You want to solder just one pin in and then solder the pin on the opposite side of the base, this way with just two pins soldered you can turn over to look to see the valve base is flat. If it is not for whatever reason you can heat one of the soldered pins and push on it to make sure your base is flat. If all is good then continue soldering the other pins.

8.2.3 Install the White EVO Film Caps & the black 47uf TUBE cap

Take your time with this section, even though it's an easy board, you will want to make it look good. Have the caps with all the printing facing up so they are easily identifiable.

The vales of the caps are marked right on the PCB, these are film caps so there is no specific orientation

You will find 3 Mundorf EVO Oil film caps in the kit. They do not have a polarity but you may want to position them so that the writing on the caps is facing up so you can read it, this makes it easy to identify the values of the components, the correct value is written right on the PCB. Solder from the bottom and the top!

The black 47uf TUBE cap is also not polarized so it can be positioned either way.

Figure 22 shows a completed Power Supply PCB. Once your PCB is completed, do not mount it into the chassis just yet, first you need to perform all the wiring operations.

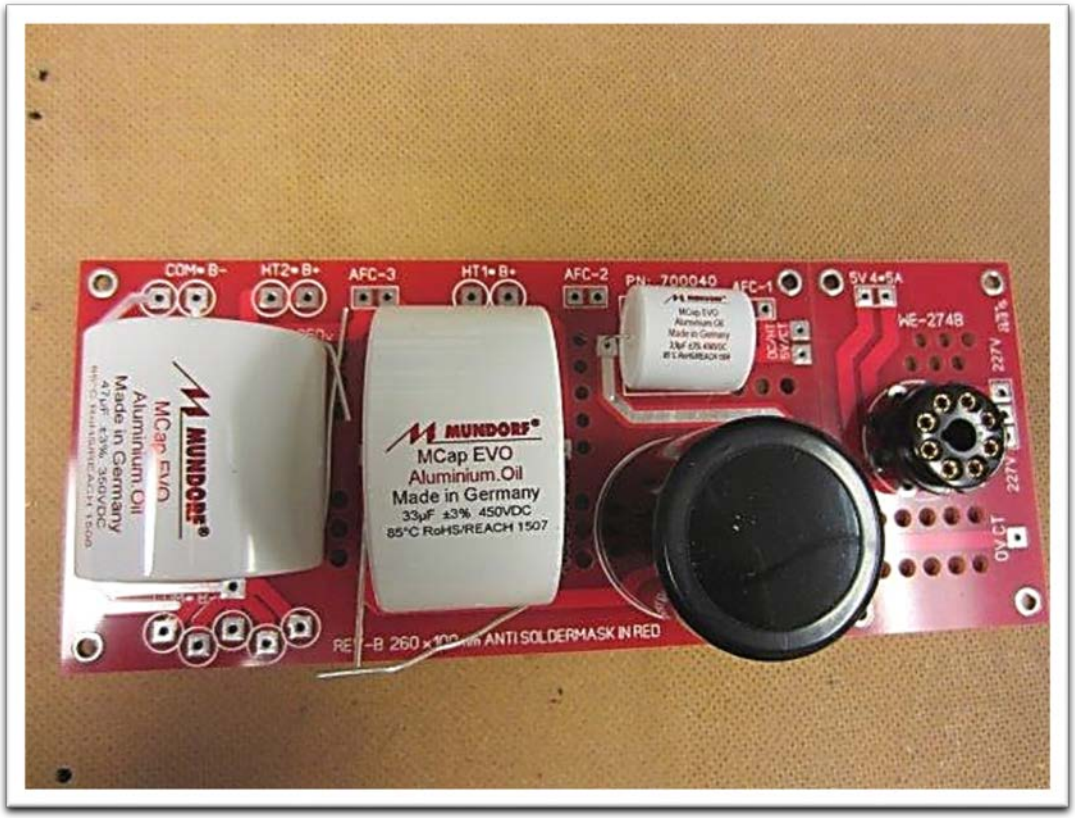


Figure 22 - Power Supply PCB and its major components

9 - Super Regulator Board

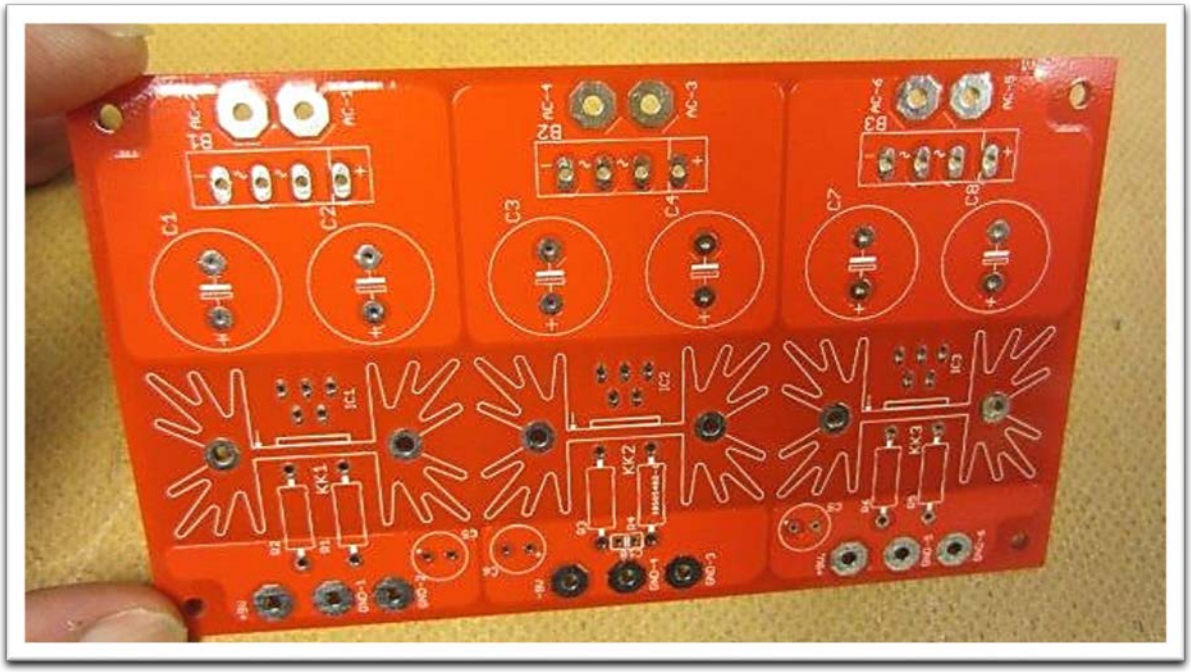


Figure 23 - Super Regulator Board

This is the most sophisticated PCB in the kit (other than the actual DAC board that we assemble for you). The Super Regulator Board takes the 3 x 8-0 AC voltages from the dedicated filament transformer PTDAC4-1 and creates three ultra-quiet DC voltages that are used on the Digital DAC Board to feed the Digital to Analog circuitry.

The parts supplied for this board can be found on the next page in *Table 3*.

SUPER REGULATOR BOARD PARTS LIST

QTY	Designation	Description	Part Number
PCB			
1		PCB	
RESISTORS			
1	R3	56K+22K=78K	P56.0KCACT-ND
1	R4	12.1K	PPC12.1KXCT-ND
2	R5, R1	2.2K	A105957CT-ND
2	R6 R2	14K	PPC14.0KXCT-ND
CAPACITORS			
3	C5 C6 C9	47uf	604-1054-ND
1	C10	10000pf 50v	493-3455-ND
6	C1 C2 C3 C4 C7 C8	4700uf 25v cap	604-1058-nd
BRIDGES			
3	B1 B2 B3	Bridge Rectifier	GBU4M-BPMS-MD
REGULATORS			
2	IC1 IC3	Regulator	
1	IC2	Regulator	LT3015ET
HEAT SINKS			
3		Heat Sink	FA-T220-25E
3	on heat sink	HS pads	926-1475-nd

Table 3 - Super Regulator Board Parts List

Examine all the parts and plan to take some time on this board – it's delicate and tricky! ENJOY

9.1 Install the Resistors

Start by installing the Resistors. The resistors are bi directional but try to put them in all in the same direction as to make it easier to identify if necessary. Match up the designations in *Table 4* with the labels on the board.

Note that value of 78K in R3 is made up of 2 resistors by putting them in series – a good way to do this is put each resistor in a hole

RESISTORS

QTY	Designation	Description	Part Number
1+1	R3	78K=(56K+22K)	56K = P56.0KCACT-ND 22K = S22KCACT-ND
1	R4	12.1K	PPC12.1KXCT-ND
2	R5, R1	2,2K	A105957CT-ND
2	R6 R2	14K	PPC14.0KXCT-ND

Table 4 - Super Regulator Board – Resistors

Note that for R3 you have to put the two resistors 56K and 22K in series so that they create 78K

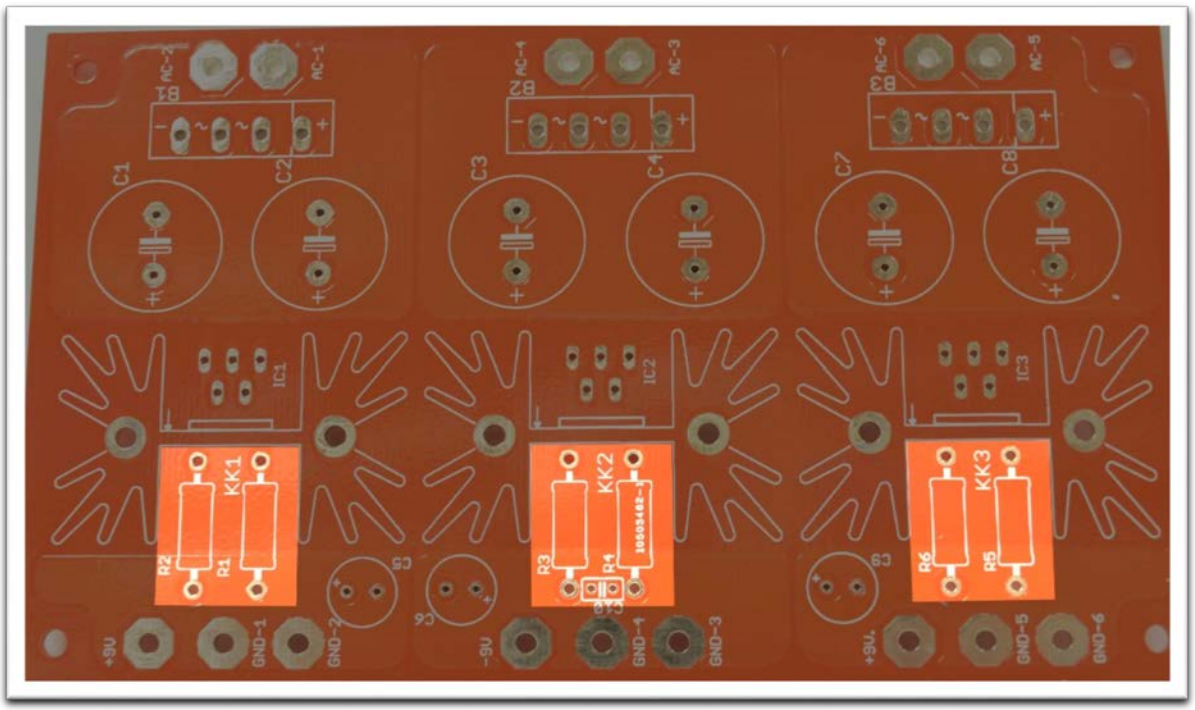


Figure 24 - Resistor locations

9.2 Install the first Capacitors

Install the capacitors in the positions highlighted in *Figure 25*.

Note: Electrolytic capacitors have a stripe down one side and that would designate the negative side of the cap – the cap has to be installed in the correct orientation or it will possibly explode at some point!

CAPACITORS

QTY	Designation	Description	Part Number
3	C5 C6 C9	47uf	604-1054-ND
1	C10	10000pf 50v	493-3455-ND

Table 5 - Super Regulator Board – Capacitors

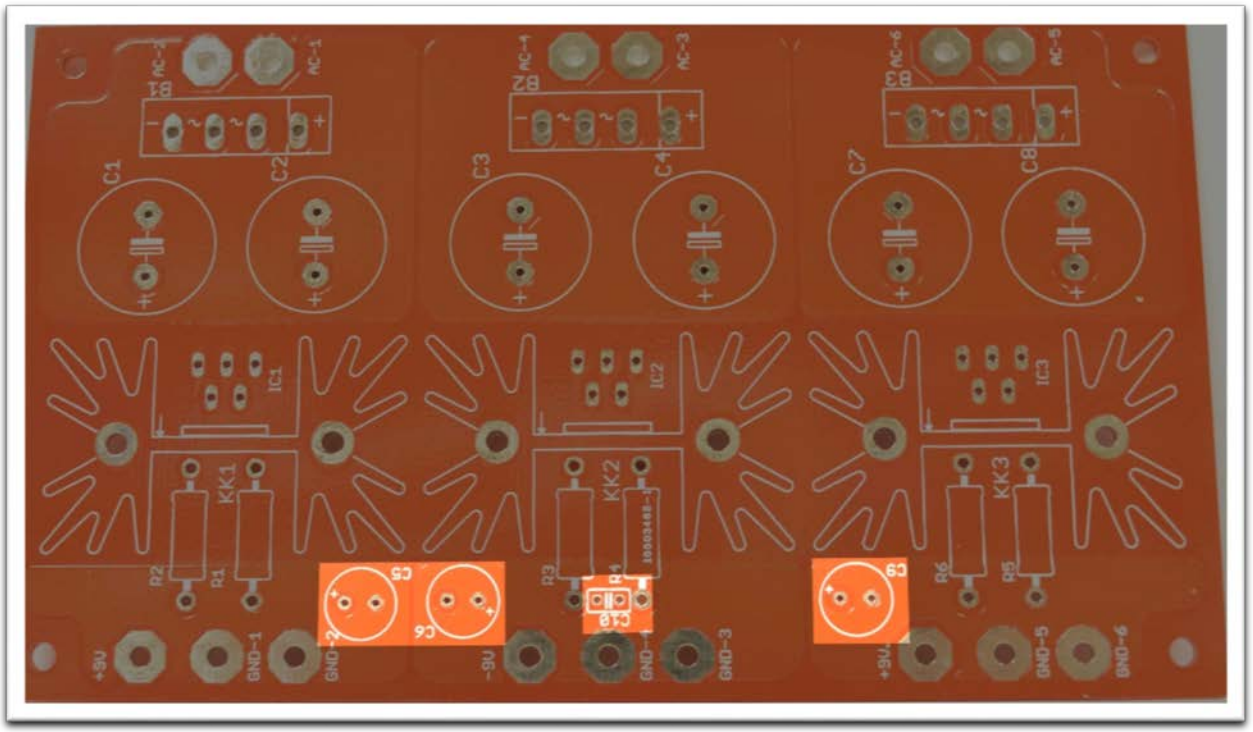


Figure 25 - Capacitor locations

9.3 Install the Bridge Rectifiers

Install the bridge rectifiers in the locations highlighted in *Figure 26*.

Note that they go in in a specific orientation with the + side of the rectifier lining up with the + on the PCB. The + side of the rectifier is the side with the edge cut off!

BRIDGE RECTIFIER

QTY	Designation	Description	Part Number
3	B1 B2 B3	Bridge Rectifier	GBU4M-BPMS-MD

Table 6 - Super Regulator Board - Bridge Rectifier

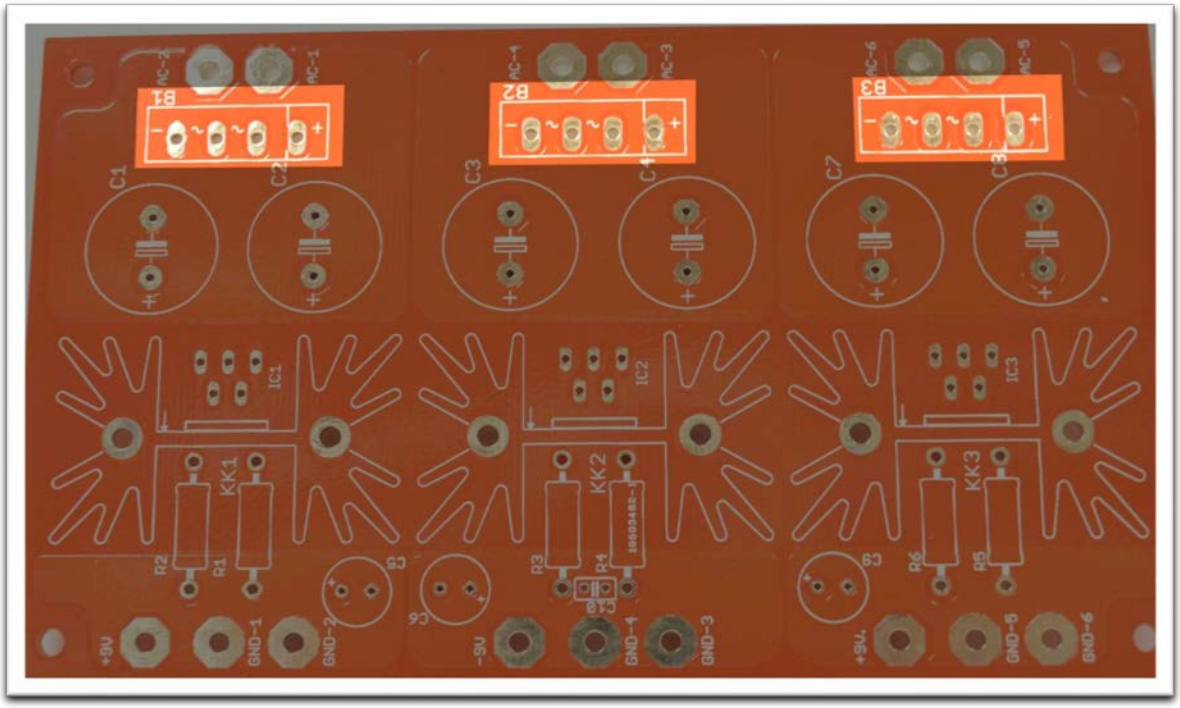


Figure 26 - Bridge Rectifier locations

9.4 Install the Regulators and Heat Sinks

These regulators will mount into the Heat sink with the pad in between – take an M3 Nut and screw provided from hardware bag and secure the regulator to the heat sink. Make sure the PAN head side of the screw is accessible by a screwdriver!

Once the regulator is attached to the heat sink, you will then need to position the heatsink and 5 pin regulator into the PCB – this is a very delicate operation. Once in position then "gently" solder the small regulator pins from the underside of the board

Be careful here, you don't want to use too much solder such that it will bridge across the pins, only a small dab will be required. For now do not secure the heat sink to the board, this could be done later once the unit is all tested and working properly!

REGULATORS & HEAT SINKS

QTY	Designation	Description	Part Number
2	IC1 IC3	Regulator	LT1963AE
1	IC2	Regulator	LT3015ET
3		Heat Sink	FA-T220-25E
3	on heat sink	HS pads	926-1475-nd

Table 7 - Super Regulator Board - Regulators & Heatsinks

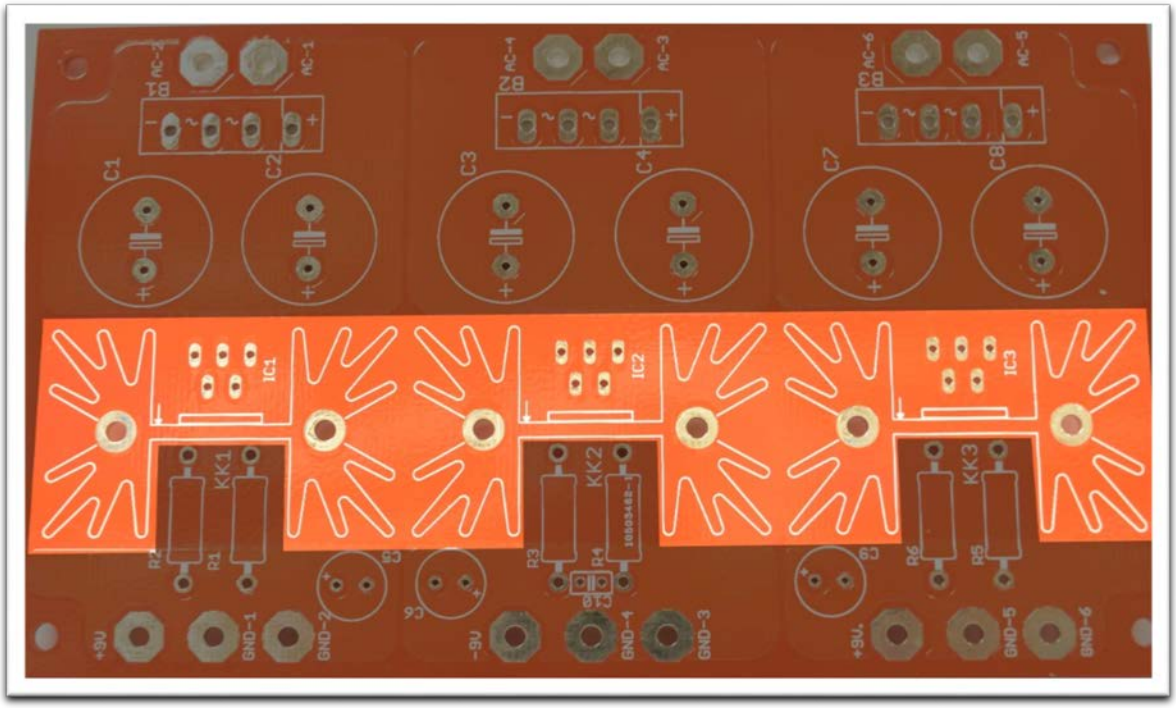


Figure 27 - Regulator and Heat Sink locations

9.5 Installing the remaining Capacitors

Finally we will add the final 6 capacitors – these are electrolytic so they go in a specific orientation.

