

Audio Note Kits

Instruction Manual

Kit1 - 5th Anniversary Edition 300B Stereo SET Integrated Amplifier

Manual Version 5.1 - January 2011



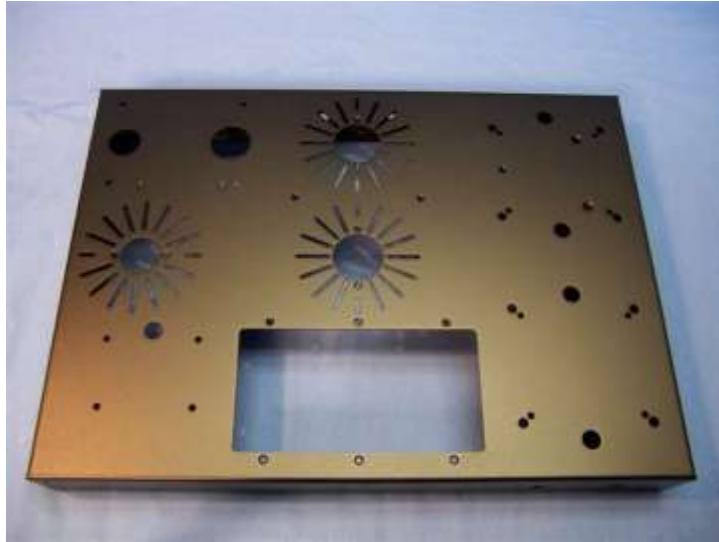
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Section 1: Introduction

This is the new Beta version for the Kit1 300B SET Stereo Integrated Amplifier.

We are using a combination of photographs / instructions along with wiring diagrams to guide you through the build process.

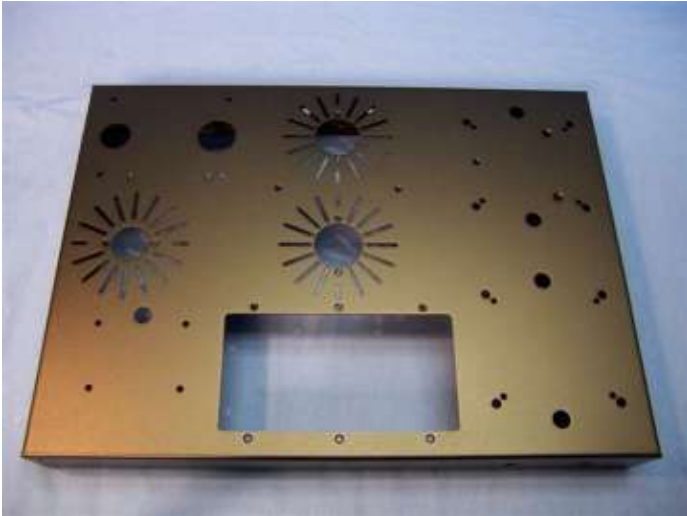


Hardware: In the kit we will be using stainless steel Metric Hardware – there are basically 2 types of screws we will be using – M3 and M4 with M4 being the bigger of the two. You will also notice that we use both PAN and countersunk screws – Countersunk screws have a flat top of them so that they can be screwed into a surface flat so that other devices can sit on top of them.

Please take your time with the build and check your work as you go along – feel free to contact us if you have any questions – audionotekits@rogers.com or phone 613 822 7188.

Ok have fun!

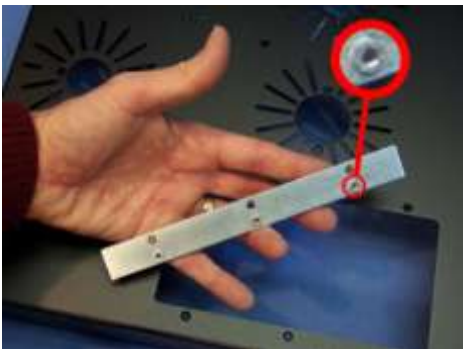
Section 2: Chassis Preparation



In this section we will be mounting most of the hardware onto the chassis ready for wiring later on.

We will begin with the front insert plate.

Installing the Front Insert Plate



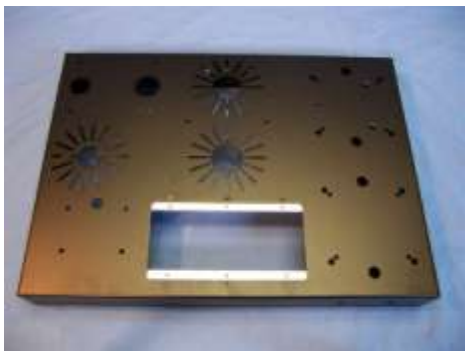
Let's start by installing the 'tang strips' into position.

These have two rows of holes. One of the rows has PEMS (see picture on the far left). These should be installed face-down.

These PEMS provide fixing for the insert plate with their tapped holes.

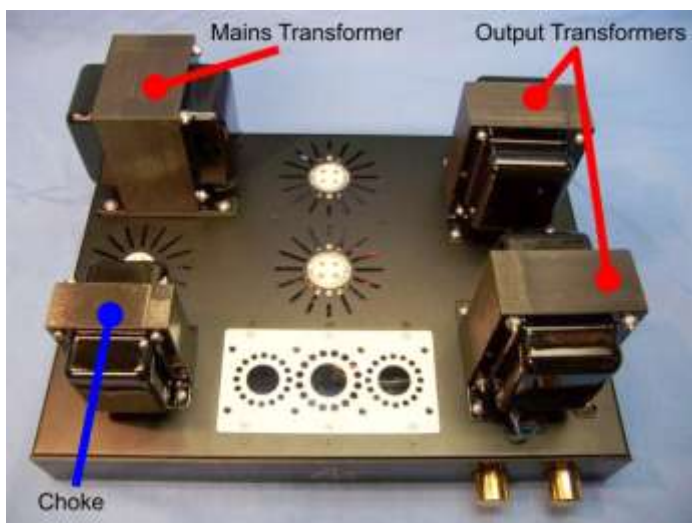


Attach the tang strips to the chassis using the holes that do not contain the PEMS. Use countersunk screws and nuts to secure them - Don't tighten too much – keep slack for now.



With the tang strips installed you will be able to then install the front insert plate by installing the 6 screws that go into the PEMS in the tang strips.