Note the capacitor with the Stripe side is the NEGATIVE side – and you can see on the PCB the + positive side denoted

CAPACITORS

QTY	Designation	Description	Part Number
6	C1 C2 C3 C4 C7 C8	4700uf 25v cap	604-1058-nd

Table 8 - Super Regulator Board - Capacitors

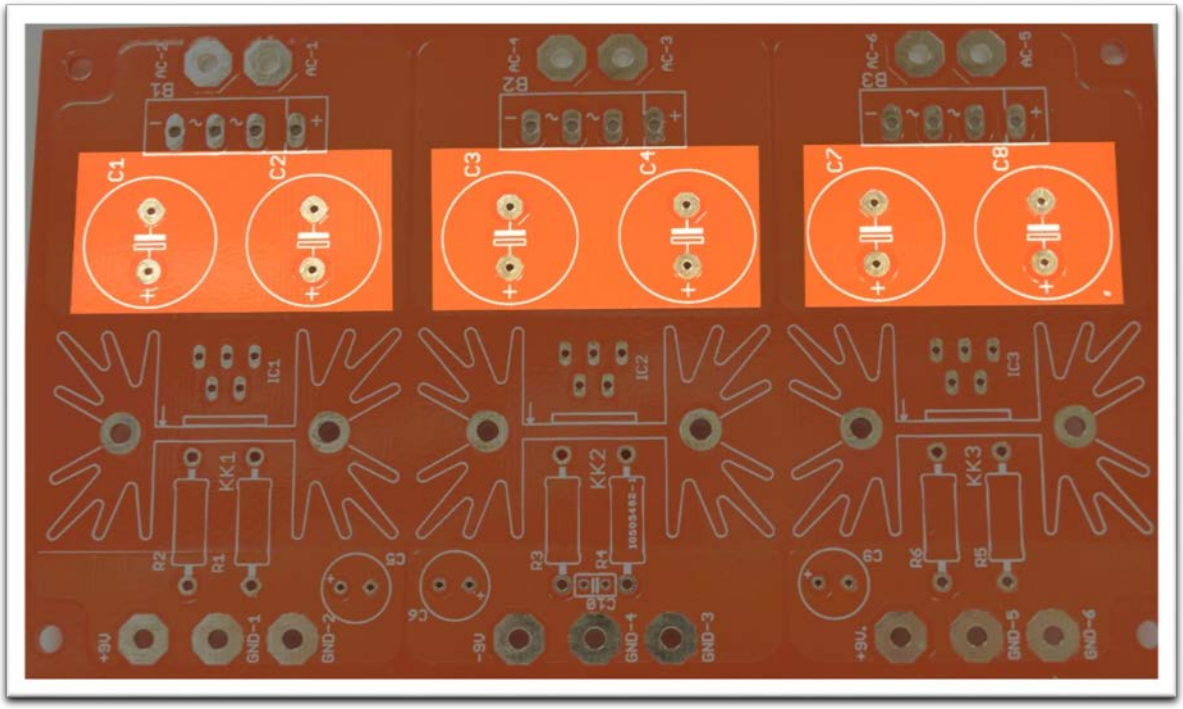


Figure 28 - Final Capacitor locations

9.6 Final Product

Be sure to snip the protruding pins on the backside to reduce risk of shorts.

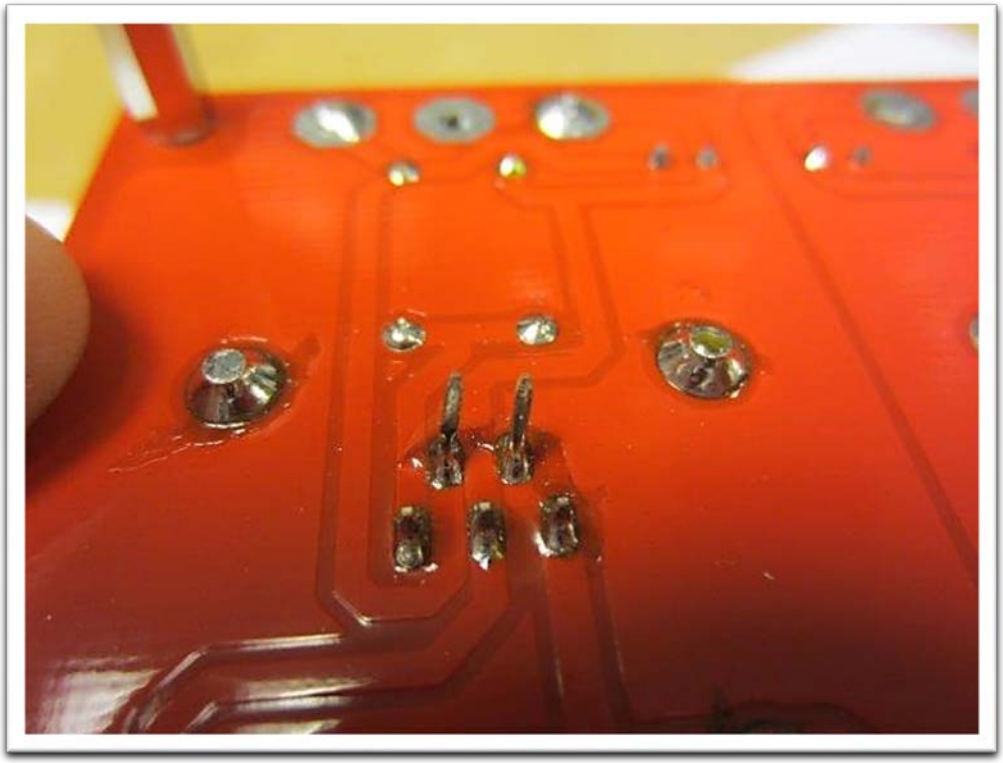
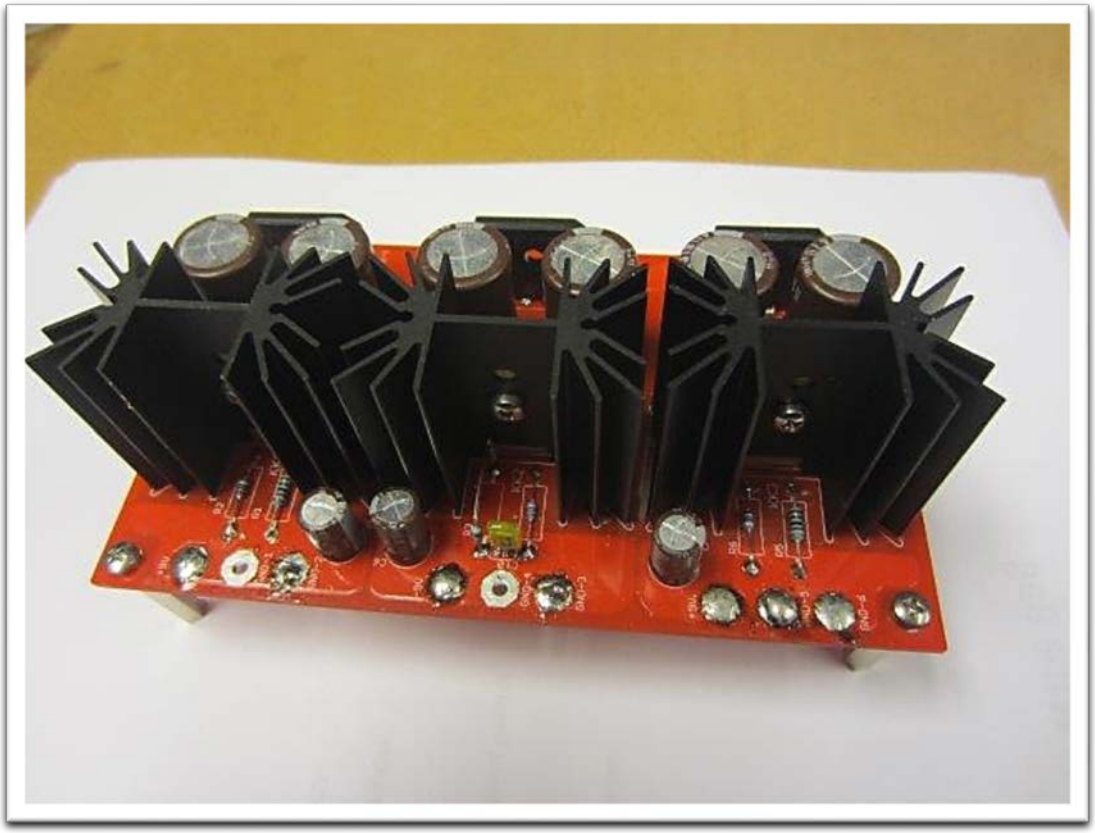
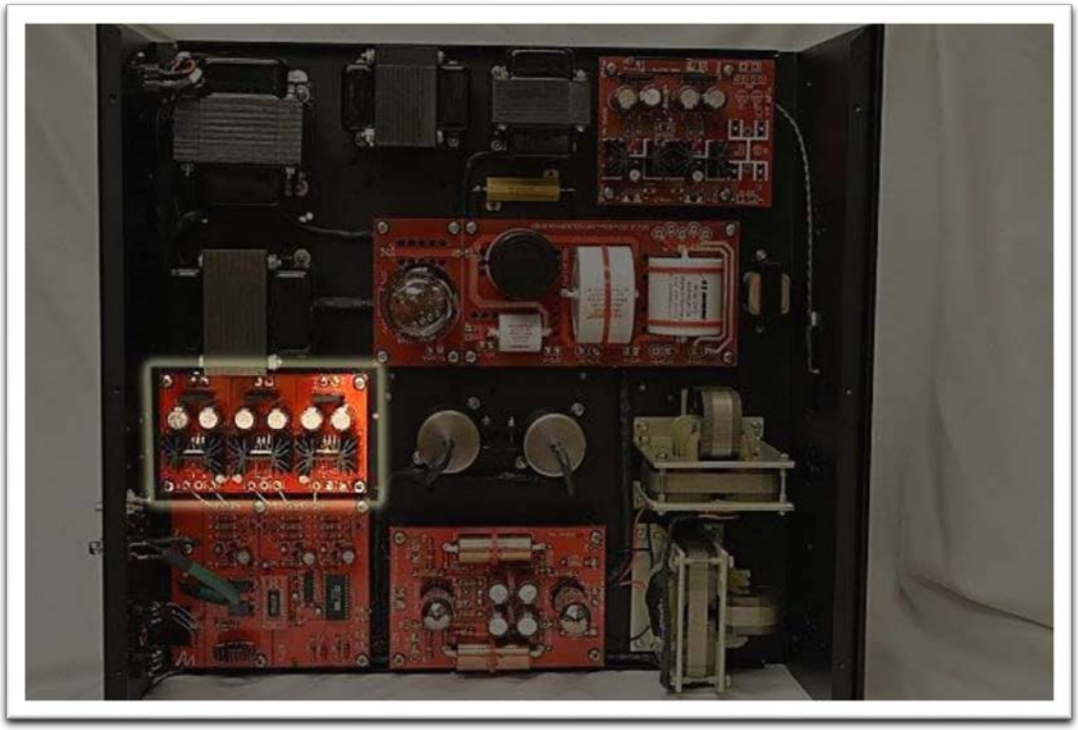


Figure 29 - Snipped pins on the back side





10 - DAC5.1 Interwiring

In this section, we are going to make all the necessary connections to hook up the Power Supply. Read through this section first before starting any work. We will start with the Mains transformer PTL4. This transformer supplies the high voltage to the Power Supply PCB. Start by looking at the three pieces of documentation below that is also located in the appendix. The Overall wiring graphic for the Power Supply and the two Mains transformers. These are also in large format on the next three pages, you might want to print these out!

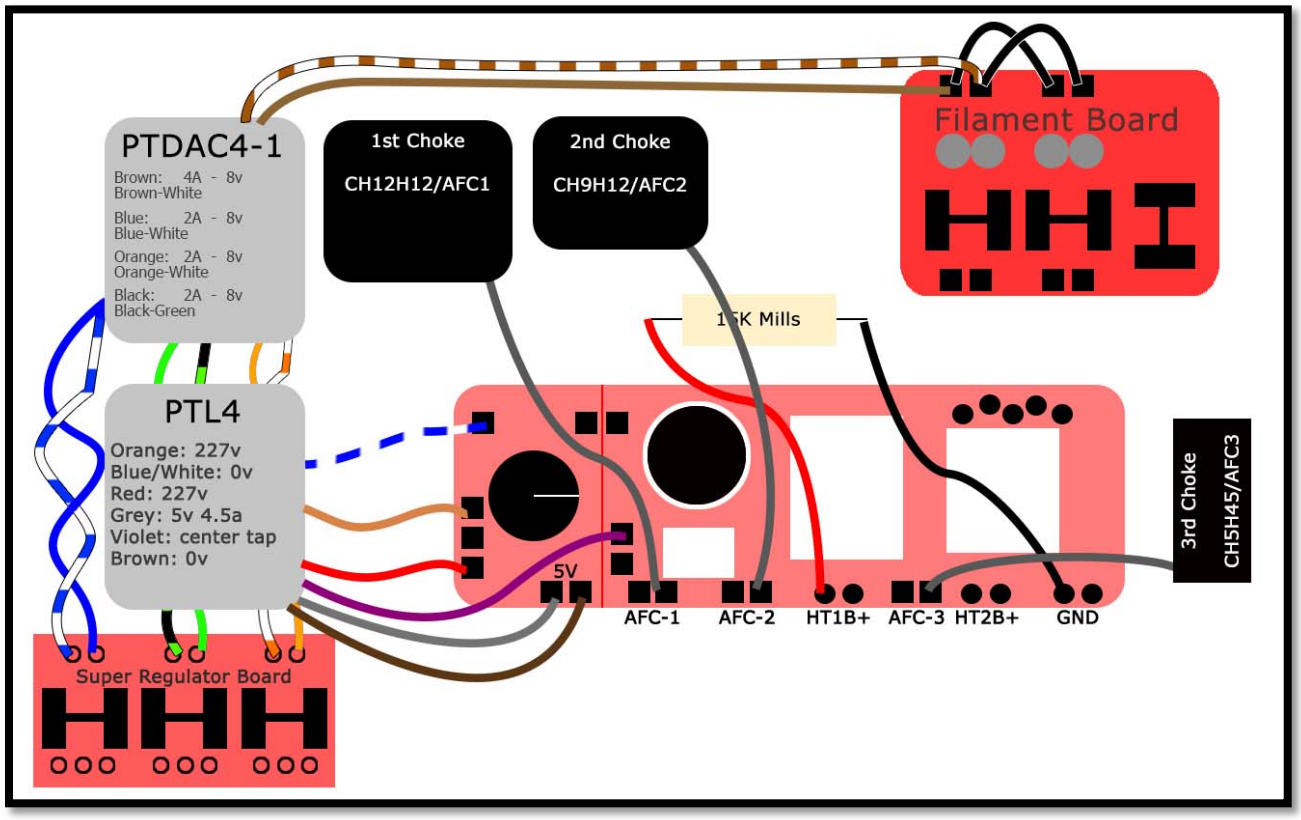
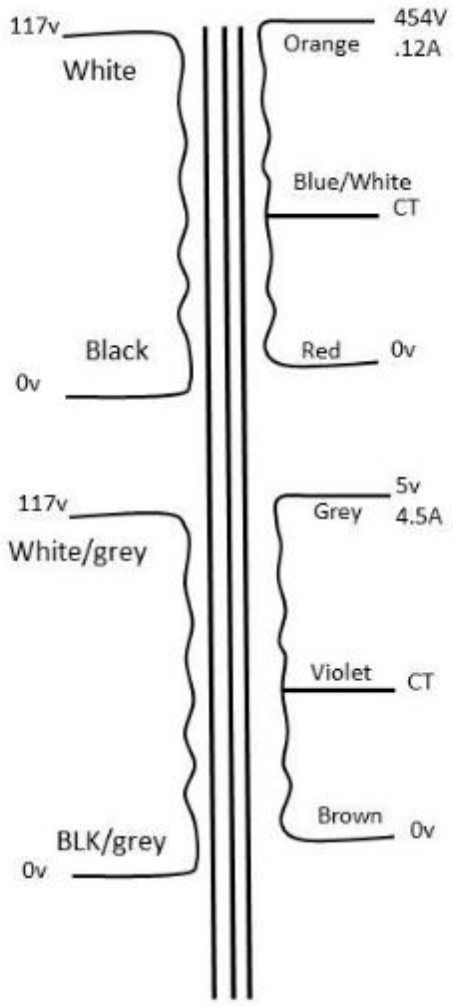


Figure 30 - DAC 5.1 Interwiring

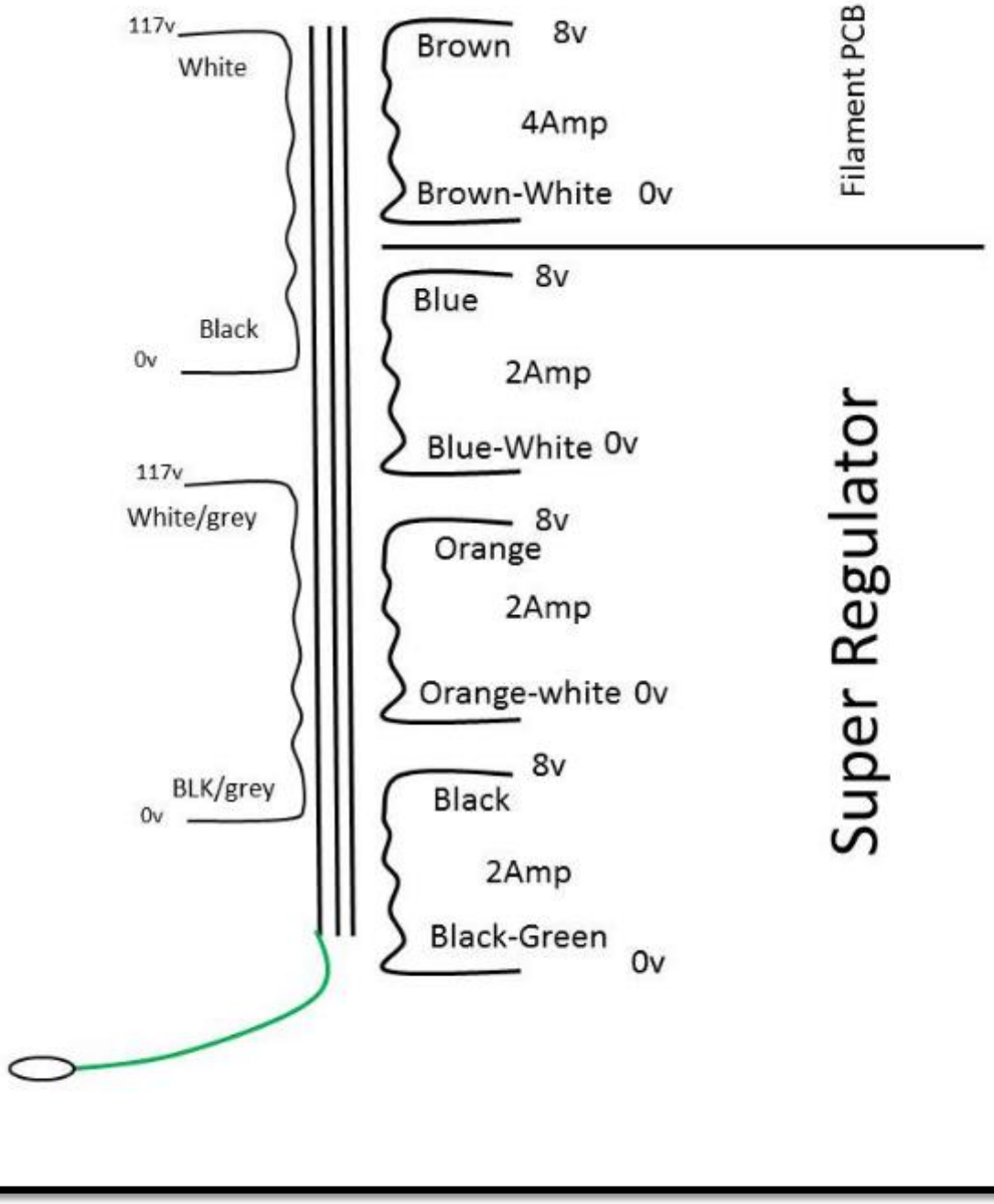
The above documentation can be found in the next full pages ahead so you can print out along with the Mains transformer connections!

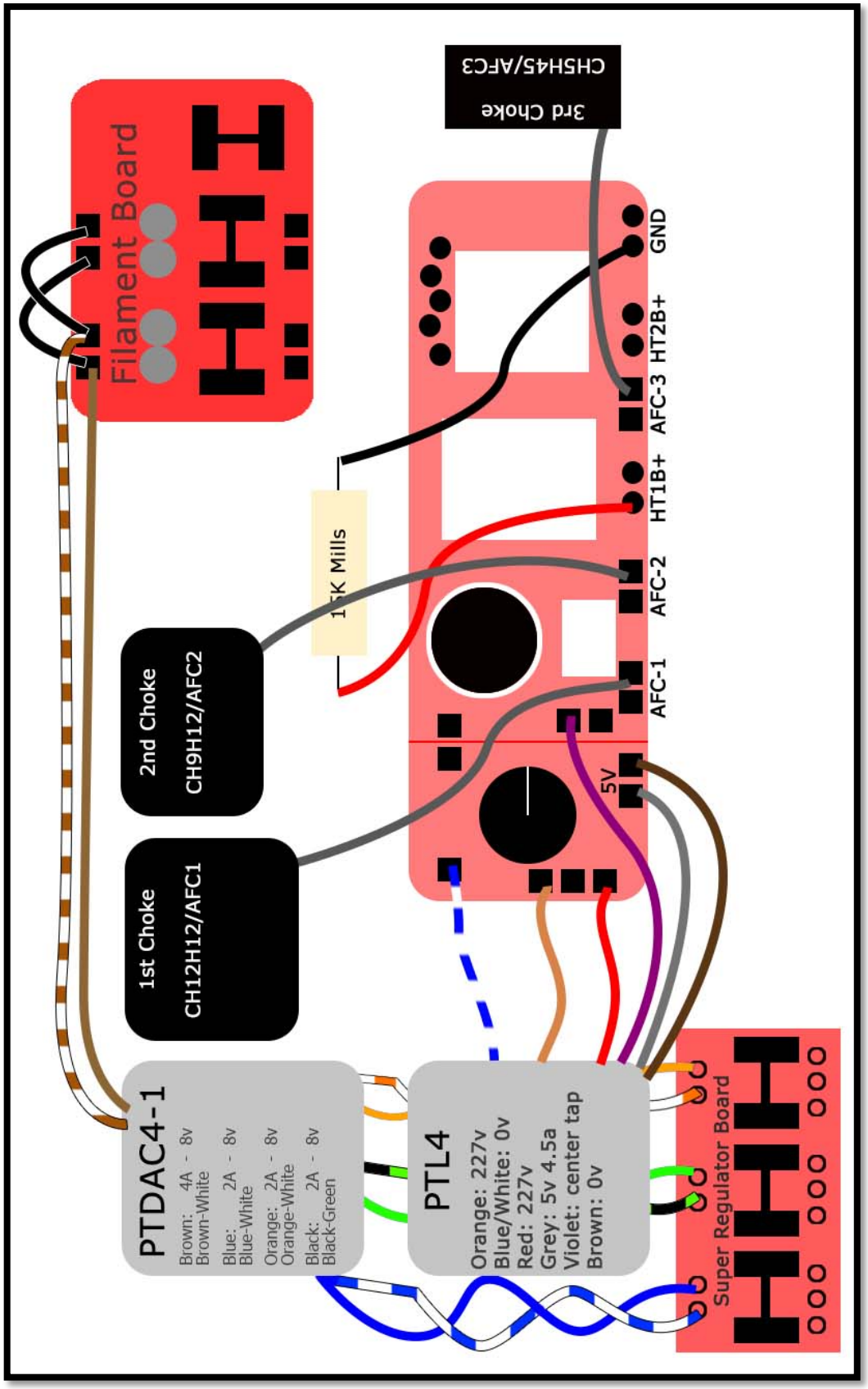
PRINT OUT and review!

PTL4 – Dac5.1 Mains transformer



PTDAC4-1 – Dac5.1 Mains transformer for Filament




Filament Board
3rd Choke
CH5H45/AFC3
2nd Choke
CH9H12/AFC2
1st Choke
CH12H12/AFC1
15K Mills
AFC-1
AFC-2
HT1B+
AFC-3
HT2B+
GND
5V
PTDAC4-1
Brown: 4A - 8v
Brown-White
Blue: 2A - 8v
Blue-White
Orange: 2A - 8v
Orange-White
Black: 2A - 8v
Black-Green
PTL4
Orange: 227v
Blue/White: 0v
Red: 227v
Grey: 5v 4.5a
Violet: center tap
Brown: 0v
Super Regulator Board

10.1 Wiring the PTL4 transformer to the Power Supply PCB

So once the Power Supply PCB is completed and the filament PCB have been completed we can start with all the interwiring. This is where we will connect the components including the Mains transformers, the Chokes, the 15K Shunt Resistor, etc to the Power Supply PCB.