Installing the Mains Transformer (T-199)

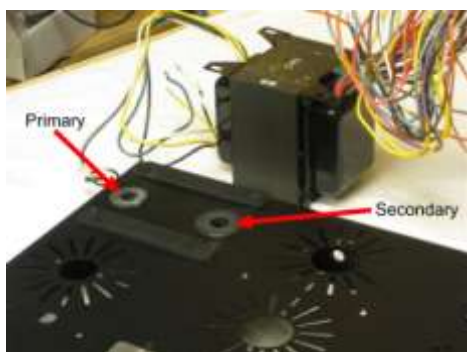


This picture shows the location of the 3 transformers and the choke that will be installed onto the chassis.

Before any of these are mounted, appropriate grommets should be fitted into the holes where the lead-outs will be passed through. These prevent the wires from coming into contact with the chassis. The two larger grommets are for the mains transformer – the remaining 5 are for the output transformers and choke.

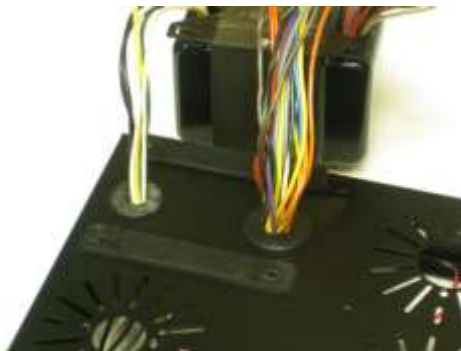
We are going to begin by installing the mains transformer this is the T-199 which supports both 300B and 2A3 operation.

The transformer has a Primary side and a secondary side – the primary side is the one with less wires.



You will want to install the 2 rubber strips. You should have already installed the large grommets in the previous step (along with the smaller ones for the output transformers and choke) along with the 2 large grommets into the correct holes as shown in the picture.

Position the transformer as shown opposite.



We recommend some WD-40 spray to Lube the grommet holes especially on the secondary and also spray the secondary wires lightly so that the wires can feed through the grommet hole – a second pair of hands could be useful at this point – Be sure to wipe off excess oil once complete.



This is a good method to feed the Mains wires into position – take your time as it's a little tricky – just be patient and it will pay off!

Almost there now – continue feeding the wires into position.



Once in position on top of the rubbers you can use the provided screws M4 16mm with washers on top side and M4 nuts underneath the chassis.

Installing the IEC Socket and Rocker Switch



With the Mains successfully installed you can install the IEC socket which is secured with 2 M3 x 10mm countersunk screws and M3 nuts.

The rocker switch snaps into position.

Use the same orientation as shown in the picture.

Choke Installation



Begin by feeding the choke's wires through the grommet hole.

The M4 x 10mm screw will secure the choke to the chassis entering from the top of the chassis but instead of an M4 nut underneath the chassis, we will be using the Hex standoffs so that our power supply board can be supported later.



Here you can see the choke in position, the 4 hex spacers in position, and the choke wire fed through the grommet hole.

Well done!

Heat Sink Installation



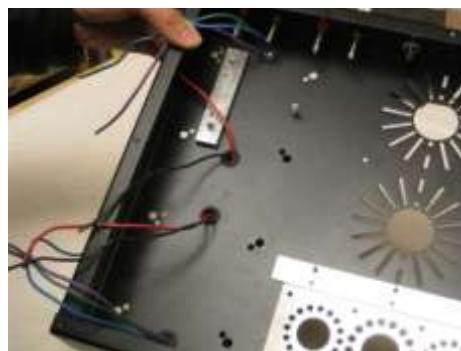
Ok so take the heat sink and you will see the holes with the little counter sunk in them – these face towards us when we install in the chassis.



You can see from the pictures the relative position of the heat sink – the countersunk M4 x 16mm screws are inserted into position and then M4 nuts are used to secure the heat into position.

Now you need to install the M3 x 16mm countersunk screw into position and use the 6mm hex spacer to secure to the chassis.

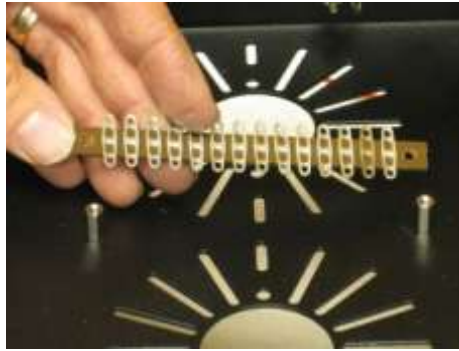
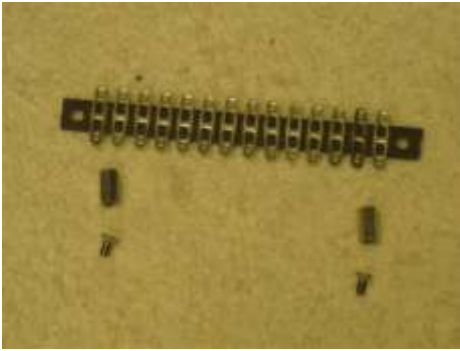
Installing the Output Transformers



We can now install the output transformers into position. Note the orientation of the output transformers such that the red/black wires are toward the center.

Go ahead and position the transformers now under the chassis, feed the wires through the grommet holes as shown, and secure them into position.

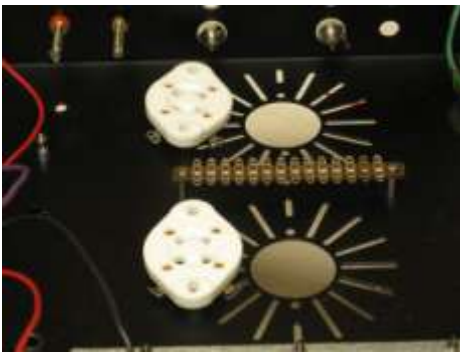
Installing the Tag Strip



Place the hex spacer on the inside of the chassis between the large 300B holes in the middle of the chassis and screw into position with the M3 6mm countersunk screw.

Then place the prepared tag strip into position and use the M3 6mm pan screw to secure down.

Installing the 300B Valve Bases

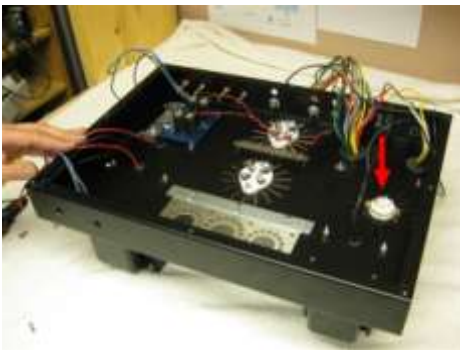


Let's now install the 300B valve bases.