Start with the PTL4 transformer located towards the middle of the chassis and identify the high voltage wires.

Orange, Red and Blue/White: check these wires out on the PTL4 transformer sheet and you will see they are 454V – CT - 0. Connect these to the Power Supply PCB as shown on the graphic. They are all somewhat short lengths to connect, give yourself a little slack in case you need to lift the board up later, an extra 2” of slack would be good or if you are an expert wiring guru you can make your own decision.

Then hook up the 5V AC filament to the PCB – these will be the grey and brown wires and the purple will be the center tap.

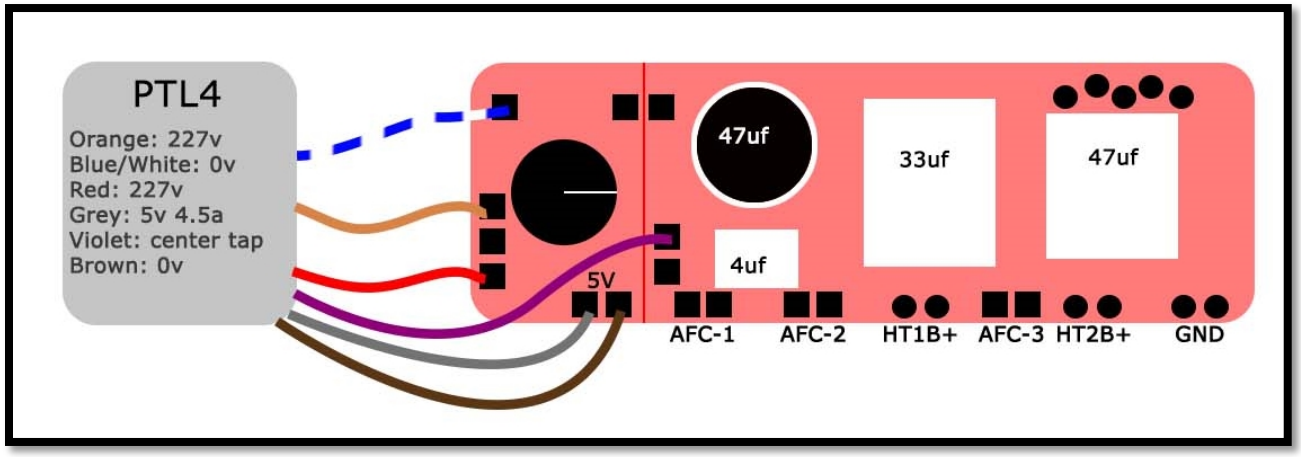


Figure 31 - Wiring the PTL4 Transformer to the Power Supply PCB

That completes the PTL4 transformer, Congratulations!

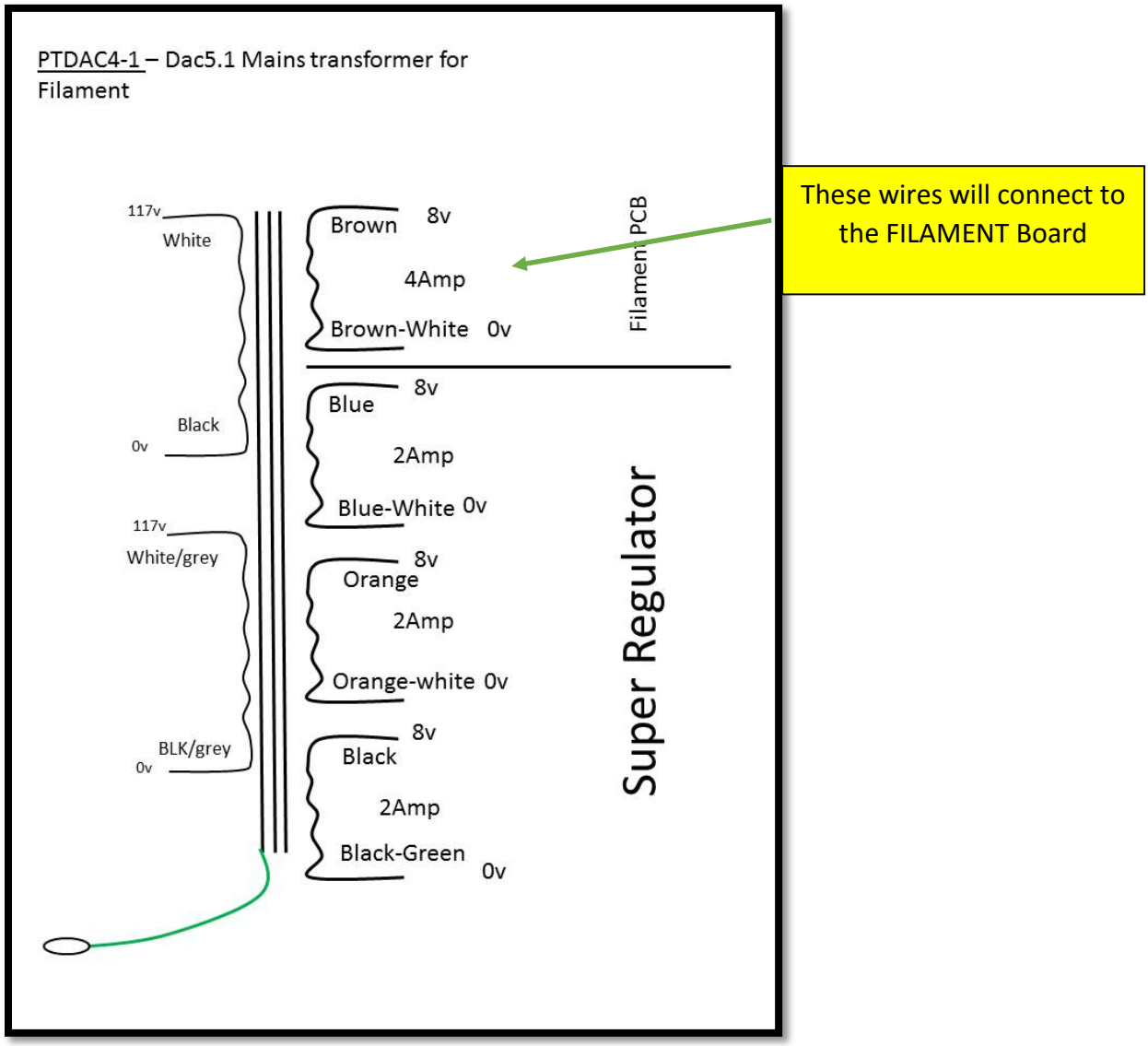
10.2 Wiring the PTDAC4-1 Transformer to the Filament Board

Now let's look at the dedicated filament transformer PTDAC4-1.

This transformer has 4 secondary's that are all 8V AC, one of them is a 4A version while the others are 2A versions. The 2A versions all go to the Super Regulator Board on the digital side while the 4A one goes to the Filament PCB.

Start by twisting the wires together on each 8v AC pair.

We are only going to be using the Brown and Brown/White for the moment. Route these wires over to the Filament Board and solder from under the board to the input of the Filament PCB.



Connect the Brown and Brown-white wires to the filament board as shown below in *Figure 32*.

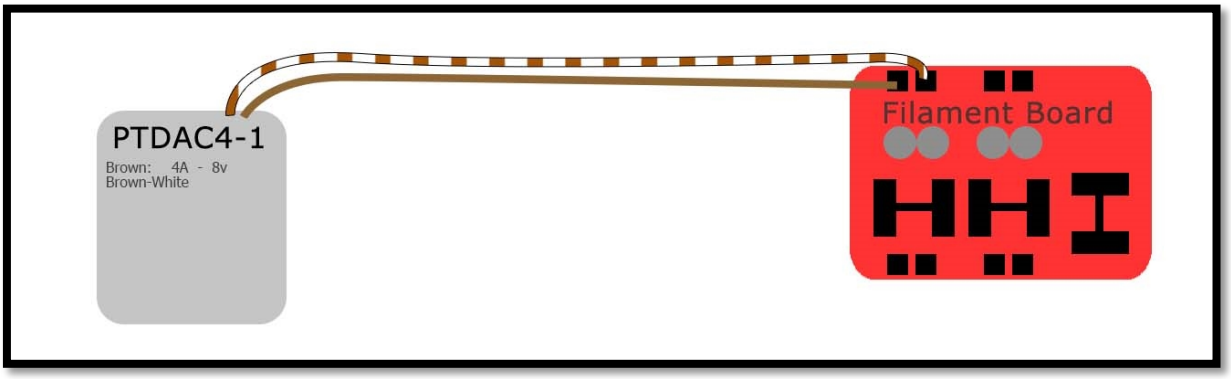


Figure 32 - Position of the brown and brown-white wires

Next, “bridge” these wires over to the second position as shown in *Figure 33* so basically this single 4A 8V ac source will supply both of these filament sections.

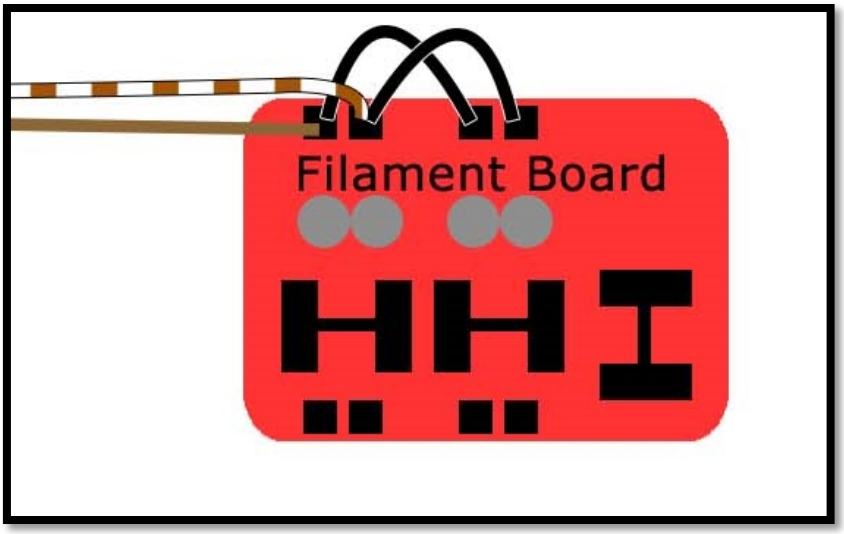


Figure 33 - Bridging the wires

10.3 Wiring the Choke Transformers to the Power Supply PCB

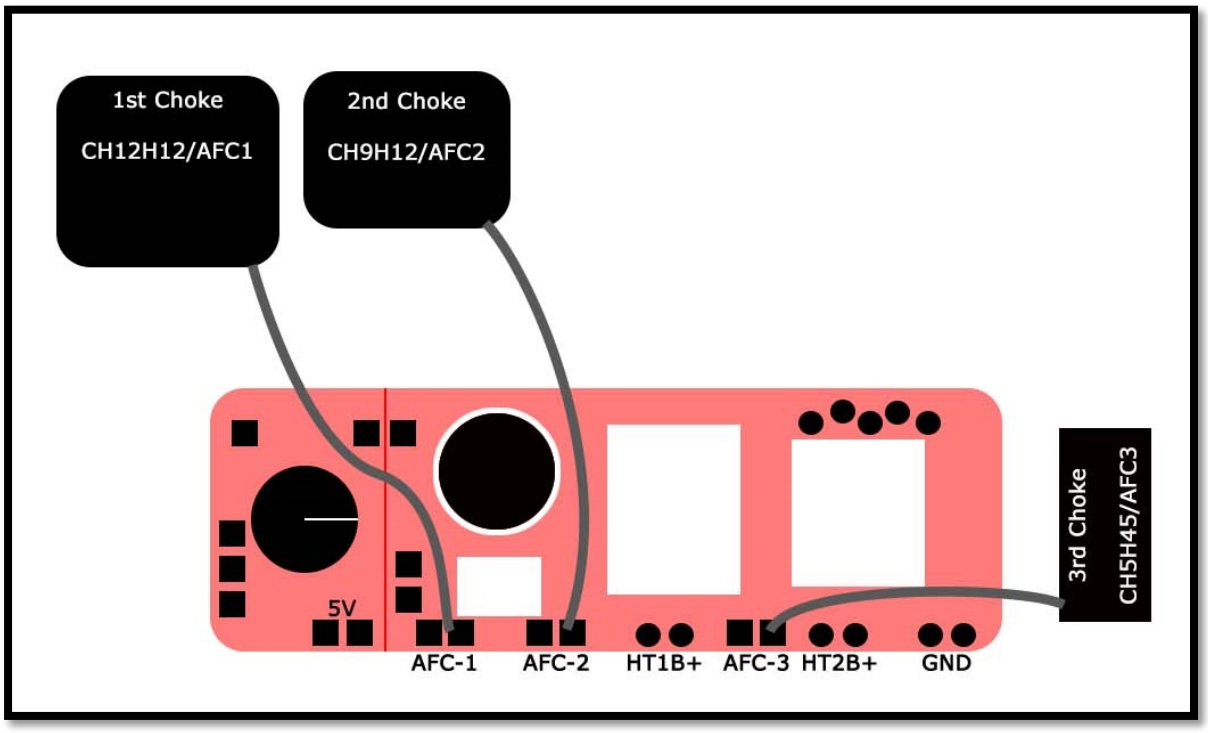


Figure 34 - Chokes to the Power Supply PCB

1. The 1st choke (CH12H12) will connect into AFC-1. It does not matter which wire goes into which of the two inputs, you don't need to twist these wires, just run them straight under the board to this position.

2. Take the 2nd choke (CH9H12) and wire to AFC-2 position.

3. Connect up the 3rd choke to the AFC-3 position.

10.4 Wiring the 15K Mills resistor to the Power Supply PCB

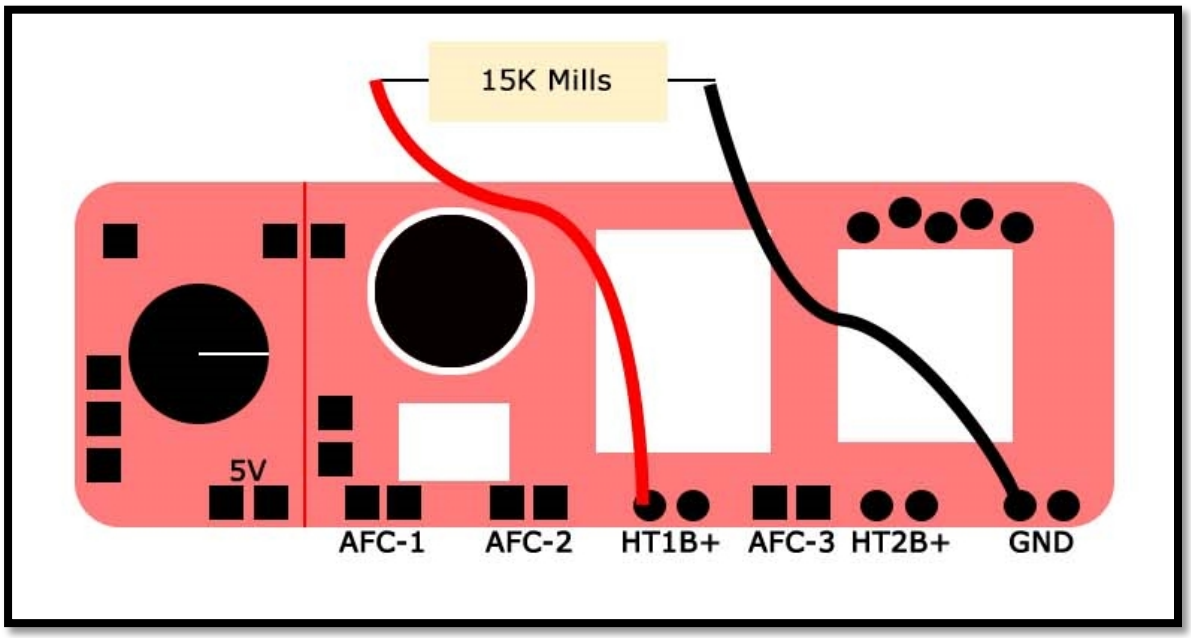


Figure 35 - 15K Mills Resistor to the Power Supply PCB

Wire one side to the HT1B+ position, and wire the other side to the GND position.

10.5 Wiring the Super Regulator Board

With the board complete we will refer back to the PTDAC4-1 transformer and take the three remaining pairs of twisted wires. It actually does not matter which pair goes to which input, they are all 8v AC pairs at 2AMPs so you can go ahead and connect the three pairs to the three inputs. Also it does not matter which wire of the pair goes to the two input pins as it is AC voltage and just a phase difference. Transformer details can be found on the next page.

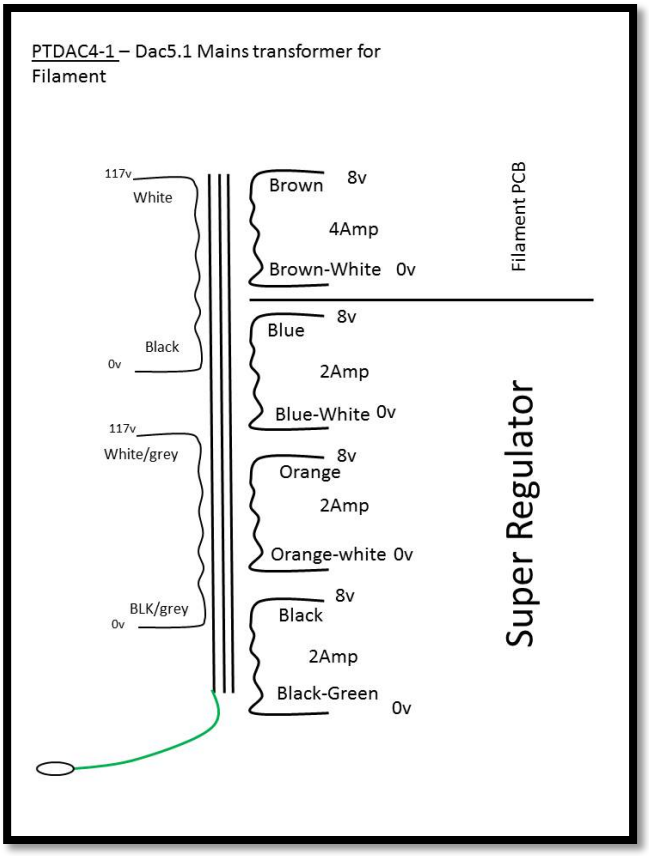


Figure 36 - Twisted wires from the PTDAC4-1 Transformer

- Take the Blue & Blue/White pair and twist together
- Take the Orange and Orange/White pair and twist together
- Take the Black and Black/Green pair and twist together

Route these wires down to the Super Regulator Board and wire into the board.

Each pair goes to an input side. They are all the same specification so it does not matter which pair goes to which of the three sections.

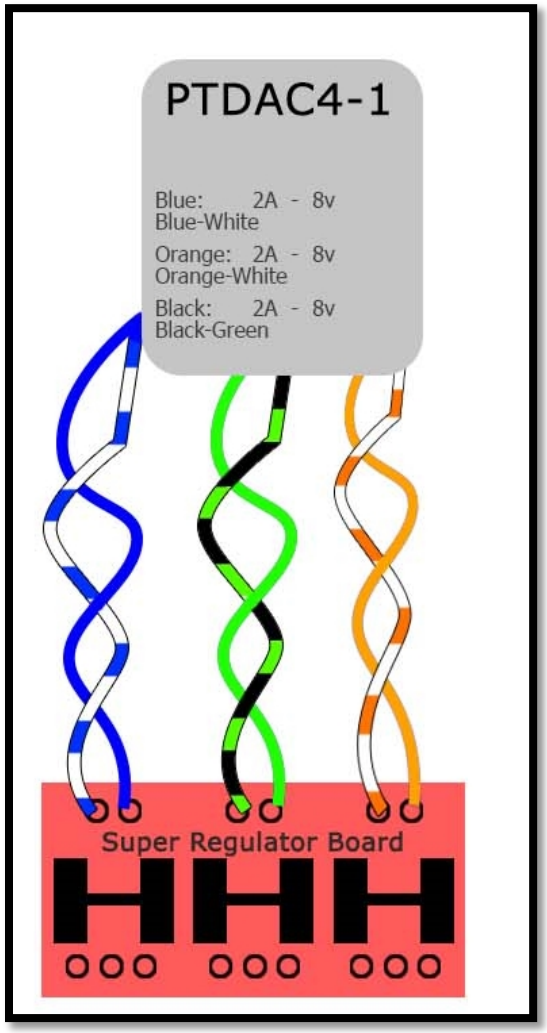


Figure 37 - Wires from the PTDAC4-1 to the Super Regulator Board

Figure 37 shows an example of the interwiring connection from PTDAC4-1 connected to the Super regulator board.

11 - Testing the Power Supply

So we have just completed building the Power Supply section which should look like the picture above. Next we will test the voltages across the Power Supply PCB, the Filament Board, and the Super Regulator Board.

Start by getting a Fuse for the IEC plug section and installing in the IEC plug. This would be a 1A slob lo FUSE 5x20mm, these can be found in your IEC bag. Make sure the rocker switch is off which means that the 0 is flush to the chassis and the 1 is raised up. When you go to power up (not yet) you will push the 1 down so that it is flush with the chassis.

Next you will power up the unit to test some voltages. Start by making sure that no wires that are connected to the Power supply are left dangling. If you have followed the instructions to this point there should be no extra wires.

We just want to make sure that when the unit powers up there won't be voltage going into a wire that is dangling. This is why we have not had you hook up any wires to the power supply board that are not going anywhere (like filaments and HT wires).