The only trick here is that **the small holes of each valve will be closest to the tag strip.**

Use the M3 x 16mm countersunk screws to secure the valve bases to the chassis – there is a little play here so center the valve bases when securing down.

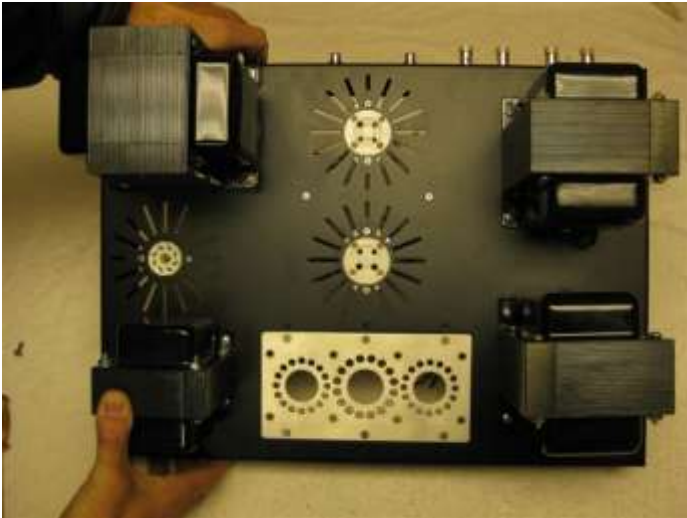
Installing the Valve Base for the Rectifier Tube 5U4G



Install the 8 pin rectifier valve base into position now over on the right hand side of the chassis.

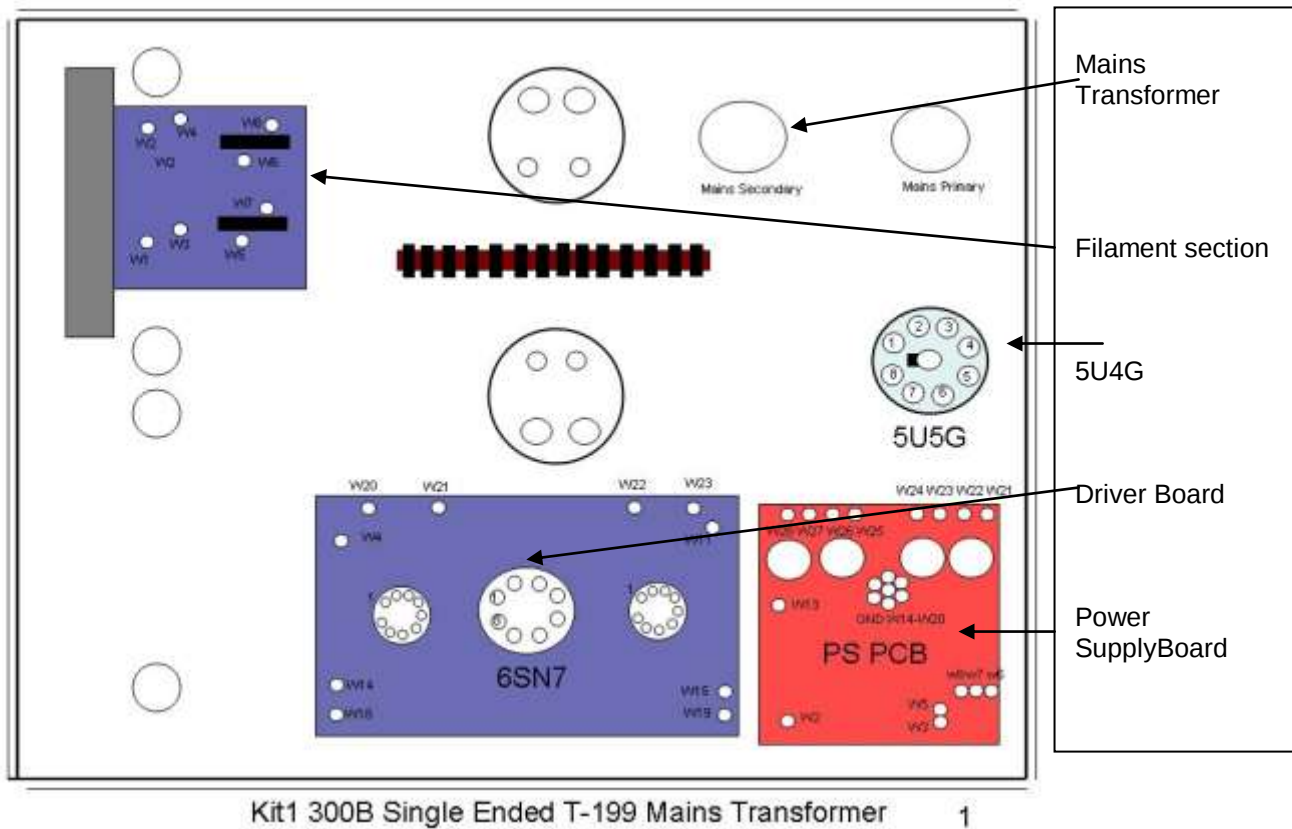
Make sure the notch is pointing towards the middle of the chassis!

Section Summary



Well done. Now that you have assembled the chassis to this point, you can begin your first wiring job in the next section.