Ok if you are feeling ready and you have checked over all your connections then you are ok to turn on and that is with NO power supply tube installed

You should be able to get 5 voltages with no tube installed

They are as follows:

The three 9V DC voltages on the Super regulator board

The two 6.3V DC voltages on the Filament Board

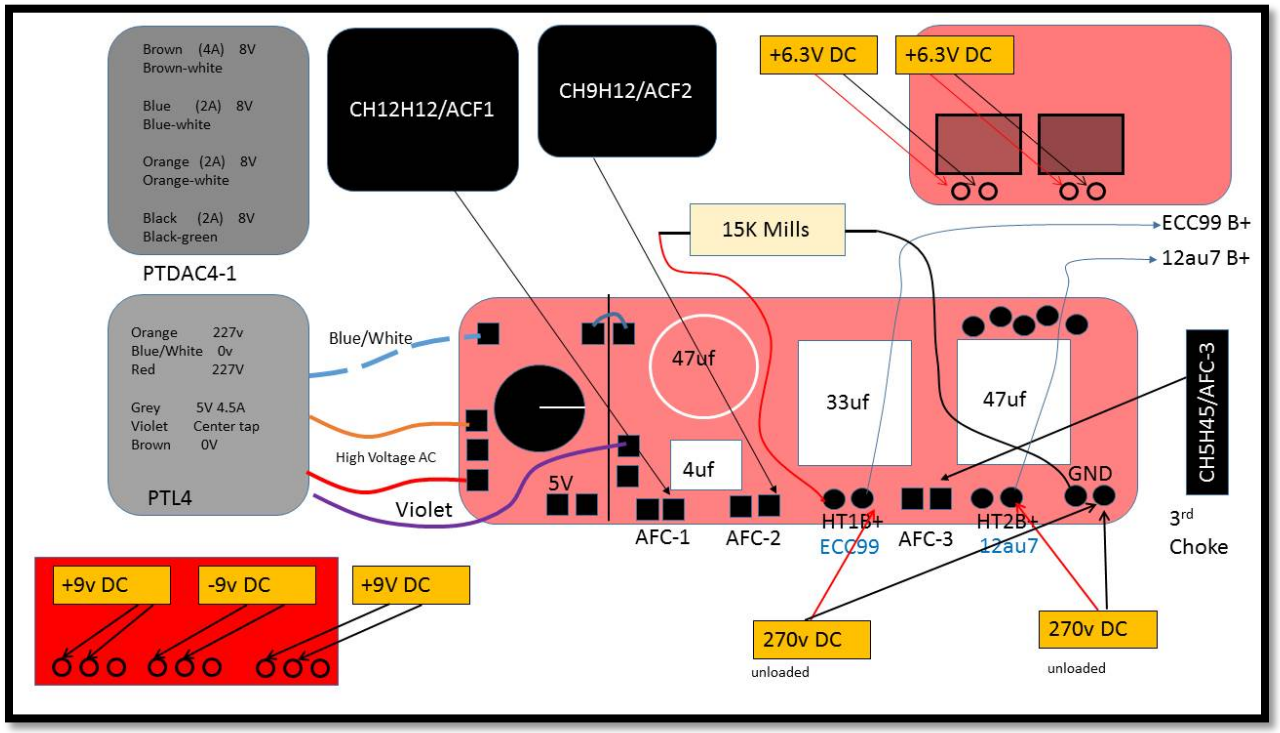


Figure 38 - Voltage check locations

See the next 2 pages for a printable version of the voltage checks. Now here are the steps to power on and test power supply

See the graphic on next page to identify these locations, use your voltmeter to measure.

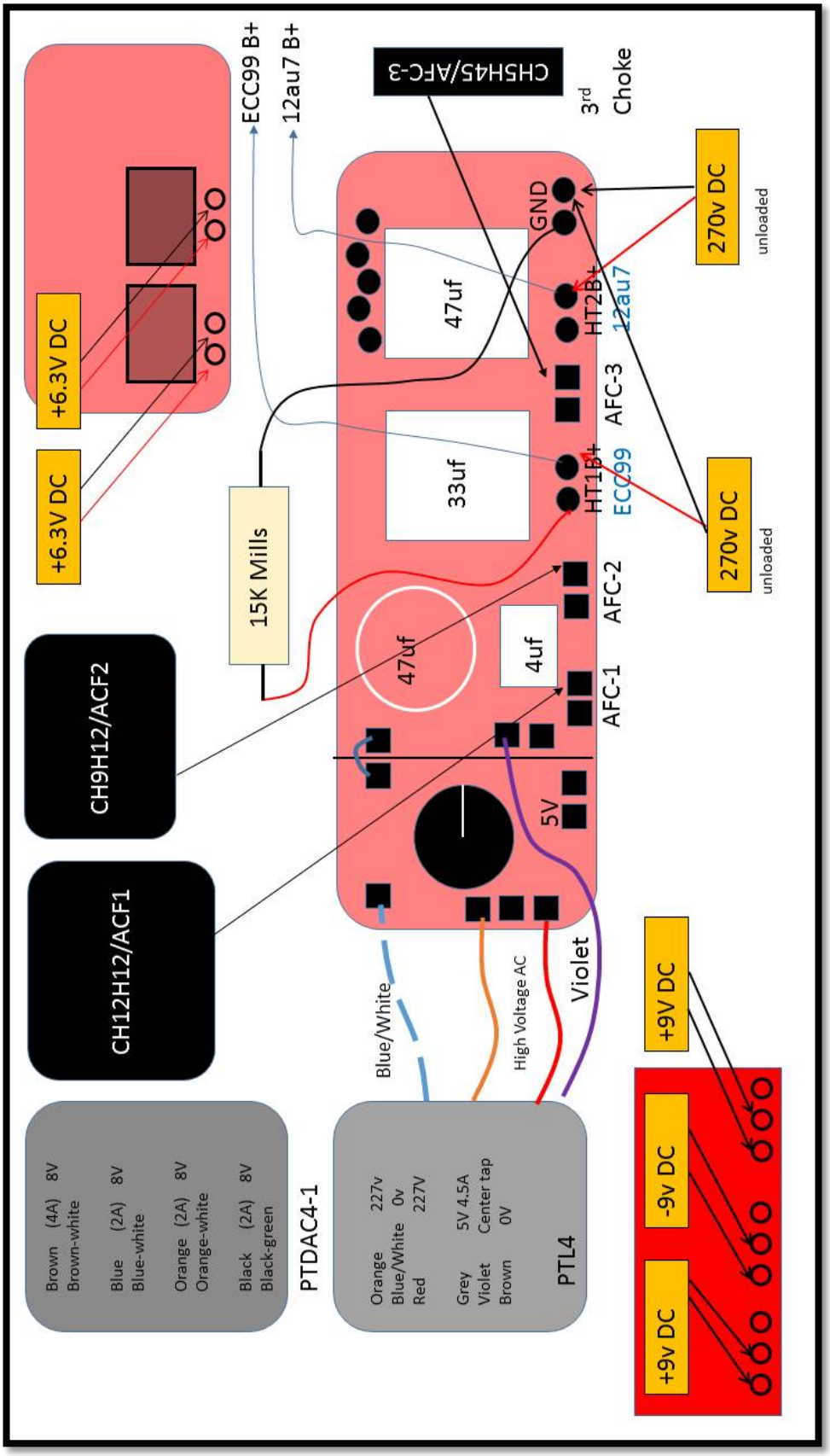
If you are not getting any voltages, make sure you are on DC volts on your meter and if still no luck check that the Power Switch is in the 1 position against chassis and that the FUSE is not blown. You can use an ohm meter on the fuse when it is removed and see if it is zero ohms (working) or Infinite (means fuse has blown).

If things are not working, contact audionotekits@rogers.com for the next steps. If all is well then move on to the next step.

Turn the unit off.

11.1 Install the 5U4G EH tube in position in the 8 pin socket

Power on the unit and measure the two HIGH voltage points (HT1 B+, HT2 B+) which will be in the 270-280 range. This voltage will settle down to 260v once we connect up the rest of the circuit, but for now if you are getting a voltage in the 260-290v DC range then all is good and you have successfully completed the Power Supply testing section.


Brown (4A) 8V
Brown-white
Blue (2A) 8V
Blue-white
Orange (2A) 8V
Orange-white
Black (2A) 8V
Black-green
PTDAC4-1
Orange 227v
Blue/White 0v
Red 227V
Grey 5V 4.5A
Violet Center tap
Brown 0V
PTL4
CH12H12/ACF1
CH9H12/ACF2
+6.3V DC
+6.3V DC
15K Mills
ECC99 B+
12au7 B+
CH5H45/AFC-3
3rd Choke
47uf
33uf
47uf
4uf
5V
AFC-1
AFC-2
AFC-3
GND
HT2B+
12au7
HT1B+
ECC99
270v DC
unloaded
270v DC
unloaded
Blue/White
High Voltage AC
Violet
+9V DC
-9v DC
+9v DC

12 - Digital Board

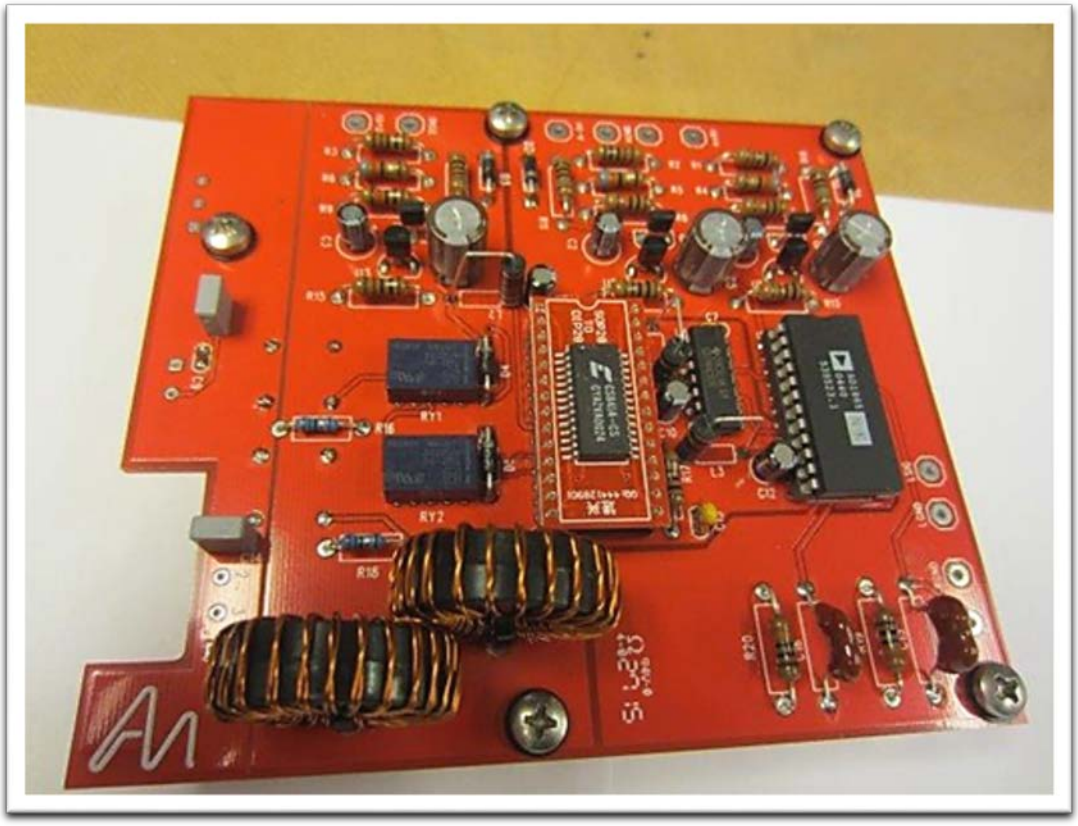


Figure 39 - Digital Board

What is the Digital DAC Board?

This is a PCB board that basically takes the SPDIF signal from a device like a transport or CD player or computer and converts it into an analog signal which represents the music and can be amplified by the output stage in our DAC5.1. SPDIF is a standard for digital music: *Sony Philips Digital Interface Format*.

THE SPDIF signal goes through a torrodial input transformer, this is done for protection and to ensure a high quality SPDIF signal gets delivered to the Board. Out of the torrodial it enters the CS8414 receiver chip, this chip will strip off the modulation and output a pure digital 1's & 0's format. This enters the Analog Devices AD1865 Resistor Ladder Chip. This chip will output a current source representing the analog waveform. A high quality AudioNote tantalum resistor of 330 ohms is on the output board and this current combined with the resistor will create the output Voltage audio signal that we will then pass on to the IV transformers in the next stage.

The DAC5.1 Digital Board has been preassembled and tested, and it is almost ready to be installed in the chassis.

12.1 Connecting the Coaxial Cable from SPDIF to the CON1 Port

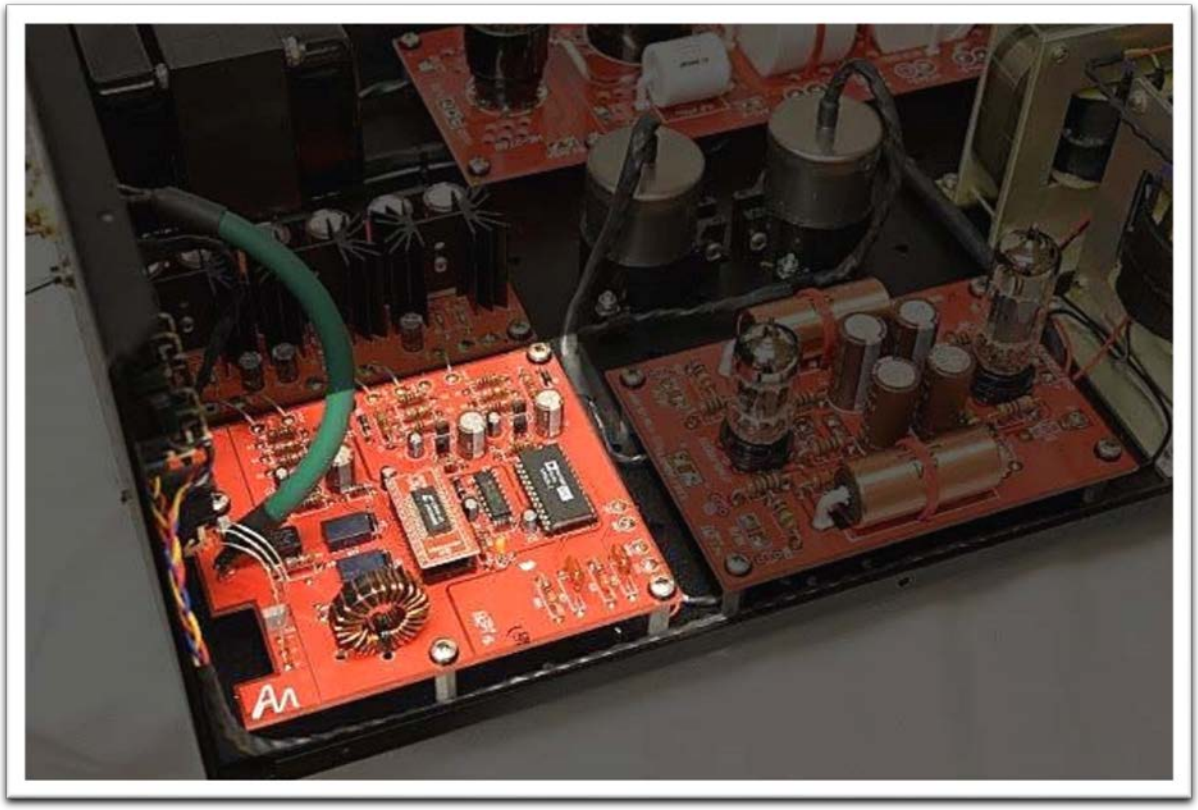


Figure 40 - Digital Board installed in position

With the super regulator board completed and in position, we are going to now position the Digital Board. This board has been built and tested at the ANK factory and will be located in an anti-static bag. There are 5 holes that secure the digital board, the hole that is unpainted and closest to the rear of the chassis will be the first hole to find.

We are actually going to just introduce a couple of connections to the digital board before positioning in the chassis that we will be installing later.

Connect the Coaxial cable from the SPDIF input to CON1
USB input
XLR input Con1

The board has two channels or inputs: CON1 and CON2. The first channel or CON1 is connected to the Silver WBT RCA provided.

The second channel is optional – you can connect and XLR input or an SPDIF input or even a USB

As mentioned we will be wiring these connections later in the build.

12.2 Mounting the board into the Chassis

There are 5 holes on the digital board for mounting and the 5th screw is the ground. Locate the unpainted ground area on the back of the chassis and you can then position the DAC PCB into the correct location. Suggesting you just loosely put one screw into the ground hole to position the board in the chassis – We will be needing to wire to this board and its easier when the board is not installed down in the chassis – we can secure at the end of the build.

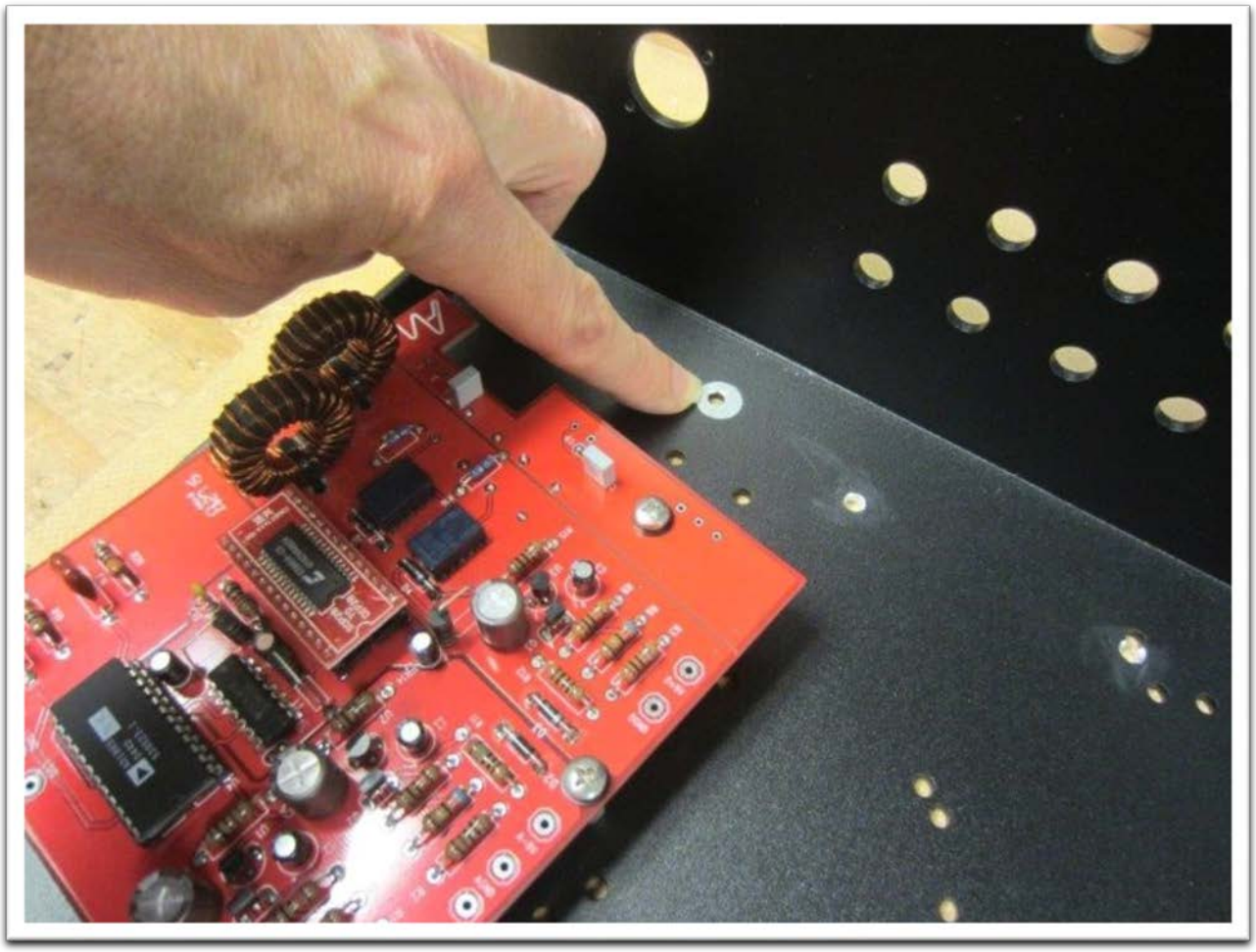


Figure 41 - Unpainted area on chassis

If you would like to wire up the inputs to the digital board – 1) SPDIF input 2) CON Switch and

3) XLR then you can go near the end of the manual on Page 86 in the section:

Rear of DAC5.1 Chassis Connections

We suggest if you decide to wait to also wait on the connections from the super regulator board to the Digital Board which are in the next section – You can do the super regulator board connections and the Digital Board inputs at the same time.

Figure 42 - Digital Board installed in the Chassis

Figure 43 Digital Board installed beside the Super Regulator Board

Figure 44 - Holes for the toggle switch and SPDIF

The Digital Board has several inputs that we will be hooking up. In the picture above you can see three holes on the right – these are for the toggle switch that is used to switch between CON1 and CON2

The two holes that you see above LEFT are the input SPDIF holes –this will connect to the WBT silver 75 ohm RCA input – the below graphic gives an over view of these connections that we will perform near the end of the build.

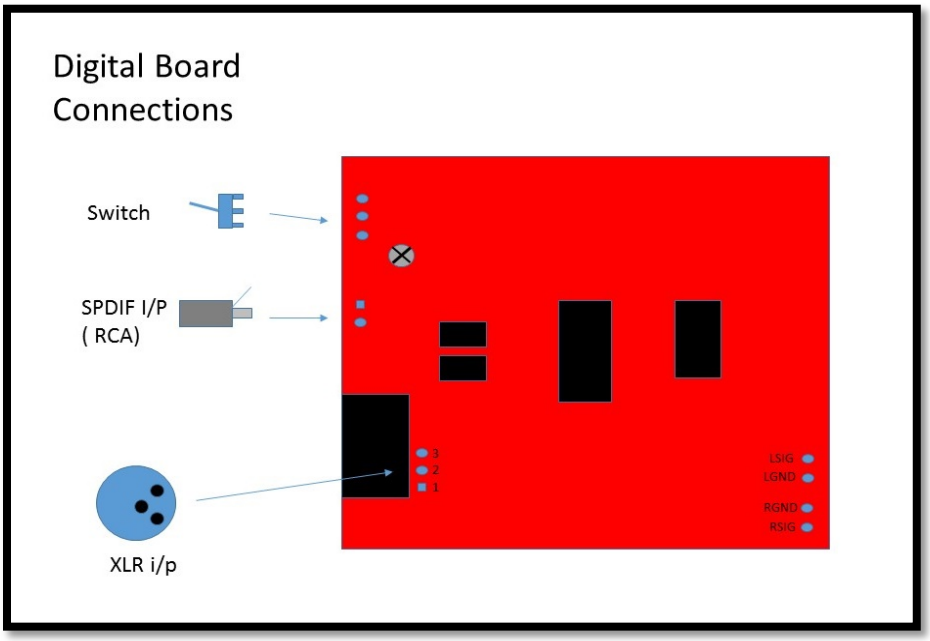


Figure 45 - Digital Board Connections

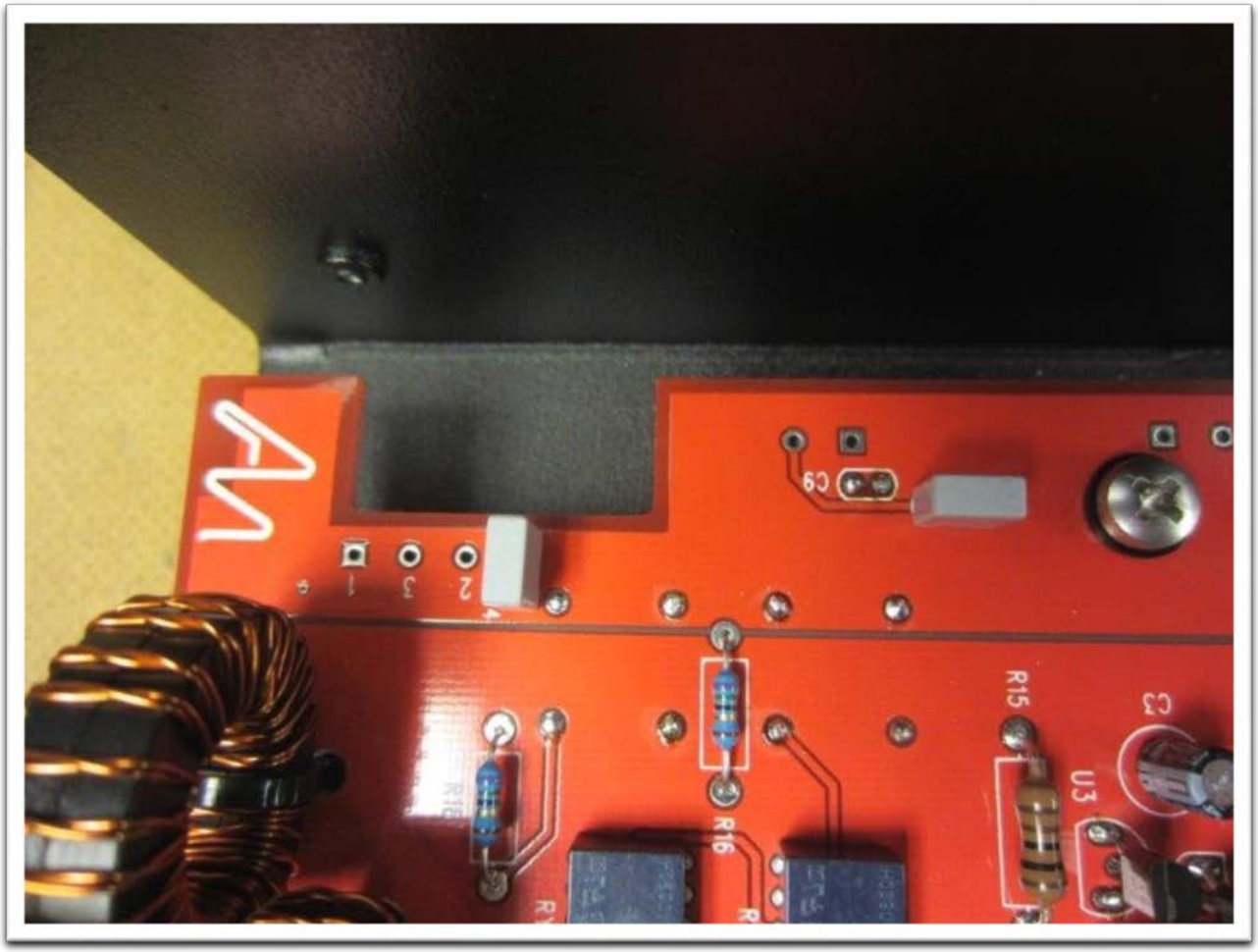


Figure 46 - XLR Digital Input holes

In this pic you can see three holes on the left of the board – these are for an XLR digital input connection – They can also be used for a USB input or a second SPDIF channel – Contact us for details.