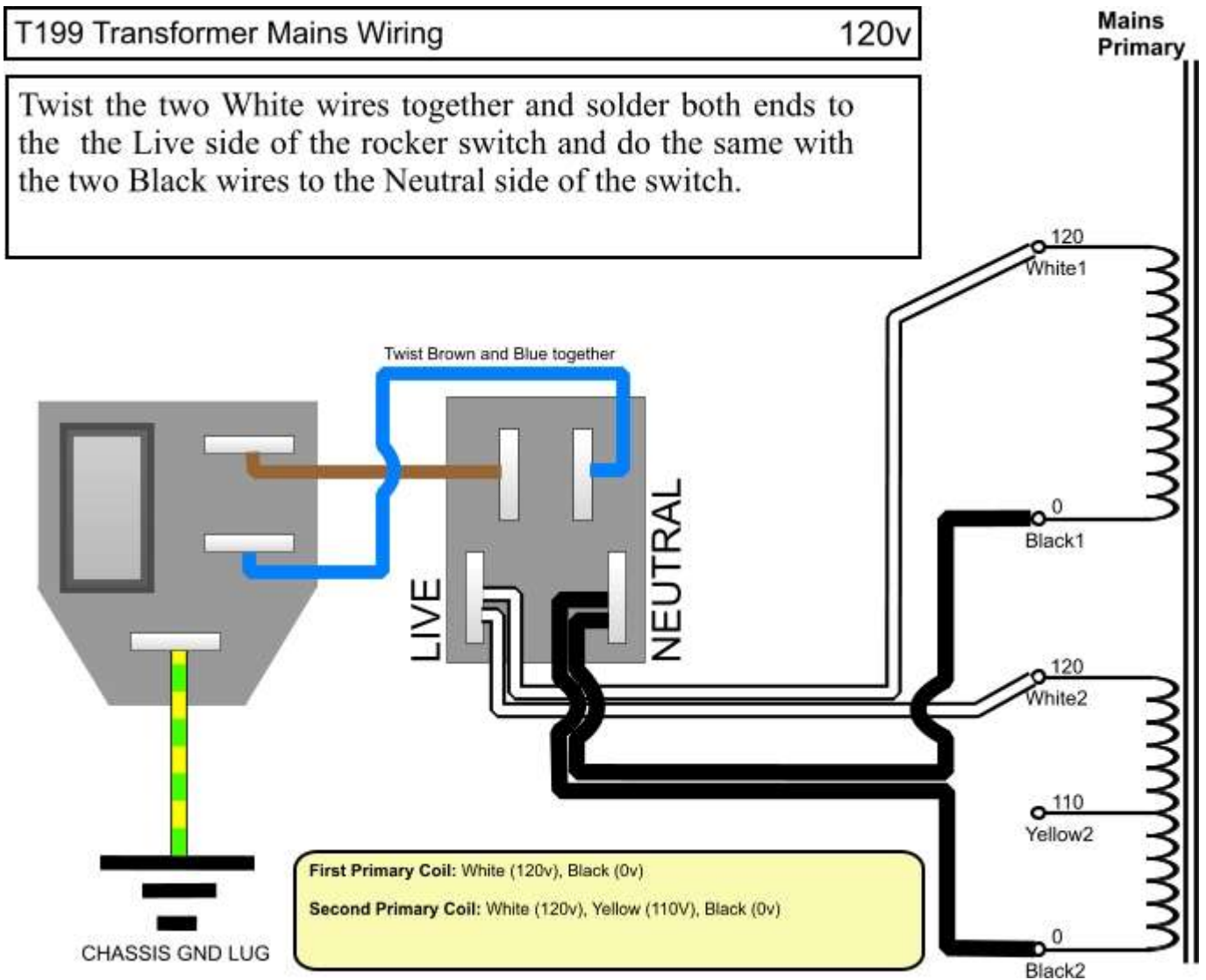
Your chassis should now look like the picture opposite.



The above graphic shows the overall layout now of the kit1 from how you will be working with it!

Section 3: IEC Section and Chassis Ground

In this section we will be hooking up the IEC section – the following example is for 120V operation – refer to the appendix for wiring for all the world voltages.

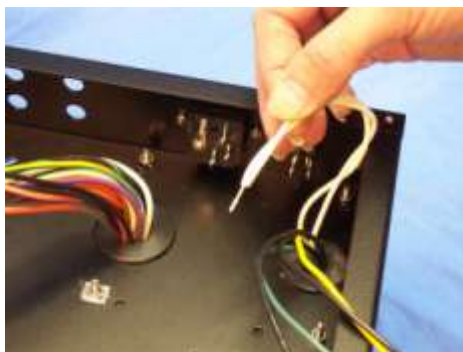


Here is a view from inside the chassis with the IEC plug and the rocker switch installed in position – the rocker switch snaps in while the IEC requires 2x M3 screws to hold into position.

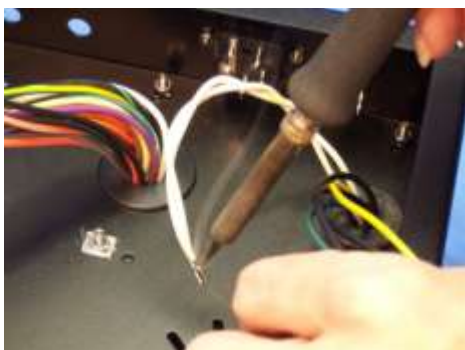


Before we continue – remember that the wiring shown here is for 120v operation only. If you are in a part of the world that requires a different mains voltage then please refer to the relevant world voltage wiring scheme in the Appendix.

First, take the two white leads from the transformer's primary winding and cut them to the same length. Don't cut them too short – you can leave plenty of length.



Strip the ends and twist the wires together.

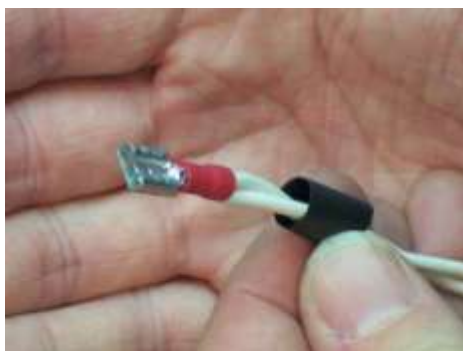


Tin the wires and cut to a size that is adequate for inserting into the crimp opening.

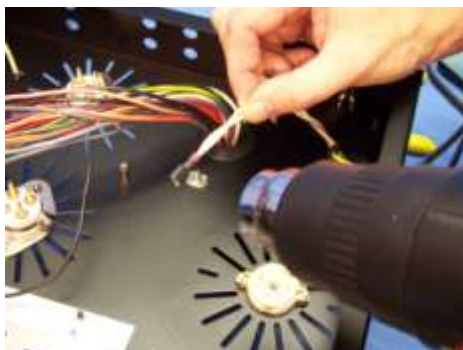


Cut a short piece of heat shrink and place it over the wires and push it down away from the end at least 6 inches (the picture shows the heat shrink just on the wires for illustration purposes).