As we mentioned these connections to the digital board can be done at the end of the build – for now let's move on to the output of the digital board which we will be connecting up and proceeding with the rest of the build.

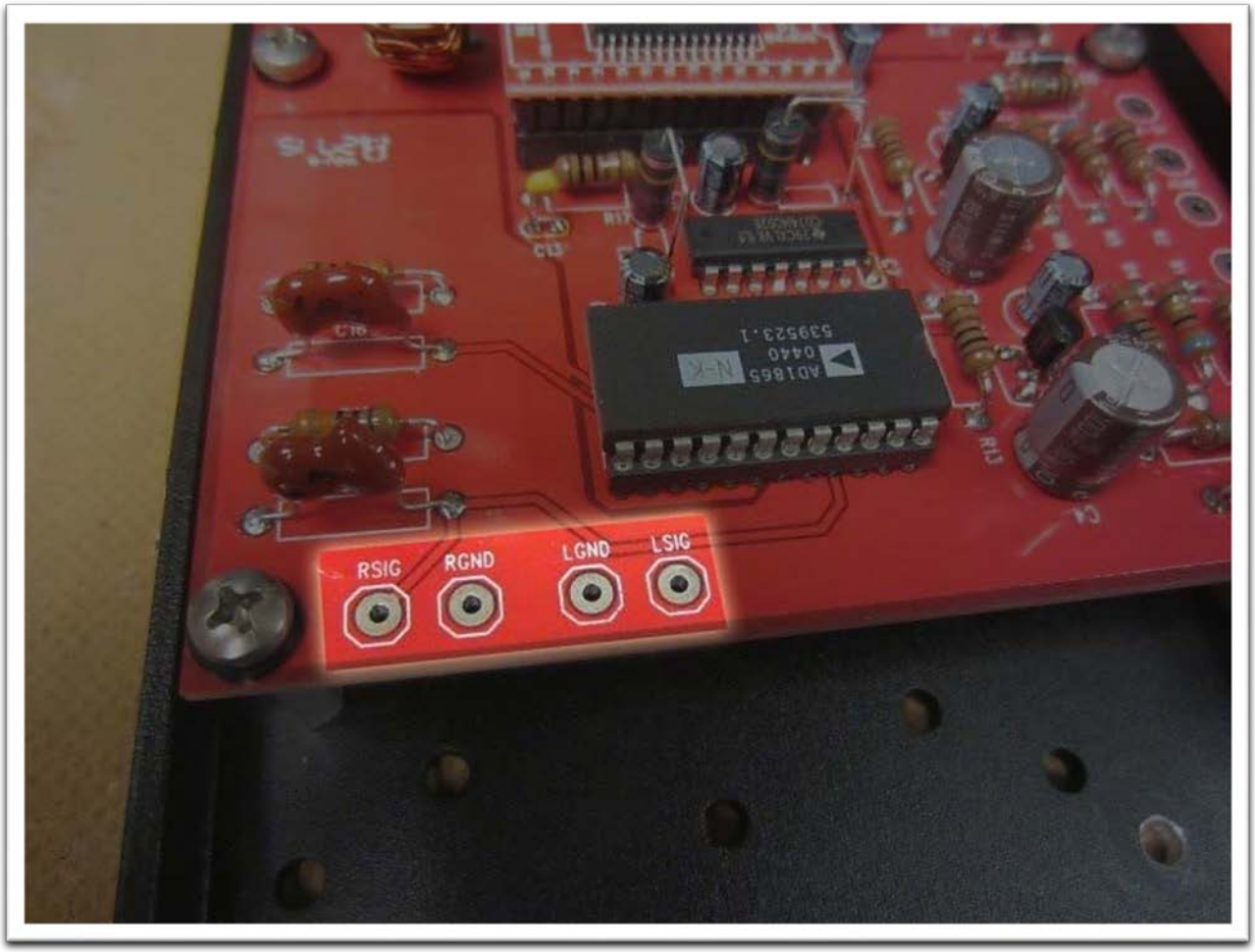


Figure 47 - Output connections on the DAC Board

Just to show you all the ports on the DAC board - These are the **Output connections on the DAC Board** – We have as Right Signal (RSIG) and a Left Signal (LSIG) – later we will be connecting these to the IV transformers which are the mu metal cylindrical cans shown below – We will repeat this information when we get to that part – for now though let's start connecting up the super regulator Board to the DAC board.

12.3 Wiring to the Super Regulator Board

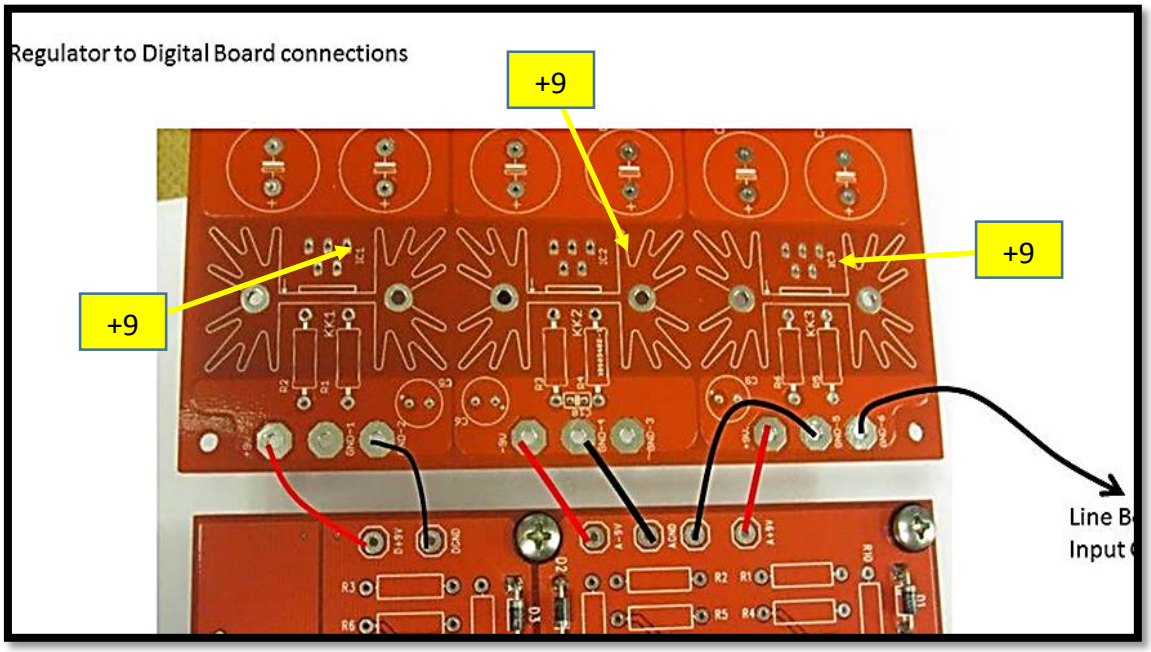


Figure 48 - Super Regulator Board to the DAC Board

The above graphic shows the connections between the Super regulator Board on top and the DAC board.

The three regulation sections on the super regulator board put out + 9 , -9 , +9

The middle section is the -9 negative voltage. So make the above connections as per the picture and it should look like *Figure 49*.

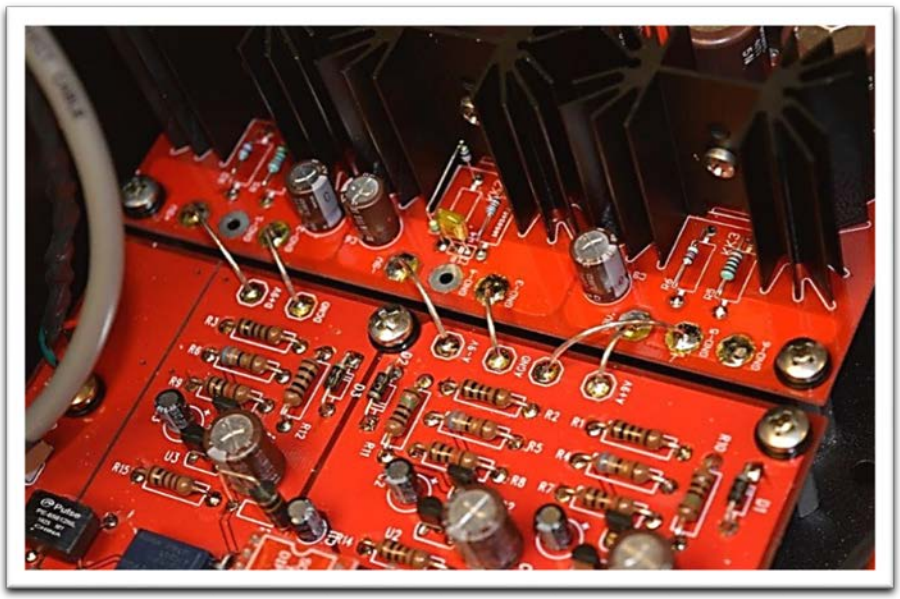


Figure 49 - Super Regulator Board to DAC Board

13 - Analog Line Board

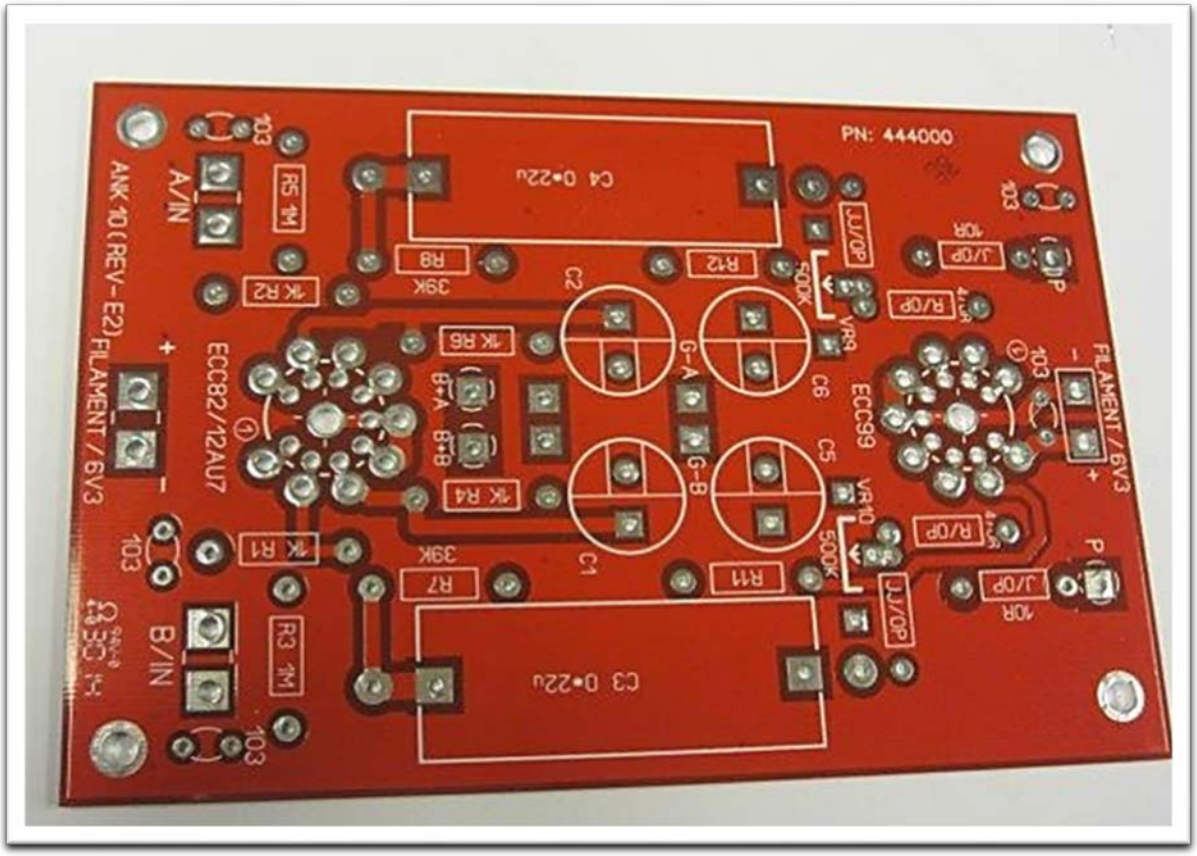


Figure 50 - Analog Board

In this section we are going to build the Analog Line Board that amplifies the Audio signal and drives the output transformers.

The input stage is comprised of a 12au7 tube and the output stage is an ECC99 that drives the output transformers. It will be installed in the chassis right next to the DIGITAL Board. This board has a couple of configurable sections but we will guide you through the configuration for use in the DAC5.1

Figure 51 - Analog Board - Completed

.

Get out the line stage kit bag with all the parts in it! Recommend you use an ohm meter to measure all the resistors and make sure you know their value and location

The parts list can be found in your kit bag or in *Table 9* on the following page – first let's install the necessary jumpers with silver wire provided.

Parts list for the Analog line board:

DAC5.1 LINE BOARD 12AU7 - ECC99 DRIVER PCB

QTY	Designation	Description	Part Number
PCB			
1	PCB	12au7- ECC99 PCB for Level 5	PCB-444000
TUBES			
1			12au7 tube
1			ECC99 JJ tube
VALVE BASES			
2			9 pin CMC valve base
RESISTORS			
2	R/OP x2		470R 1W
2	R1 R2	12au7 Grid	1K 1W tantalum
2	R5 R3	12au7 Grid to GND	1M 1W Tantalum
2	R6, R4	ECC99 Cathode	1K 1W tantalum
2	R7 R8	12au7 Anode	39K 1W tantalum
2	R9 R10	ECC99 Grid to GND	1M 1W Tantalum
2	R11 R12	ECC99 Cathode	820R 1W Tantalum
2	500K , 500K	VR9,VR10	1M 1W Tantalum
	J/OP,J/OP	plate	solid core silver wire 22g
	JJ/OP,JJ/OP		solid core silver wire 22g
ELECTROLYTIC			
4	C1 C2 C5 C6	tube cathode bypass	470uf 35v Elna Silmic
FILM CAPS			
2	C3 C4	Signal Film caps	VCAP/ Film .22

Table 9 - Analog Line Board parts

13.1 Installing the Jumpers

Add jumper wires in the positions shown in *Figure 52*.

The board is configurable as a dual mono so there are separate HT and GND traces for each channel – so you will need to connect these up for this configuration as shown

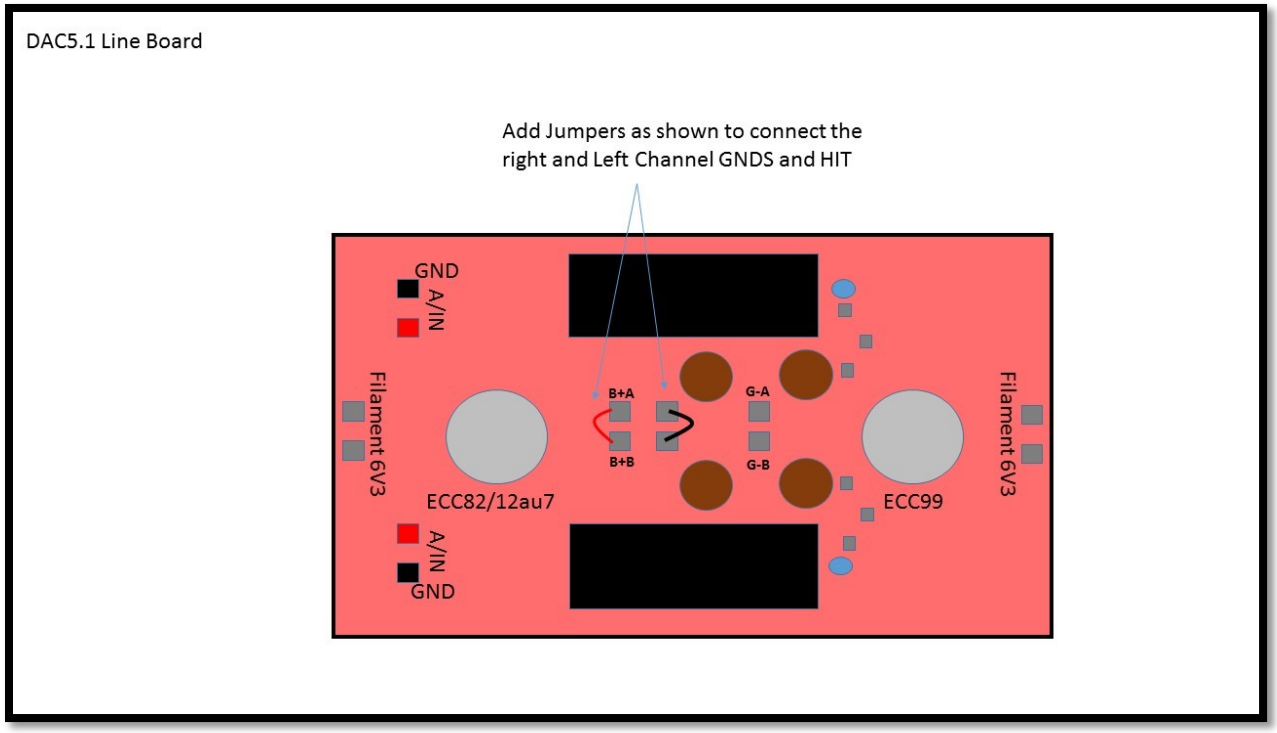


Figure 52 - Jumpers on the Line Board

B+A > B+B: This is the high voltage input for each channel so we are basically connecting the channels together.

Black Jumper: This is the high voltage input for each channel so we are basically connecting the channels together. NOTE : G-A and G-B are also grounds and connected to the black jumper as you will see when you flip over the board – You may notice that the in the photograph of the board it is slightly different these jumpers but we have found this the optimal way to do it

With the jumpers installed lets continue with populating the Line Board

13.2 Install the components

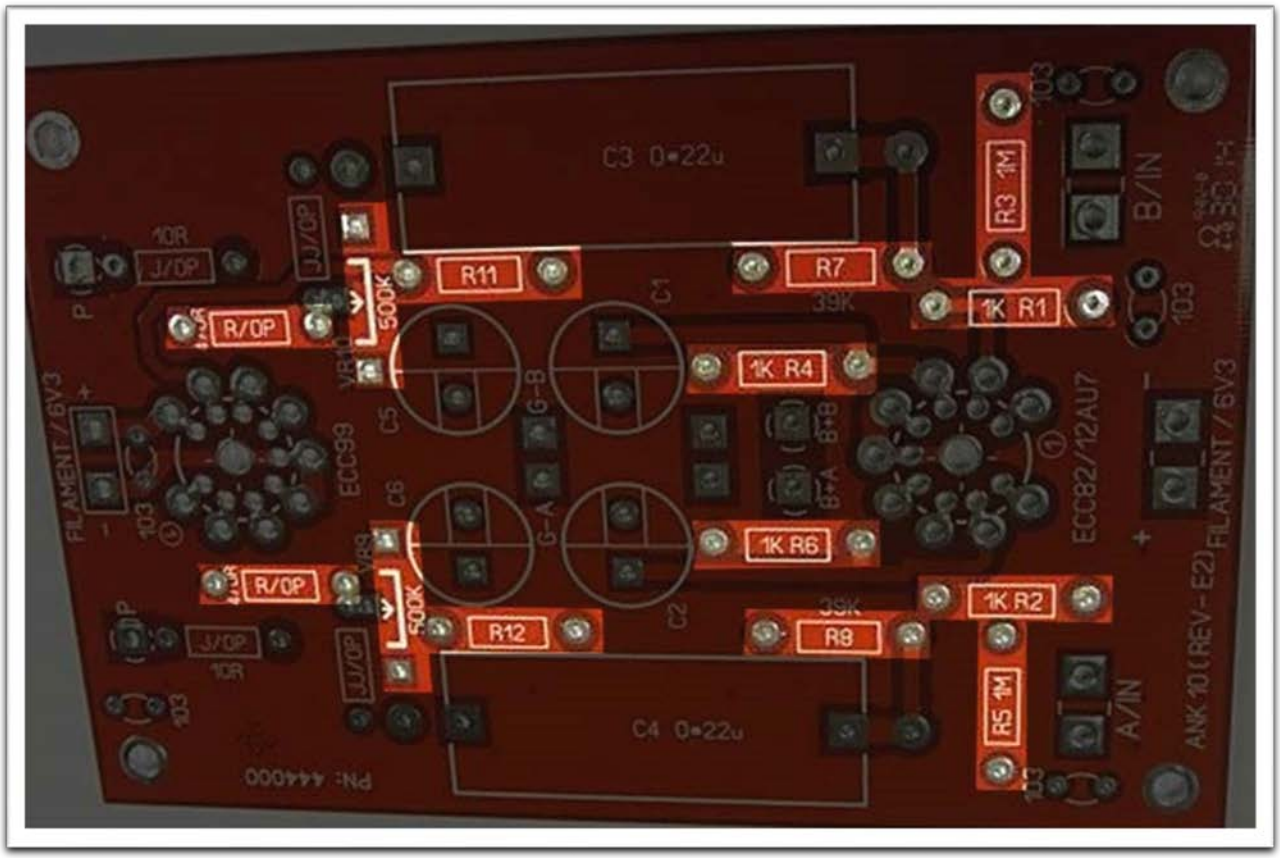


Figure 53 - Resistor Locations

So this board basically will be installed in the following order but feel free to do your own way if you prefer!