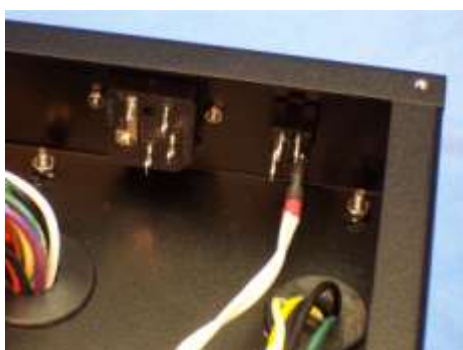
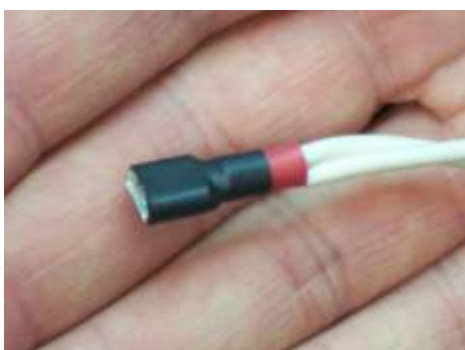
Note that for 240 v and 230V regions and other world voltages you may be using just one wire to go into the crimp.



With the tinned ends of the wires now just coming to the end of the CRIMP you will need to add solder so that the solder melts onto the wires and the crimp to secure the wire in place – this will take plenty of heat and let the solder flow – don't be too quick to pull your iron away – a good 5 seconds of heat will be required – then let cool and position the heat shrink over the end of the crimp.



Pull the heat shrink over the crimp as shown and heat with a heat gun. Sometimes a hair dryer can also be used so long as it can focus the heat to a specific point.



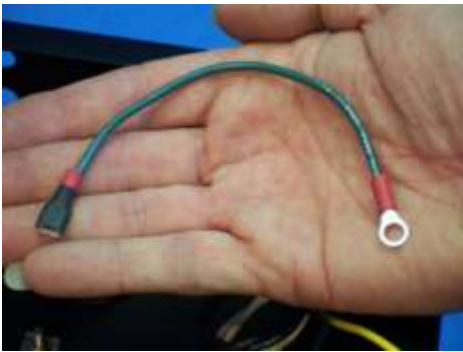
You can see the result in the far-left picture (we have included some extra crimps in case you have trouble).

Once the crimp has cooled you can place it in position on the rocker switch as shown. *(Note that the black and white leads can be fitted to either side of the rocker switch but they must be adjacent to each other).*



Repeat the process with the pair of black wires – start by twisting them and repeating the instructions to install the crimp into position.

Congratulations you have successfully completed the first part of the IEC section – we now have pre-made cables for the rest of this section – much easier...



Start by installing the pre-made ground cable into position by pushing the crimped end on the IEC socket and the ground end on the GND screw holding in the Mains transformer.

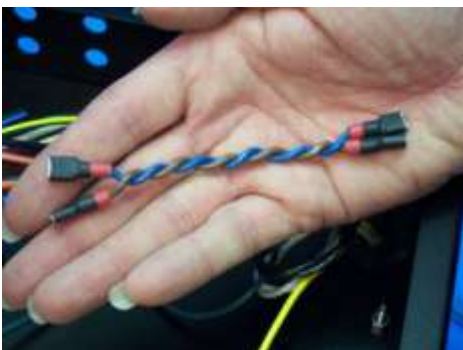


Now take the green wire coming out of the Mains transformer primary and trimming – we will be adding a ground lug to this wire and connecting to the same CHASSIS ground position.



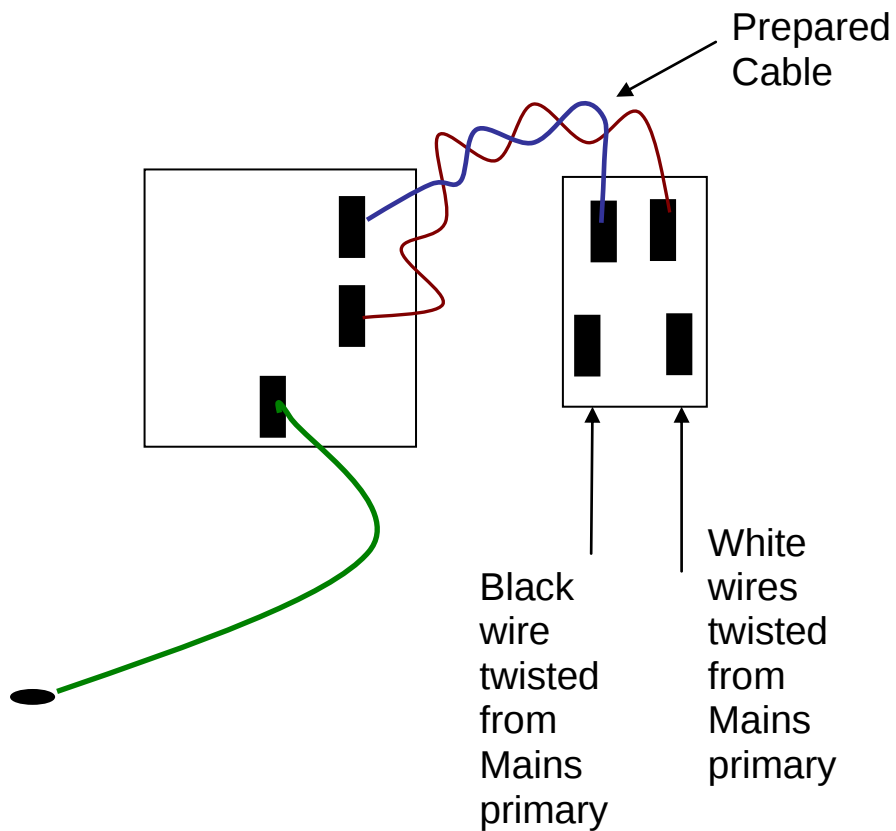
Now take the prepared green wire with ground lug on it and you can install to the same location and tighten the screw holding down the three ground wires.

This third wire goes to the Power Supply Board W2.



Here you can see the prepared brown and blue wire that we will use to connect between the rocker switch and the IEC plug – connect as shown.

The IEC section is now prepared for 120v operation.



This diagram represents the connections that we have made in the IEC section.

It represents 120v (USA) operation.

For other world voltages please use the appropriate wiring chart in the Appendix.

Section 4: Filament PCB



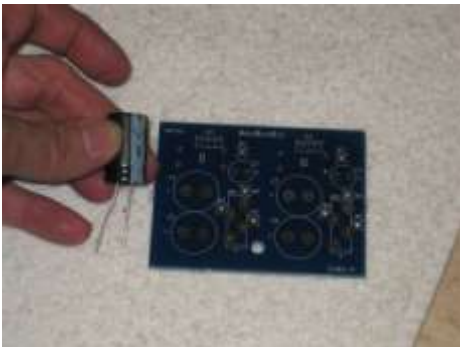
In this section we will build the Filament section.

The heart of this amplifier are the 300B tubes – in order for a 300B tube to operate it needs 5V DC applied to its two “filament” pins – these are the 2 thicker pins on the 300B.

This filament PCB takes in 7v AC and converts it down to 5V DC – There is a trick though in that the 5V DC is floating – in other words it does not sit at ground potential – and therefore we use an isolation kit to isolate the regulators from the heat sink.

Here is a list of the parts we will be using:

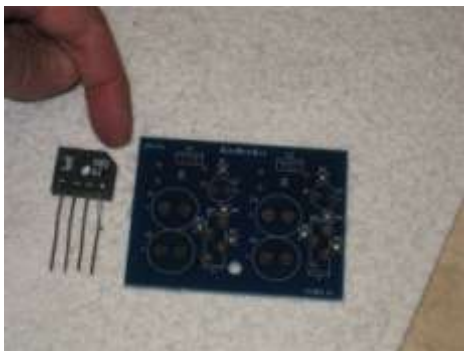
Quantity	Description	
4	CAPACITOR	4700uF 16V – C1, C3, C5, C6
2	Bridge Rectifier	KBU6J
2	2.5V ADJ Regulator	LM1084 ADJ
2	100R	R2, R4
2	330R	R1, R3



Install the 4 capacitors into position in C1, C5, C3, and C6.

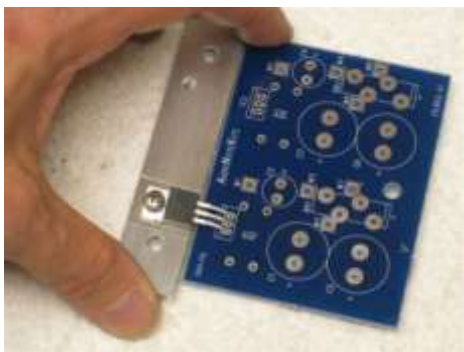
Make sure that the STRIPE on the negative side of the cap is oriented correctly – you will note the + on the PCB designating the positive side of the capacitor.

We don't install caps in the C2 and C4 positions.



Install the Bridge rectifiers in position in BR1 and BR2 – note the keyed side of the rectifier with the angled corner is the + side and faces the bottom of the board.

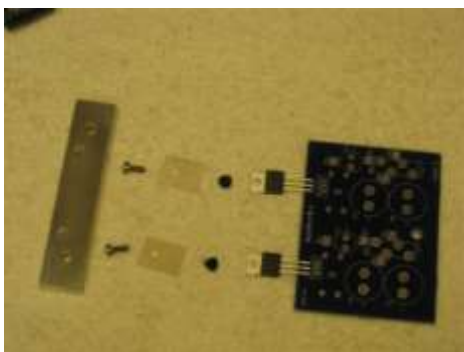
Then install the resistors into position – the regulator is programmable based on the ratio of the resistors – we install a 330R ohm resistor in R1 and R3 and a 110 ohm resistor in R2 and R4.



Then you will want to install the LM1084 regulators into the PCB – this part requires a little attention – as you want the regulator to rest on the heat sink with the hole matching up.

I suggest that you lay the filament board into the chassis and just line up the hole of the regulator with the hole on the heat sink – it seems that the regulator pins go about 1mm below the bottom of the board – once happy, solder the regulators into position.

This picture shows the regulator mounted to the heat sink – do not do this yet – read the following instructions before doing this.

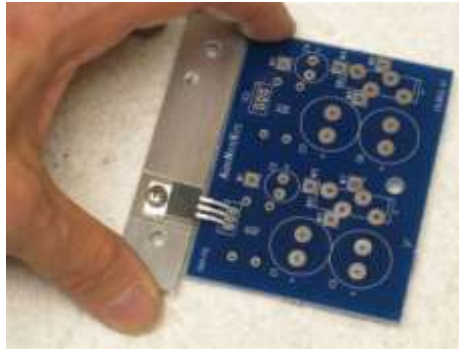
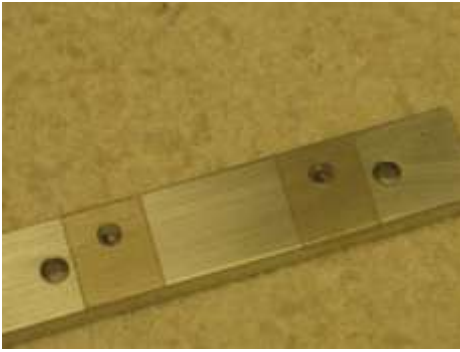


Once the Filament board has been fully populated, you will use the insulation kit to attach the regulators to the heat sink.

It is important to understand this arrangement. The regulator body must be electrically isolated from the heat sink so read the rest of the section before proceeding.



The securing screw is isolated using a flanged plastic washer. It is important that this is inserted correctly – see pictures opposite.



The clear Mica washers are used to isolate the regulator bodies from the heat sink.



Note we are showing you here how to screw in the regulator to the heat sink.

My suggestion is not to do this at this point because later we will be connecting wires to the filament board and it will be easier to make these connections with the filament board not connected to the heat sink – so for now leave the filament board “installed” in the chassis but not fully secured down!

Once the filament board is installed and positioned in the chassis you may want to take an ohm meter and make sure that the middle pin of the regulator is NOT connected to the heat sink in any way!

Section 5: Power Supply Board



In this section we will be populating the very important power supply PCB.

Basically it involves resistors, capacitors, and links.

The resistors and links are on the underside of the board with the capacitors on the top side.

Capacitor parts list:

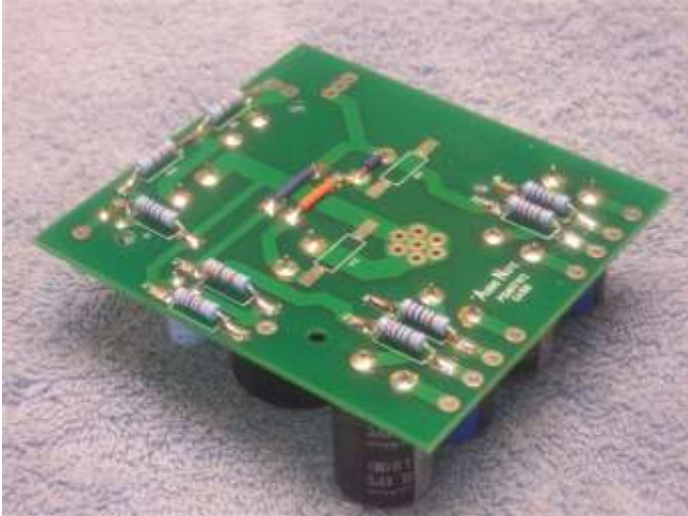
Quantity	Description	Location
2	47uF 400V	C1 & C2
2	68uF 450V	C11 & C13
1	1nF 1000V	C4
1	220uF 450V	C8
2	100uF 450V	C12 & C14
1	10uf 160v	C9

Resistor parts list (a color code chart can be found in the Appendix):

Quantity	Description	Location
1	100R 1W	R1
1	82K 1W	R2
1	330K 1W	R3
2	2K2 1W	R5 & R7
2	2K7 1W	R6 & R8
2	220K 1W	R9 & R10

Note: R4, R11, and R12 are not used

Resistor Installation



The Resistors are installed on the underside of the power supply board.