13.2.1 AudioNote Tantalum Resistors

Install the Resistors – be sure to check with an OHM meter and also read the color codes if you are so inclined to install the correct resistors in the correct positions – The only tricky one is the 1M resistors installed where you see the words 500K- this is a configurable position for use in other kits – in the DAC5.1 we will install a 1M resistor in this position

13.2.2 Valve Bases

The 2 9 pin valve bases need to be installed – there is only one way for them to go in – the main key is to be sure they are FLAT - we don't want a tube leaning over later – best way to do this like on the power supply is to use some tape to secure the valve base down – solder one leg from underside of the board and then the leg on the opposite side – with these two legs soldered remove the tape and make sure it is flat – if not flat then easy to correct at this point by re applying heat to the solder joint and pushing on the valve base on the side that needs some adjusting! Once you are satisfied then you can continue soldering the other legs!

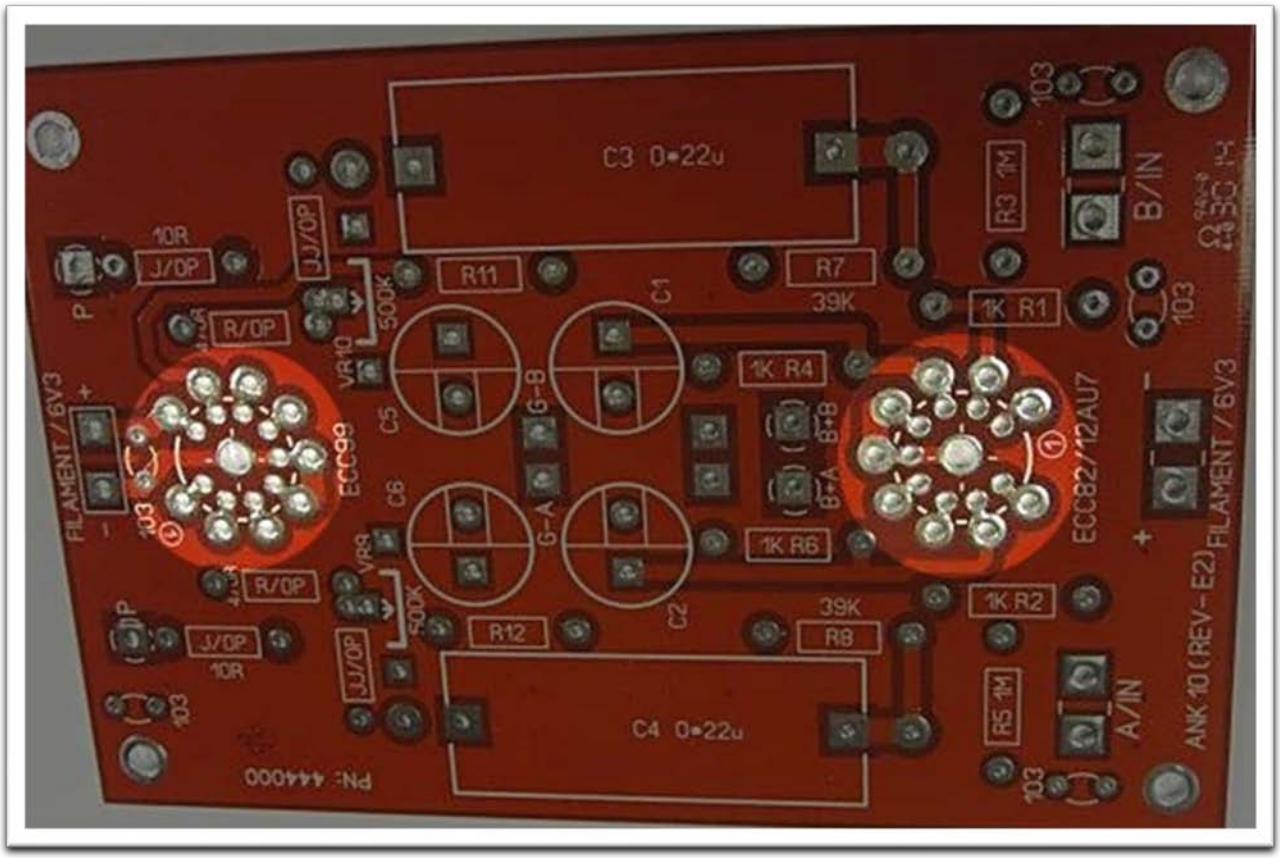


Figure 54 - Valve Base Locations

13.2.3 4 x 470uf

Then you can install the 4 Electrolytic capacitors – make sure to install in the correct orientation with the + and the – in the correct way.

13.2.4 VCAP Film Caps

The film caps are installed next – these are the large .22 VCAP or AudioNote capacitors – if you are using VCAP – there is a green and red lead on these caps – make sure that the green side is on the INPUT side of the board where the 12au7 tube is – the output of the board is the ECC99 side and that is where the red lead would go. If using AudioNote film caps then locate the line on the Cap and consider this the input side

Here is a shot of the Line stage completed and with tubes in it

Figure 55 - Completed Line Stage without Tubes

Figure 56 – Completed Line Stage - Installed

13.3 Wiring to the Filament Board

Any tube as we are sure you are aware needs a filament voltage – in this case the Filament Board on the power supply is supplying a pair of 6.3V DC filaments – These voltages will be connected to the analog line board - You will need to go to your wire bag and remove the 22g red black twisted wire that we will use to connect the filaments – cut this long 1 meter cable into two 50cm halves – then you will need to solder the red & black wires into the Filament Board in the first position – then take the other 50cm twisted red black and solder into the other filament position – see *Figure 57.*

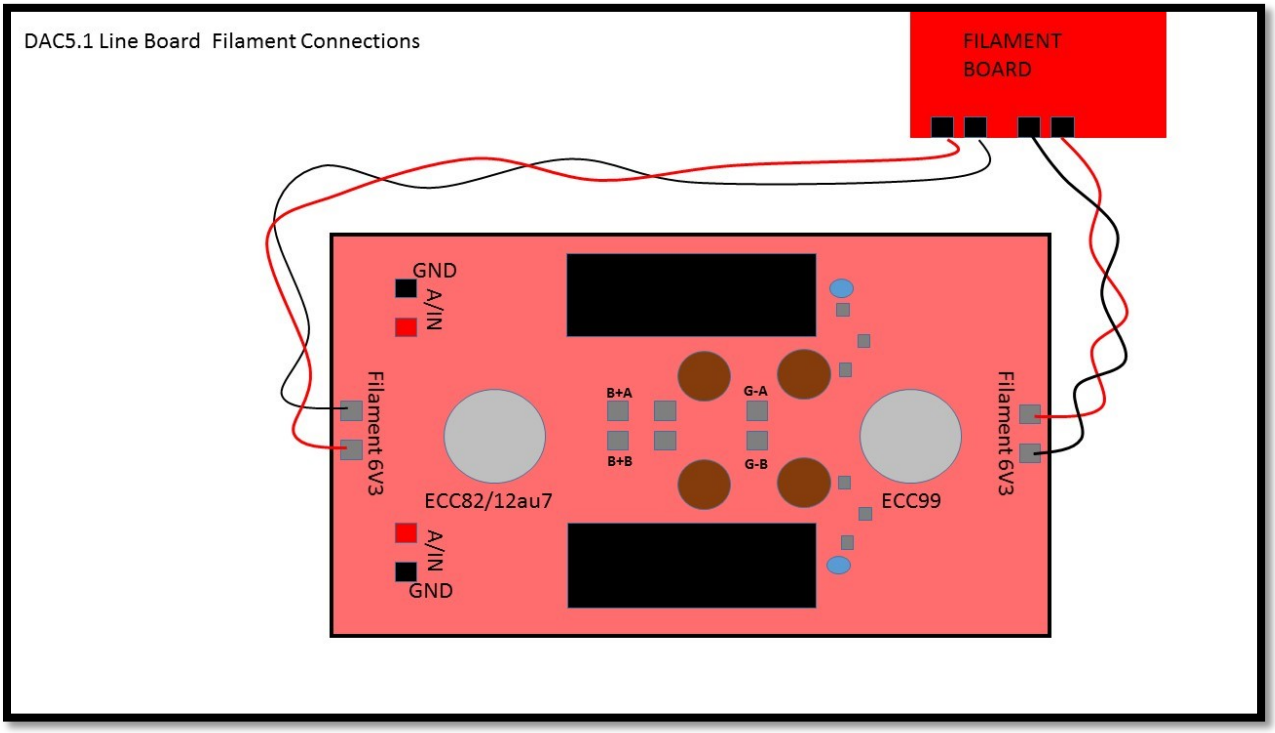


Figure 57 - Line Board to the Filament Board

This slide represents the filament supply wiring that you will do (note that the diagram shows a red line with arrow – this represents a twisted red black wire going from the filament board output to the line stage Filament input) – take the twisted red and black 22g wire and connect each section to the filament input sections on the Line Board.

13.4 Wiring Connections to the Power Supply

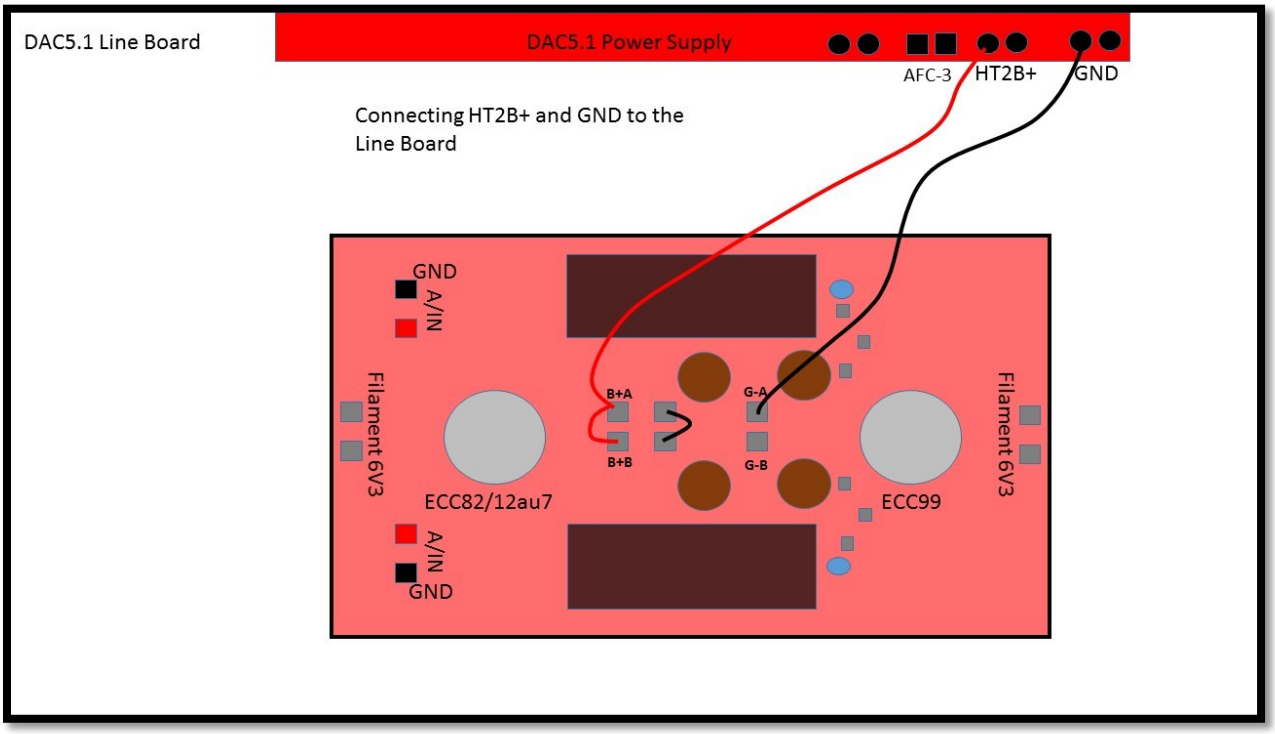


Figure 58 - Wiring the Line Board to the Power Supply PCB

In this section we are going to connect the Power Supply Board to the Line Board – as you can see from the graphic you will install the ground wire as shown to either one of the G-A, G-B connections – use a Black wire 18g . The HT2B+ from the power supply connects to the B+A connection as shown on the graphic.

14 - I/V transformer installation

The I/V transformers are 1:1 transformers housed in a mu metal can and transfer the delicate analog signal generated on the DAC board over to the Line stage with the correct impedences.

Figure 59 - Location of the I/V Transformers

On the next page you can see the graphic that shows the connections between the Digital Board Output to the IV transformers to the Input of the LINE Board.

14.1 Connecting I/V to Digital Board

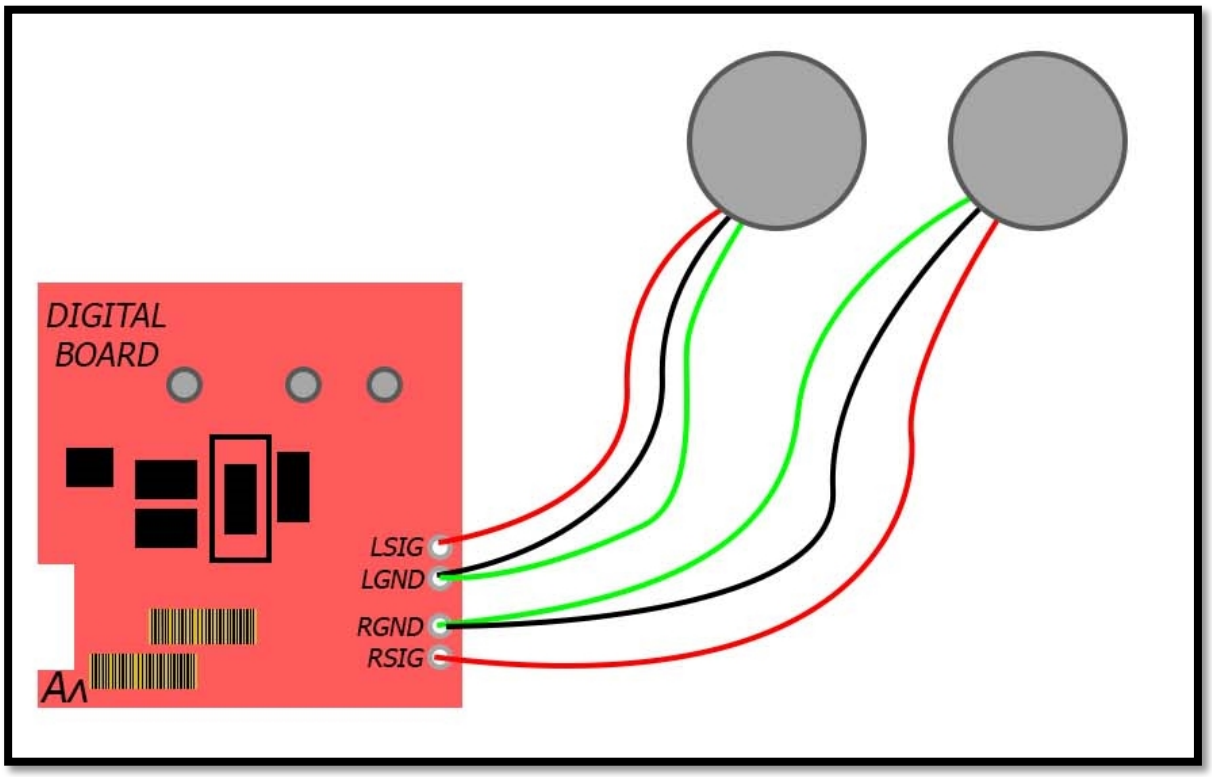


Figure 60 - Wiring the I/V to the Digital Board

In the above graphic you can see the Output of the Digital Board connects to the IV transformers. The red wire from the IV is the signal input and the black and green wires are connected to Ground. The wire from the IV transformers when you strip the ends will have exposed wire, this wire actually needs to be TINNED as it has a coating on it and will be difficult to solder into the board without doing this first. Once tinned, you can bring it to the hole on the digital board and apply some solder and it will connect to the board.

For the black and green wires, we suggest you twist them together and strip off some exposed wire, then tin this wire and place into the RGND on the digital board.

14.2 Connecting I/V to Line Board

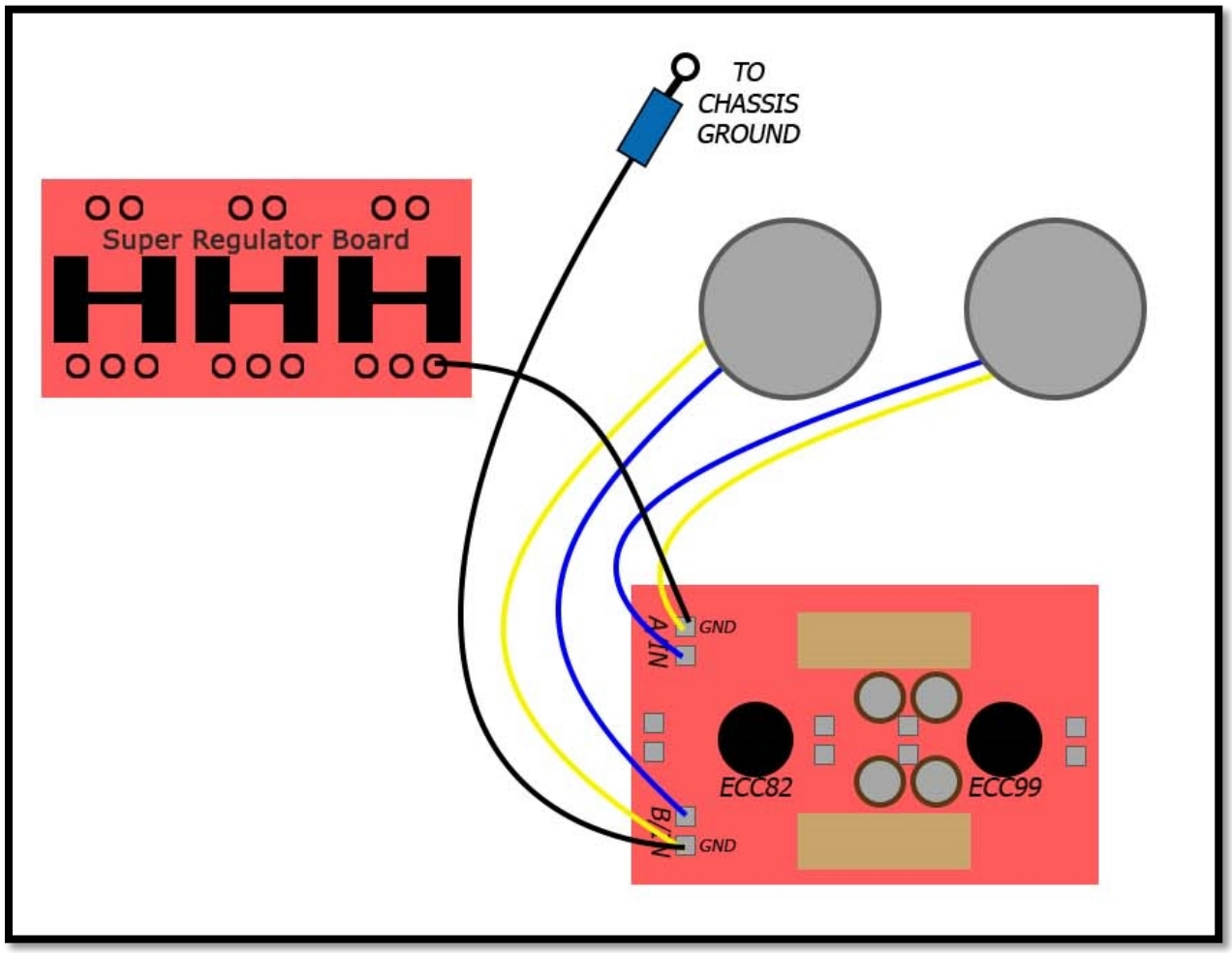


Figure 61 - Wiring the Line Board to the IV Transformers and Super Regulator Board

Now for connecting the output of the IV transformers to the Line board you can follow the graphic above – you can see that the blue wires are the signal and the yellow wires are the ground - Also remember this is where you have to connect the ground wire from the super regulator board (last hole on the right of the board) over to the input GND on the line board.

CHASSIS GROUND CABLE Connection (from ground screw to the INPUT ground on Line Board)

You can take the provided black wire with 10R resistor and .01 cap and GND lug that is connected to the chassis ground screw over by the IEC socket – route this wire over and connect to the Input of the Line Stage – see next page for input SIGNAL and ground locations.

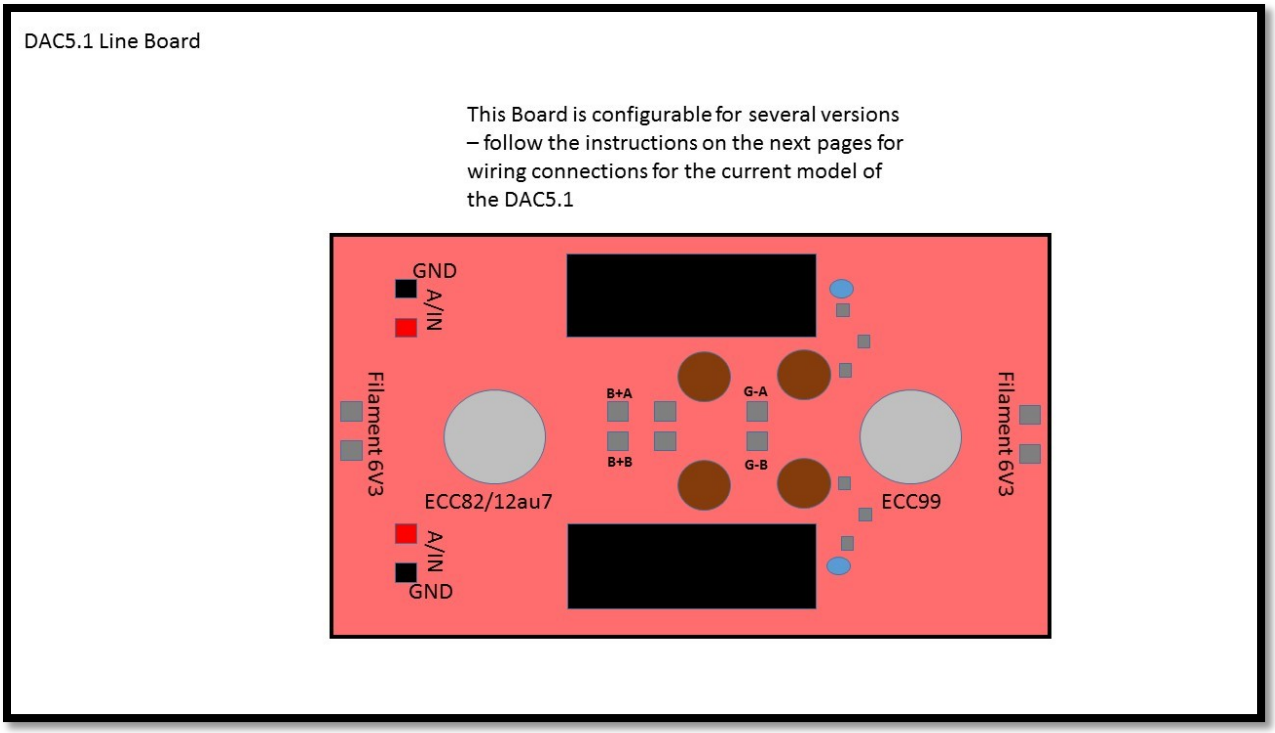


Figure 62 - Line Board

A graphic of the Line board showing the Inputs – NOTE the ground inputs are on the Outside and the left and right signal inputs are on the inside

With the IV transformers connected up we can move on to the installation of the output C core transformers.

15 - Triple C core Output transformers

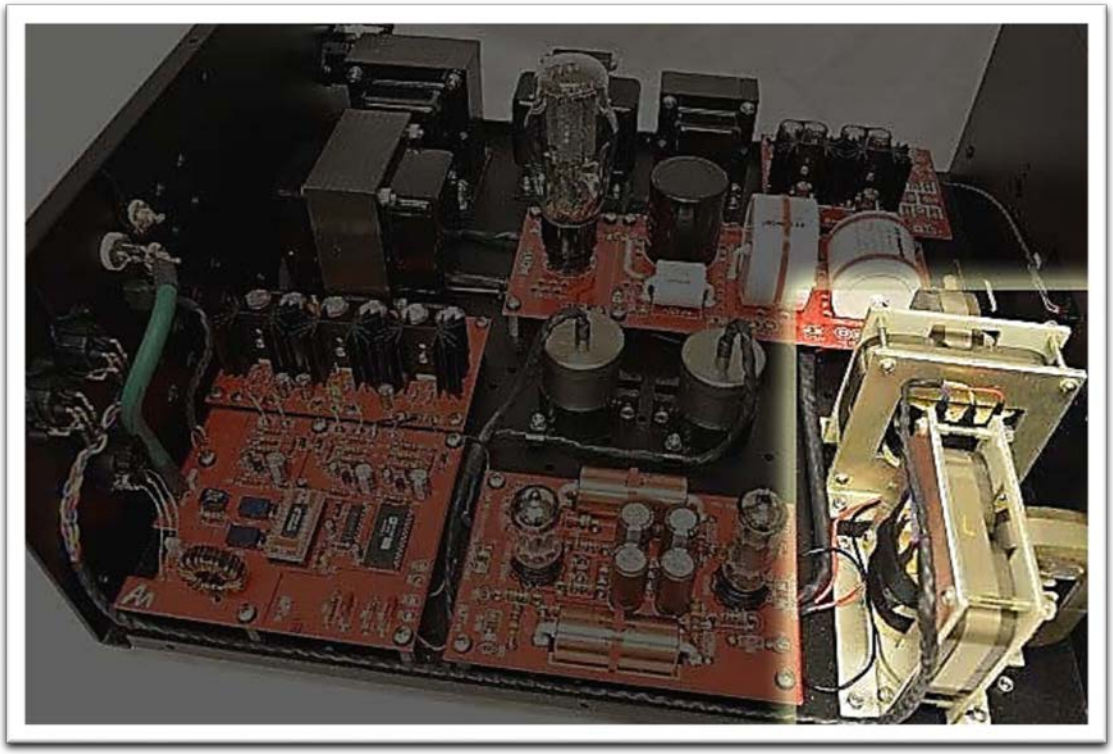


Figure 63 - C Core output transformers – Opposing Polarity

The C core output transformers are positioned in the chassis – The picture above shows the transformers at opposing polarity but this is not necessary – align them evenly as shown in the graphic on next page in *Figure 64* and this matches up with the correct holes in the chassis.

15.1 Mounting into the Chassis

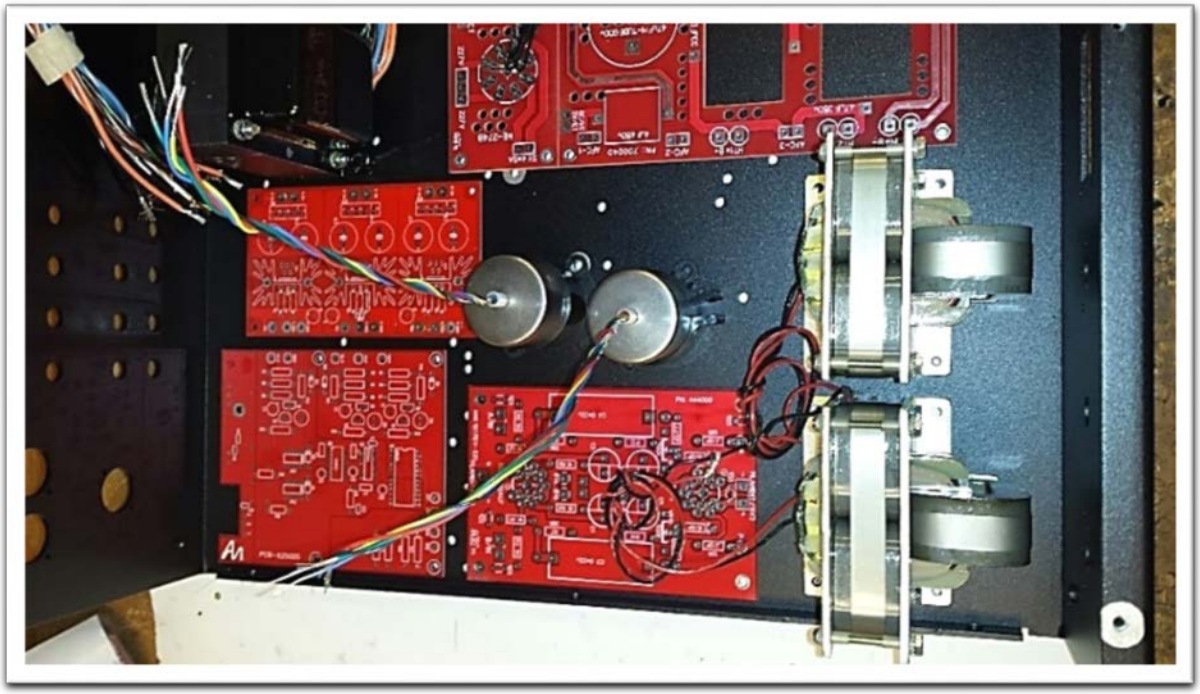


Figure 64 - C Core transformers - Correct Polarity

Secure with the 4 M4 screws and nuts – these transformers have a primary of basically a black and red wire which connects to the Line board (see graphic) and a secondary which is just lugs – so you will need to take the supplied wire and solder to the lug (there are three lugs per transformer) and connect to the XLR & RCA output

With the output transformers in position please make the primary transformer wire connections – the RED wires will connect to the Line Board and the black wires will connect to the Power Supply Board – see next page for detailed instructions:

15.2 Output transformer (CC-410) connections to the Power Supply

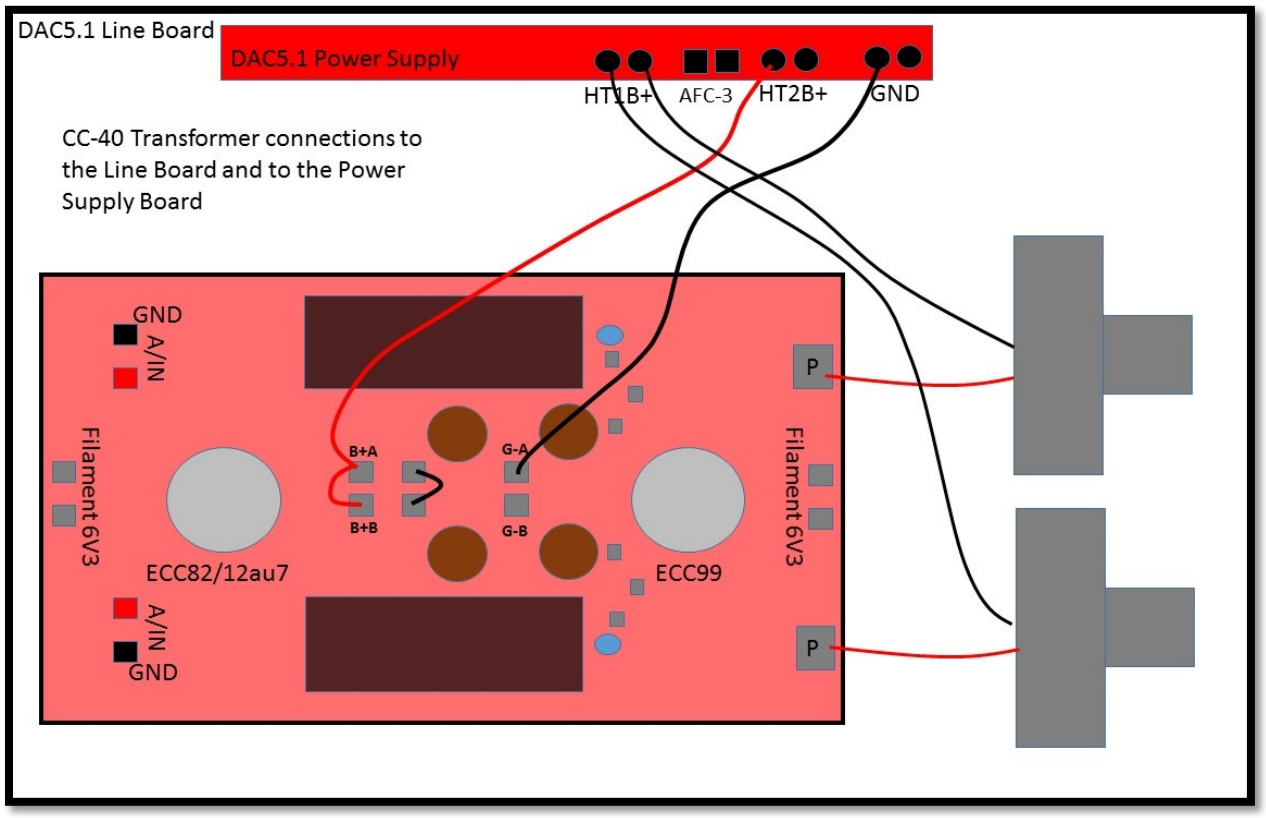


Figure 65 - Output Transformer to the Power Supply PCB

Once C core transformers are installed, you can connect the red primary wires to the Line stage board as shown and connect the Black wires from the primary back to the Power Supply Board into HT1B+.

16 - Rear of DAC5.1 Chassis Connections

Let's take a look at the input and output connectors on the back of the chassis –

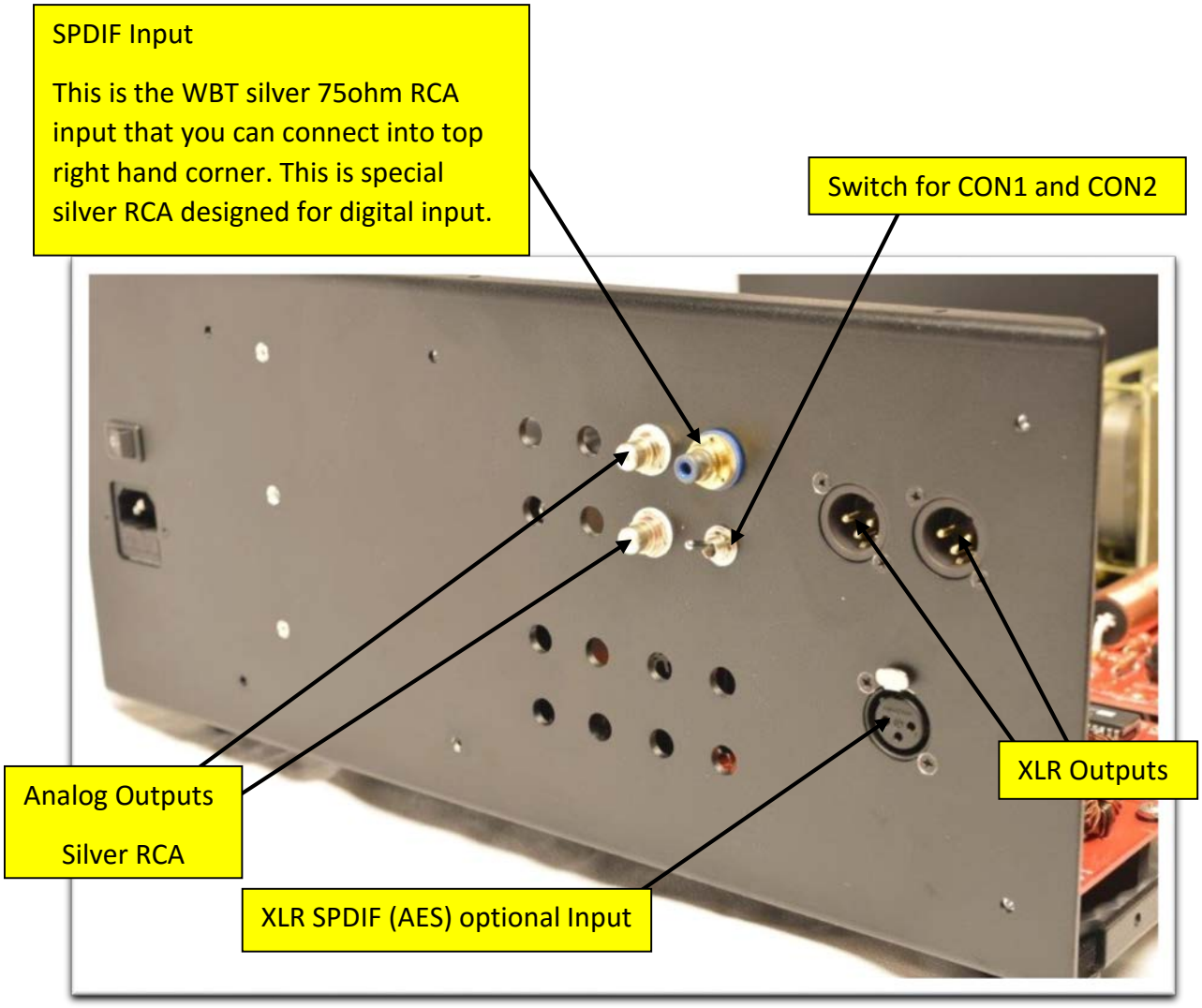


Figure 66 - Rear of Chassis connections

Let's go ahead and install these various connectors to prepare for final wiring – for the RCA's and you can put the Black on top and the Red on the bottom!

Figure 67 - Close up of the SPDIF input, selector switch and the RCA outputs from the rear of the chassis

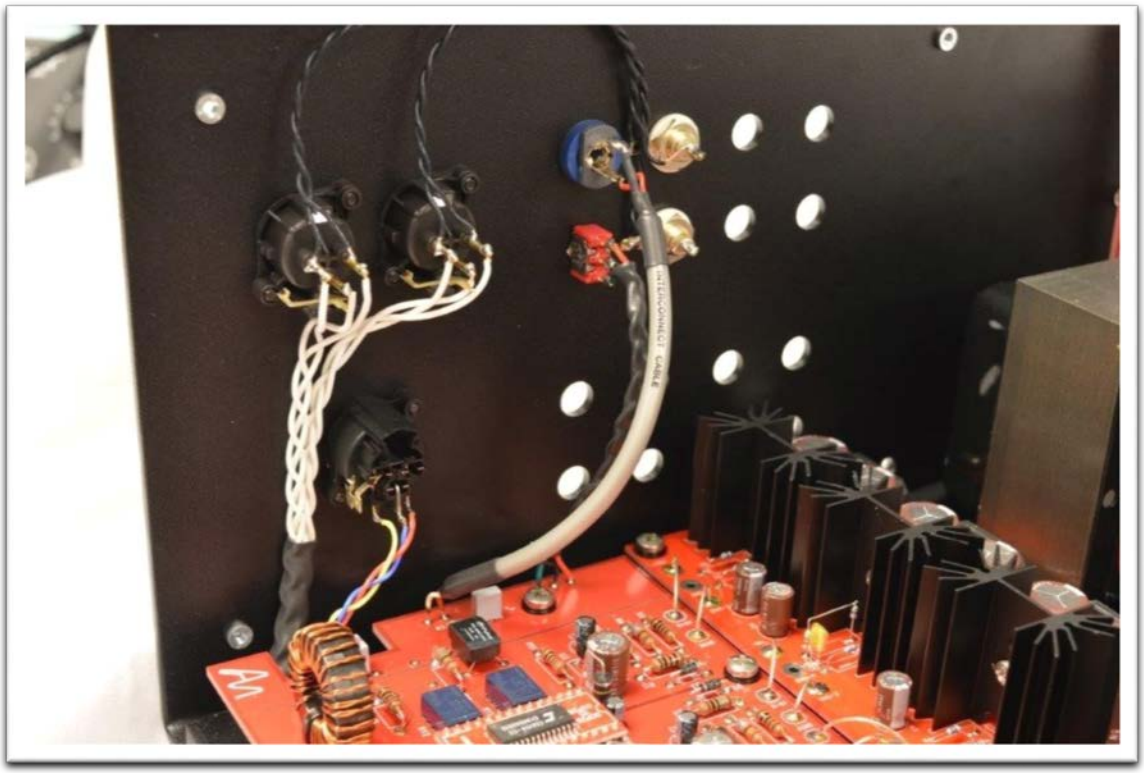


Figure 68 - inside of the chassis showing all the connections

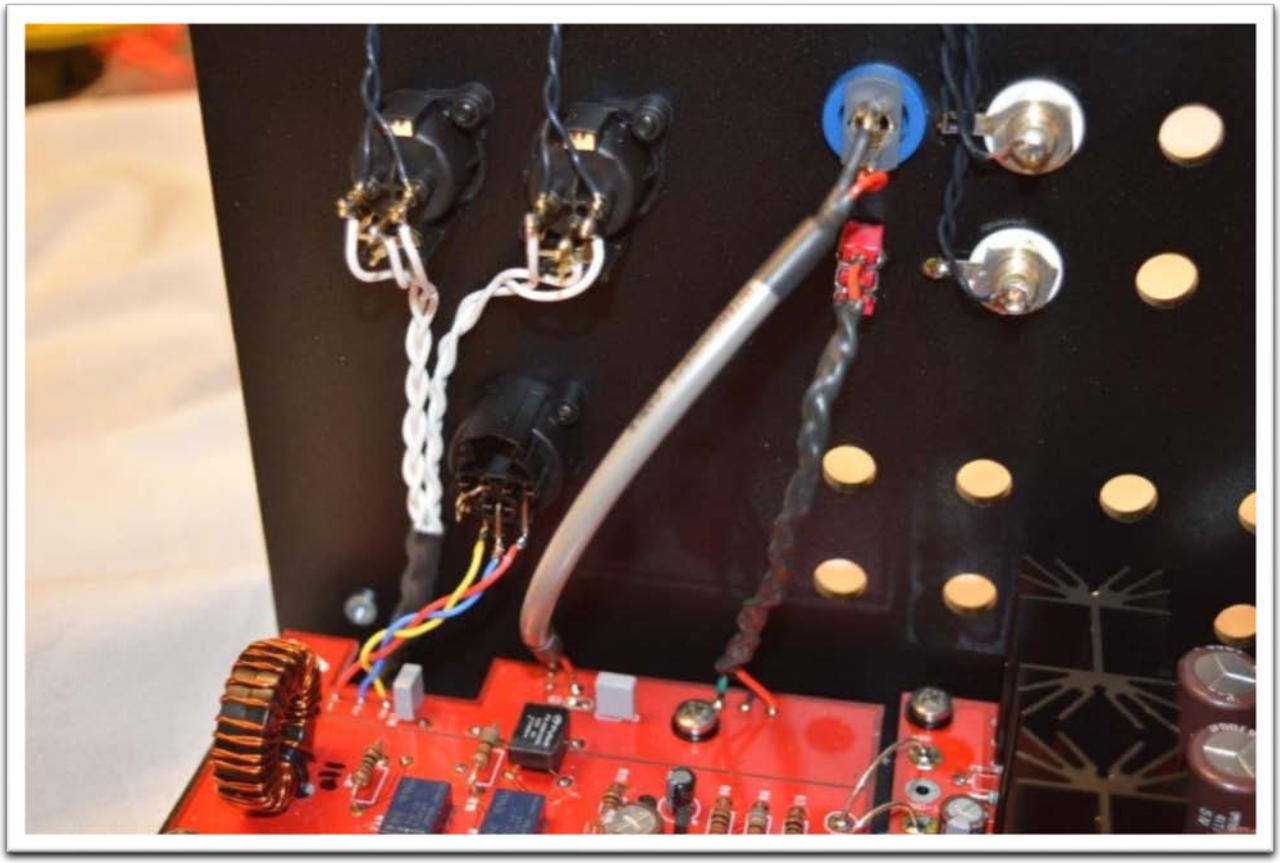


Figure 69 - Another angle from inside the chassis showing the connections
You can clearly see the RCA outputs on the right side and the SPDIF RCA input above the CON1 CON2 switch

17 - Wiring the Output transformer Secondary's

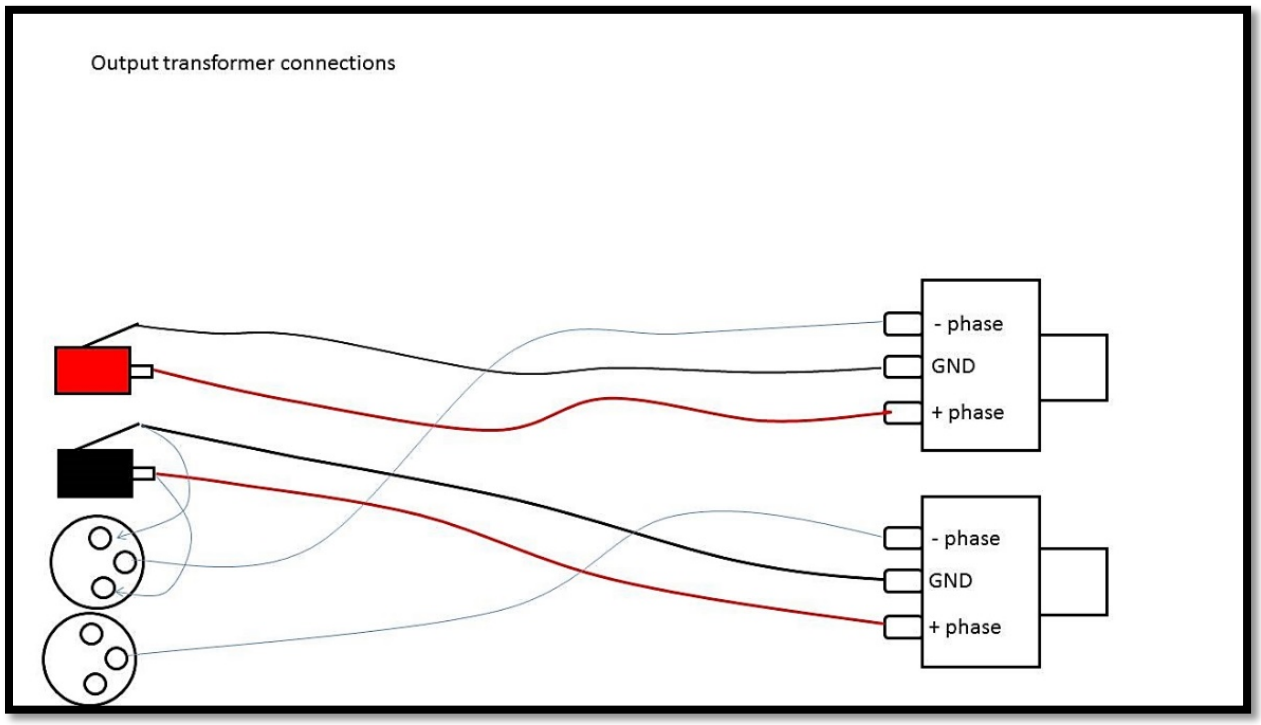


Figure 70 - Output transformer wiring

We are now going to connect wires from the output transformer to the RCA outputs. The C core output transformer has three terminal lugs on them at the top – These lugs allow us to use a high quality wire from the transformer to the output RCA – this carries the all-important analog output signal from the output transformer – Plan out your route - as you can see on the next page in *Figure 71*, we have routed the wires from the output transformers down along the side of the chassis.