The picture opposite shows the underside of a completed board.

It is important to install the resistors in the manner explained below – please read these instructions thoroughly before you begin.



These pictures show how the resistors lay on the board.

This can be a fiddly job so I suggest that you read and follow the instructions below.

FOLLOW THESE STEPS FOR POSITIONING THE RESISTORS

1. The easiest way of fitting the resistors to the board is to tin each end of them first, before soldering them to the board. To do this heat up the component and touch the solder to it, giving a very thin coat of solder. Its useful to have some styrofoam so you can stick the tinned resistors so they can stand up!
2. Before soldering the resistor to the board, tin also the pad on which it is going.
3. Holding the resistor in place, heat one end with the iron so that it is lightly held to the pad by the solder. Then heat the other so that it is held similarly.
4. Finally apply a little more solder to each end to make a firm and solid joint. Ensure that one end has cooled down before soldering the other!

Capacitor Installation



Fix the capacitors taking great care to observe the correct polarity with the electrolytics.

Accidental reversal could damage the amplifier, your health, and your house insurance!

Note that the small 1nF 1000V capacitor has no polarity.

Link Installation



Connect insulated wires as jumpers across the centre of the board in both positions marked **LINK**; make sure that they do not rub against any other soldered parts.

Also, using insulated wire, make the link **OPTIONAL LINK 2**, this being easiest carried out on the resistor side of the board, i.e. the wire will join the two holes directly above R11.

This completes the Power Supply Board – it too can be positioned in the chassis but not secured down.

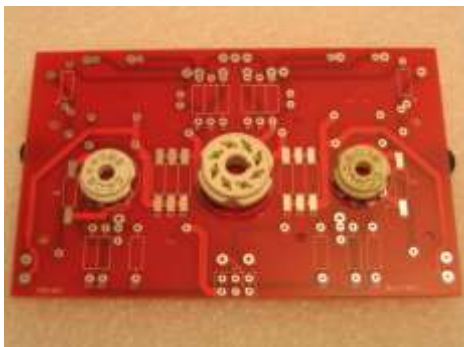
Section 6: Driver Board



This board is used to provide the 6SN7 and 5687 amplification stages of the amplifier. Refer to the large accompanying schematic diagram to view the circuitry on this PCB. Please READ THIS SECTION COMPLETELY before starting assembly.

Parts list:

Quantity	Description	Location
2	330K 1W	R1 & R2
2	680R 1W	R3 & R8
2	470K 1W	R4 & R7
2	10K 1W	R5 & R6
6	82K 1W	R9, R10, R11, R12, R13, R14
2	1K 1W	R15 & R18
4	820R 1W	R16, R17, R19, R20
2	1M 1W	R21 & R22
4	.015uF 200V (Signal capacitor)	C1, C2, C3, C4
2	100uF 10V (Electrolytic)(+/-)	C5 & C6
4	.22uF 600V (Signal Capacitor)	C7, C8, C9, C10
2	470uF 16V (Electrolytic)(+/-)	C11 & C12



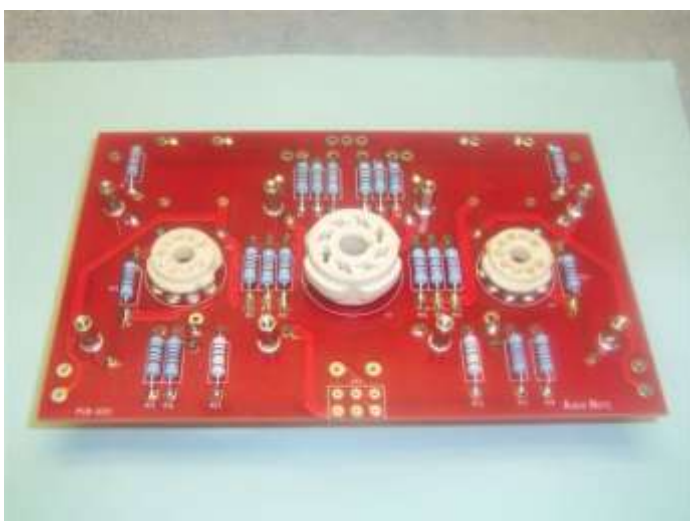
Carefully fit the 8-pin (octal) valve base to the resistor side of the board i.e. the side with only R numbers. NOTE this base needs to be correctly positioned; if you look at the octal base, there is a slot in the base where the spigot (key) of the valve fits in, this index is marked on the board and they must be aligned together.

Push the two 9-pin valve bases into this side of the board and check that the ceramic bodies of the bases rest on the board itself.



Make sure that all the solder lugs are pulled properly through the board, as far as possible, before you start soldering them into place.

They require large amounts of solder the 8-pin base is best soldered from either side of each pin in turn. Remember that the bases must be level on the board, as otherwise it may be difficult to fit them through the holes in the chassis later, which may make inserting the valves difficult.



Bend the following resistors, **R9 to R14** and **R19 & R20** to shape as described in the PSU board section. (82K).

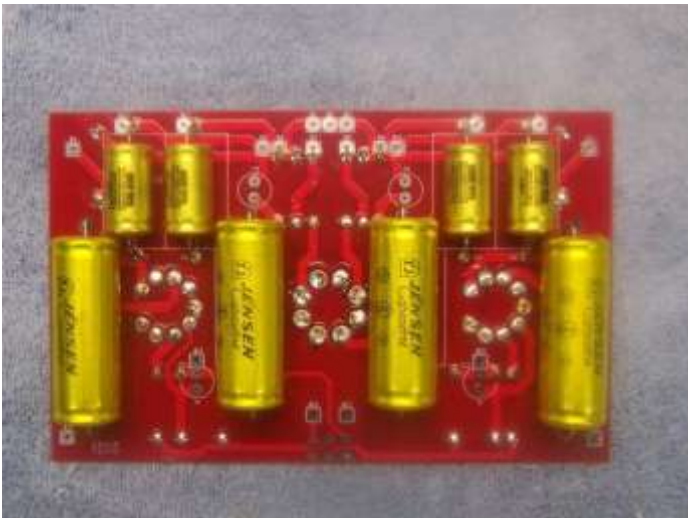
Cut them to length and tin the ends and tin the solder pads on the board.