Figure 71 - Wiring from the output transformers down along the side of the chassis

If the wiring of the output transformers is a daunting task here are some thoughts for you – The first goal will be to twist the RCA signal and ground wire from both transformers and route along the edge of the chassis – then take the (-phase) wire from the output transformer and then wrap that around the twisted wire. Our goal is to hook up the RCA outputs – if you are not using XLR outputs on the DAC then you cannot bother wiring them up and you won't need the (-phase) wire from the output transformer – connect the center tap wire from the transformer and connect these to the Ground on the RCA – so basically each transformer will wire to its own RCA. Then connect the + Phase wire from the output transformer to the Signal on the RCA.

If you are connecting the XLR outputs then you can connect the (negative Phase directly) to the XLR output (see graphic for exact connections a few pages back) – and parallel the wire from the RCA signal and ground over to the XLR.

18 - Final Checks – DAC5.1

At this point we have completed the wiring of the DAC 5.1 – We have also successfully tested the Power supply for 260-270V DC HT1 and HT2 – We also have 2 x 6.3V DC filaments .tested as well.

It might be a good idea to make some of the following checks prior to first power up. Use an ohm meter to make some checks – so we are checking for connectivity – if you have any questions please contact us

18.1 Power UP & Testing

If you are ready for power up – then install the two line stage tubes – the 12au7 and the ECC99 into the correct positions (ECC99 closest to the output transformers.) Along with the 5U4G EH tube in the power supply

If you power on and see all the tubes lit that's a good start – you may want to double check the HT1 and HT2 voltages which should be around 260v – you can definitely try the DAC in your system if you are feeling confident – we are assuming a working power supply of course! Take the SPDIF from your transport and connect to the SPDIF input on the rear of the DAC5.1 – connect the analog outputs to an integrated amplifier or a pre-amplifier – consider this a line output – Play some music through the transport into the DAC – if there is no sound you can toggle the con1 con2 switch. If all goes well you are listening to some sweet music – if there is a problem with either no sound or sound in one channel or a weak sound etc contact audionotekits@rogers.com for support.

APPENDIX 1

CON2 Connections

APPENDIX 2

Optional Rotary on off switch

19 - Installing the Rotary ON/OFF Switch (Optional)

We suggest that before installing the rotary on off switch at the front you verify that the Mentor is working properly first – then if all good and you wish to install the on off switch at the front follow the instructions – if you just want to have a place holder at the front you can install the rotary switch and place the knob on it for aesthetic reasons and not use this switch and just use the rear rocker switch for on off power!

Here is the idea of the on off rotary!

The mentor comes with two on off switches – there is a rocker switch at the back of the unit and an optional ON off switch at the front – the idea is that you can leave the rocker switch at the back of the unit in the ON position permanently and control the ON off from the switch at the front – this is just for convenience sake if you prefer to switch power on and off from the front of the unit

This rotary switch is installed in the front right position on the chassis – remove all the hardware as shown!

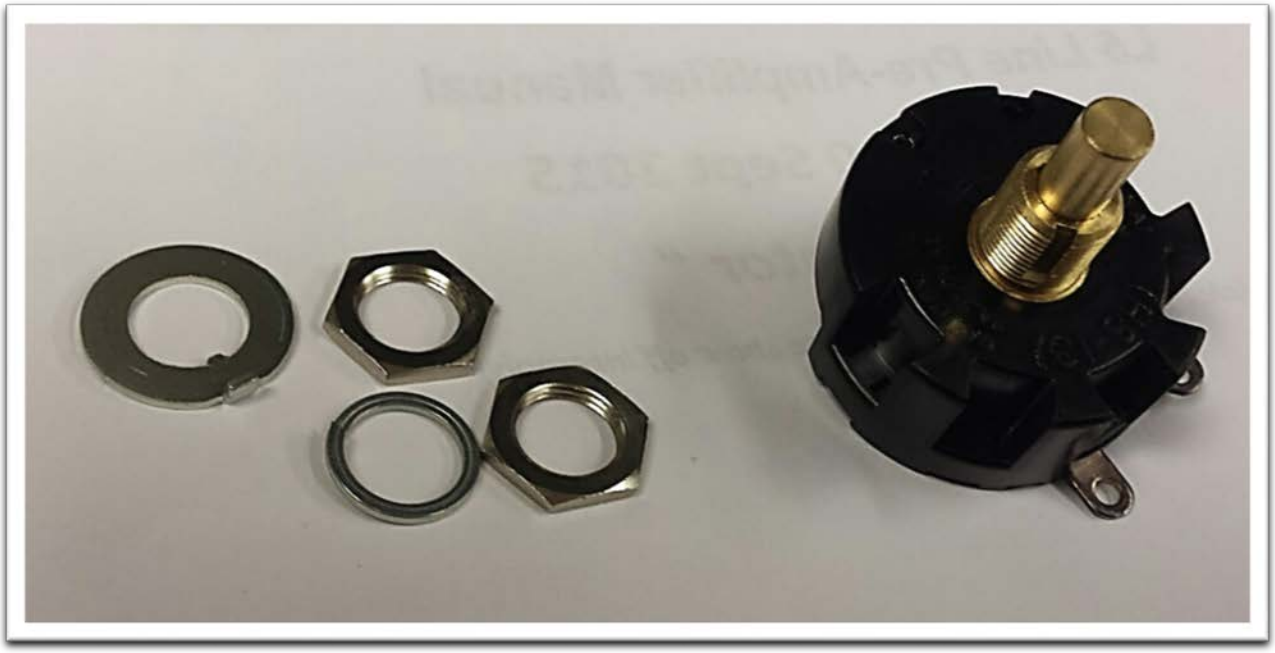


Figure 72 - Disassembled Rotary Switch

Then position on the front of the chassis as shown in *Figure 73* & *Figure 74*

Figure 73 - Installed Rotary Switch (Outside)

Figure 74 - Installed Rotary Switch (Inside)

Take the prepared twisted ON/OFF cable supplied from wire bag and solder to the Switch as shown in *Figure 75*. It is recommended that you add heat shrink so the bare metal so it is not exposed as it carries mains voltage and you could get a nasty shock if you touched this while the unit was on.

Figure 75 - Rotary Switch Wired

The other end of the cable has a pair of CRIMP lugs - What you will do is to replace one of the wires in the twisted pair that is connected from the IEC to the rocker switch – so you have already installed a twisted pair of crimps – take just the RED wire as an example and remove this from the IEC and the rocker switch and in its place connect up the crimped ends of the Rotary ON OFF wire - see *Figure 76* below

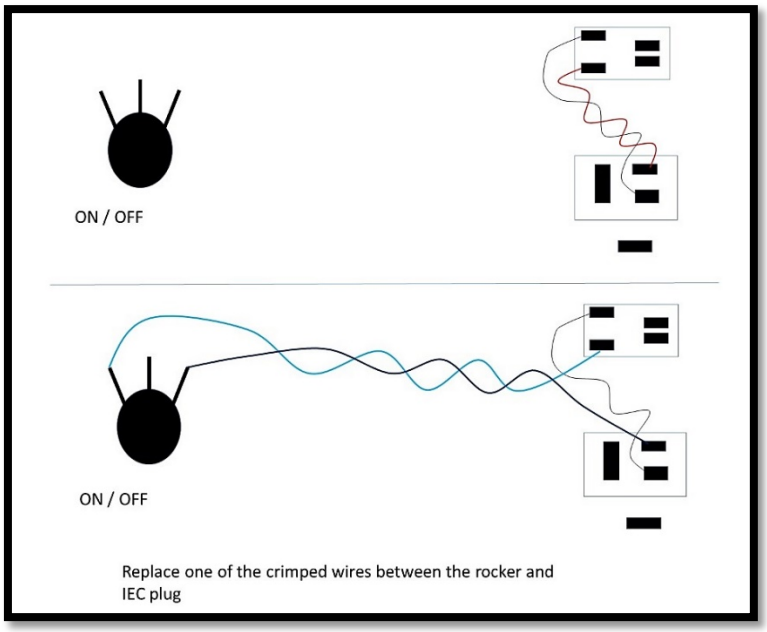


Figure 76 - Wiring the Rocker switch and IEC Plug

19.1 Front and Rear Faceplates

Peel the plastic off both the front and the back of the faceplates and then install in position – the front faceplate will use larger M4 Black countersunk screws (4) and the rear faceplate will use the smaller black M3 countersunk screws

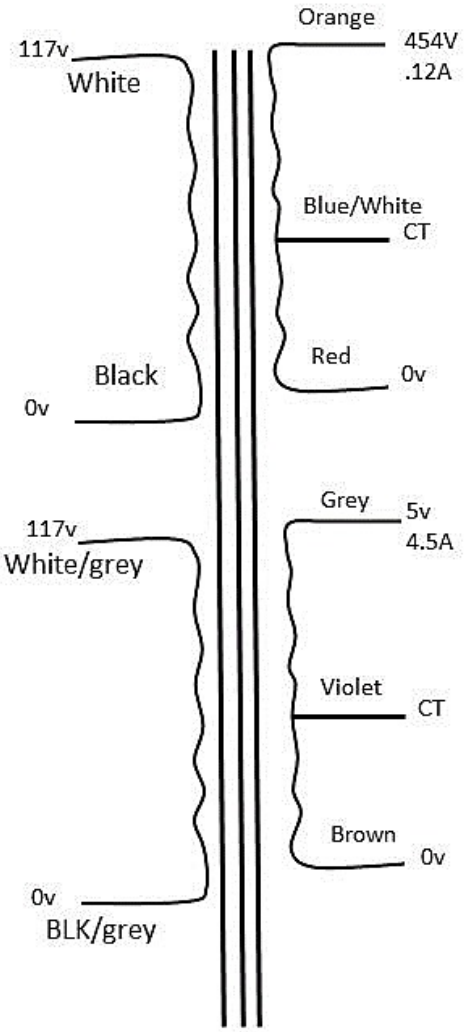
20 - Final Thoughts

Thank you for investing in the ANK DAC5.1 and for working your way through the assembly –

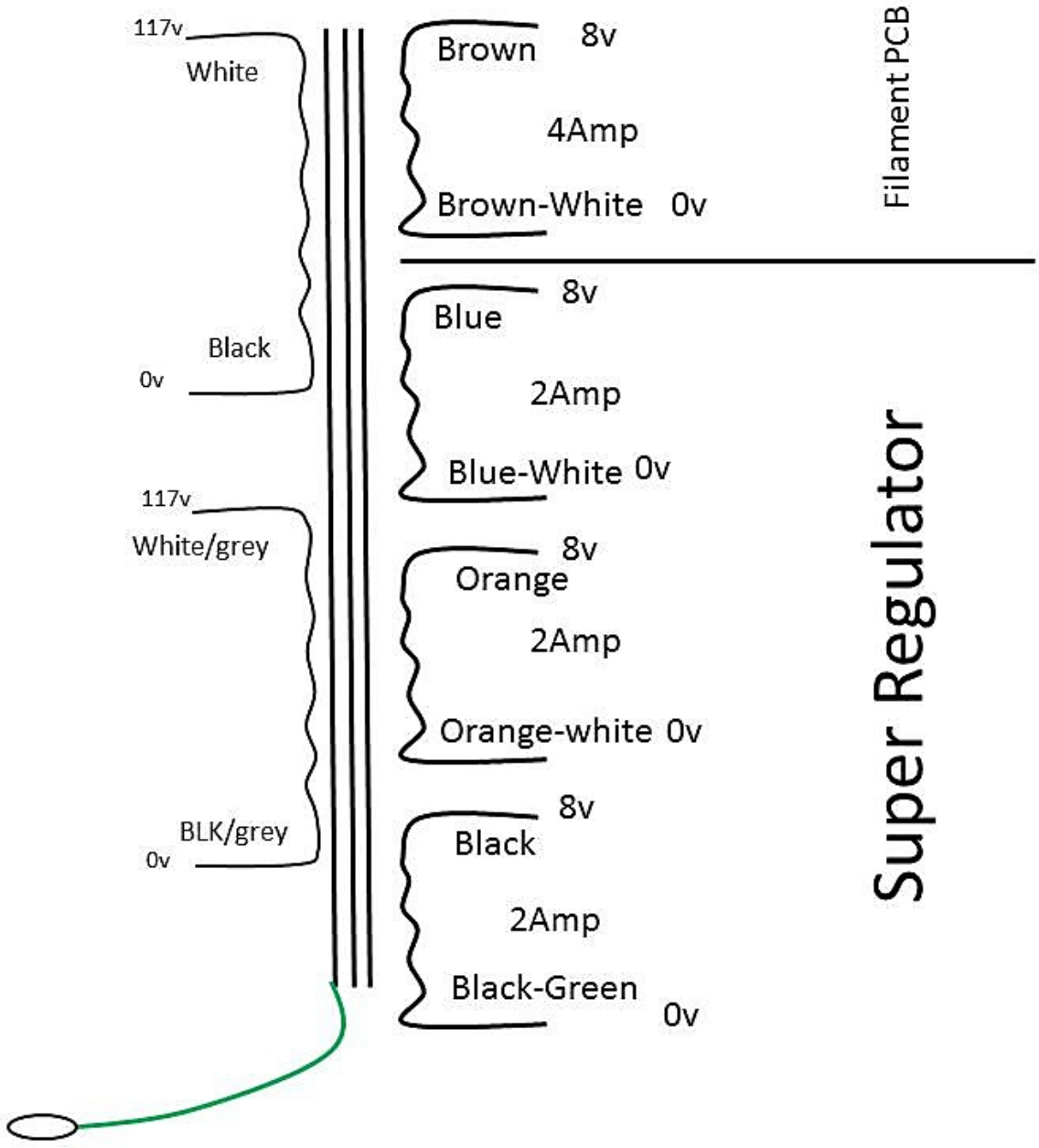
Please email us your thoughts audionotekits@rogers.com and let us know how everything went – any suggestions for tweaks to the manual will be appreciated. Also if you would like to send us some pics we can post on the website or our facebook page and we would love a review from you regarding the sound - We hope the unit brings you many years of joy and we look forward to hearing from you.

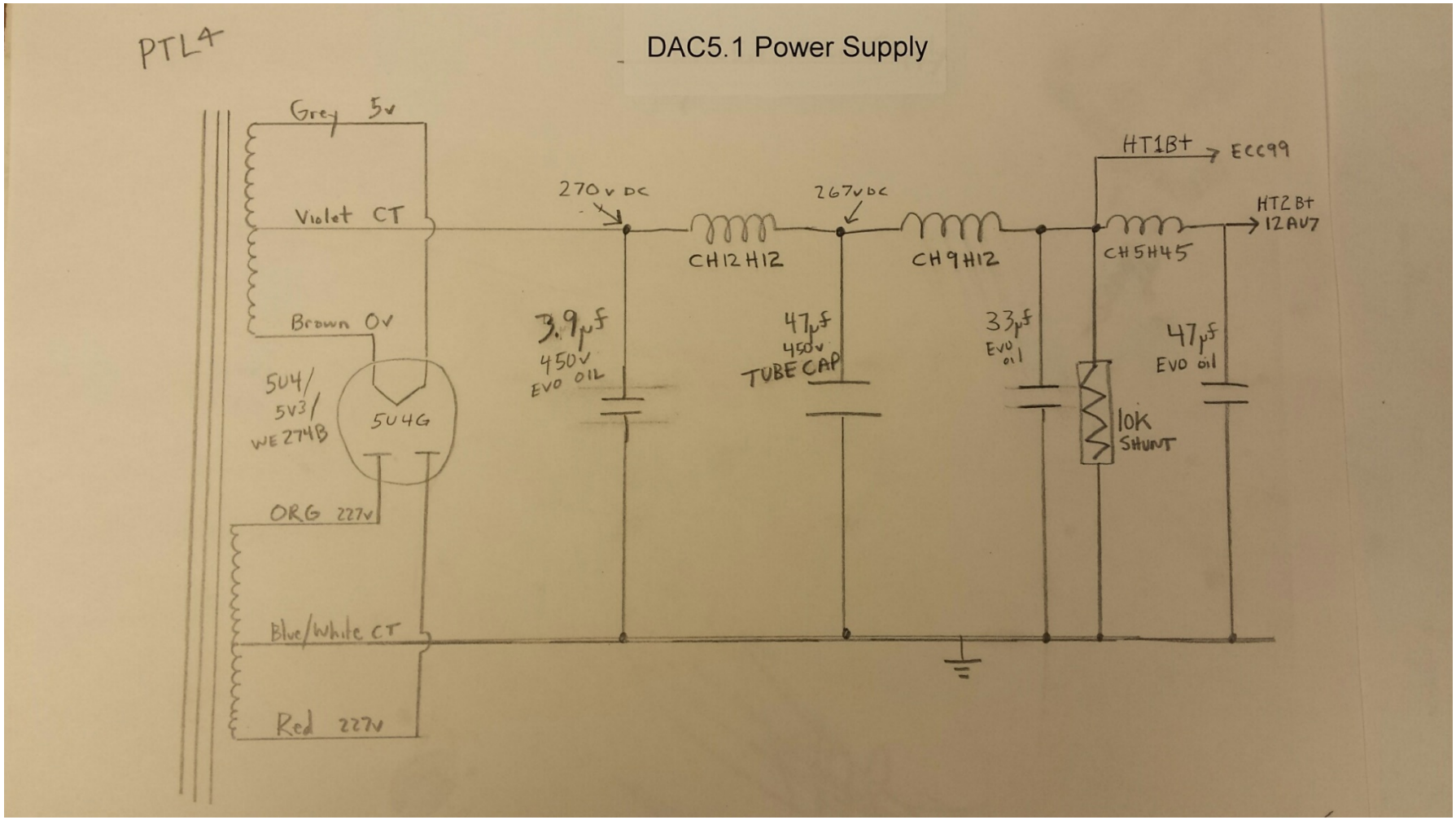
21 - DAC5.1 Appendix

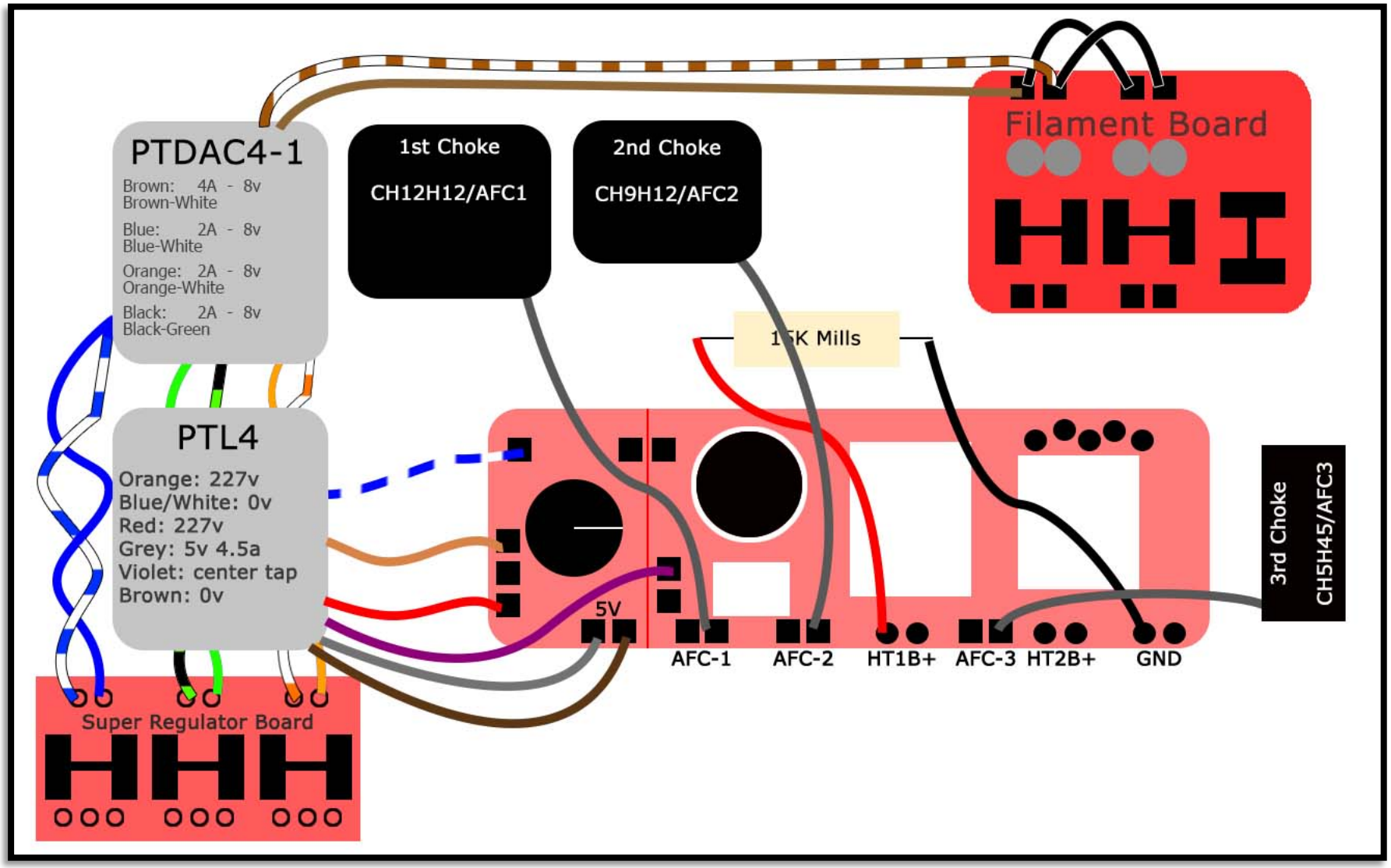
PTL4 –
Dac5.1 Mains
transformer



PTDAC4-1 – Dac5.1 Mains transformer for Filament




PTL4
DAC5.1 Power Supply
Grey 5v
Violet CT
Brown 0V
5U4/
5V3/
WE274B
5U4G
ORG 227v
Blue/White CT
Red 227v
270v DC
267vDC
CH12H12
CH9H12
CH5H45
HT1B+ → ECC99
HT2B+ → 12AU7
3.9μf
450v
EVO OIL
47μf
450v
TUBE CAP
33μf
EVO oil
47μf
EVO oil
10K
SHUNT


PTDAC4-1
Brown: 4A - 8v
Brown-White
Blue: 2A - 8v
Blue-White
Orange: 2A - 8v
Orange-White
Black: 2A - 8v
Black-Green
1st Choke
CH12H12/AFC1
2nd Choke
CH9H12/AFC2
Filament Board
HHI
15K Mills
PTL4
Orange: 227v
Blue/White: 0v
Red: 227v
Grey: 5v 4.5a
Violet: center tap
Brown: 0v
3rd Choke
CH5H45/AFC3
5V
AFC-1
AFC-2
HT1B+
AFC-3
HT2B+
GND
Super Regulator Board
HHH