Fit these resistors first (both sides of the board are used), then fit the remaining resistors through the board in their respective positions.

HINT: For R1 to R8 and R15 to R22, pre-form the legs by gently bending around the shaft of a small screwdriver - do not bend the legs too close to the body or too sharply.

Note that R9, 10, 11 and 12, 13, 14 are connected in parallel, that is as two single large resistors. A single resistor in this place would get much too hot.

At this stage it may be a good idea to secure the 8 hex spacers into position.



Insert **C1, C2, C3, C4**, (.015uf) the power bypass capacitors on the other side of the board (the capacitor side).

NOTE: The capacitors (.22uF and .1uF) are signal capacitors and are not polarized (no + or -) so orientation does not matter. The .22uf capacitors have a 300~ on them and that refers to 300V AC which is similar to 600V DC.

Insert **C7, C8, C9, C10** (.22uf). Again, these capacitors have no polarity so it does not matter which way they are oriented.



Insert **C5, C6**, (100uf) **C11 and C12** (470uf) the cathode bypass capacitors. These are electrolytic caps so be sure to orient according to the + - on the capacitor and the PCB.

Using insulated wire, link **W9 to W17, W10 to W13, W5 to W12** and **W6 to W16** on the driver PCB with black wire (see opposite).

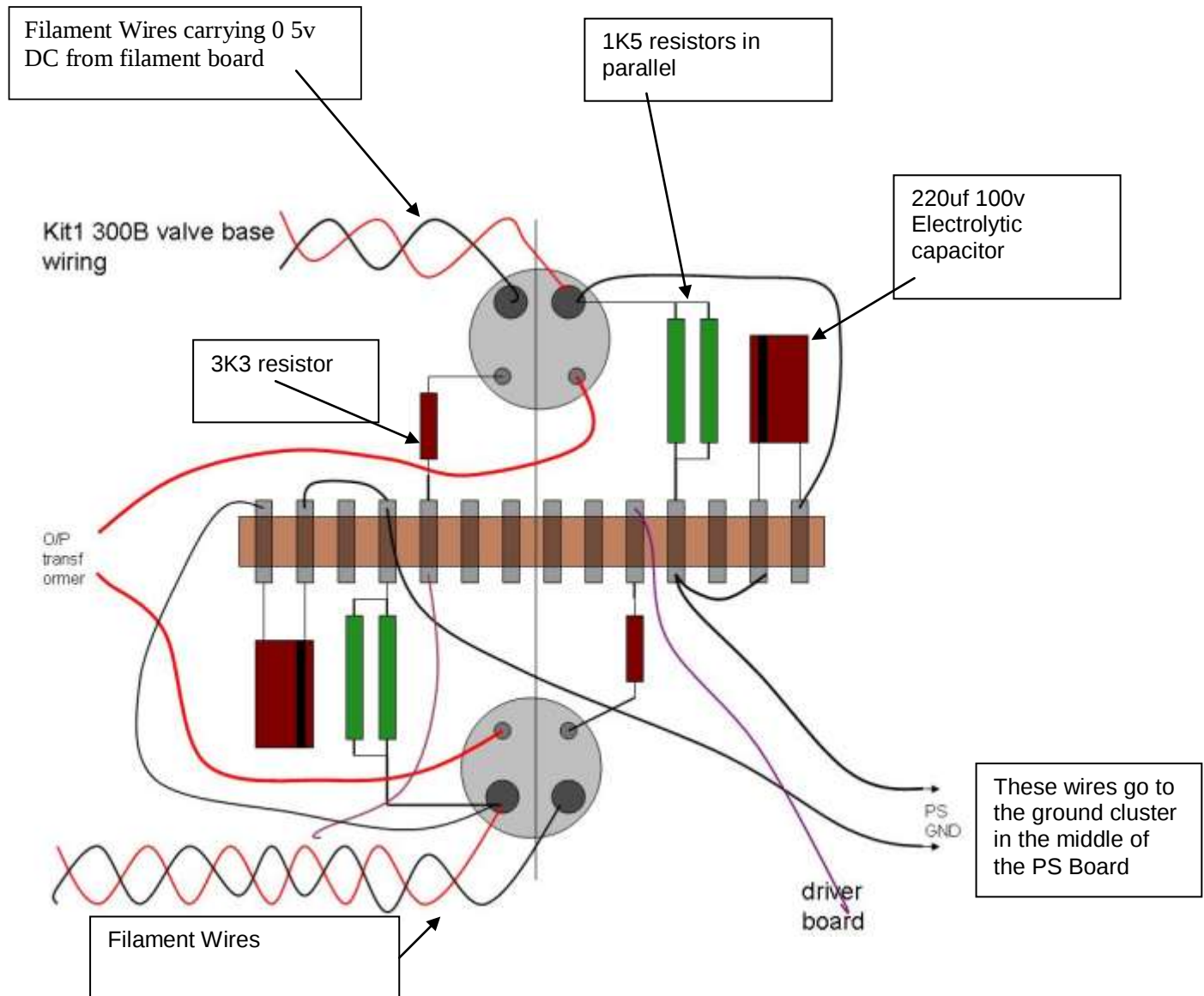
DO NOT INSTALL THE POTENTIOMETER DURING THIS SECTION It's the very last thing we will do in the kit you are finished with the driver board for now!

Well done!



Section 7: 300B Tag Strip Wiring

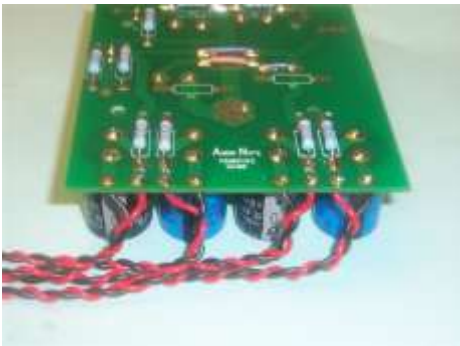
In this section we will be hardwiring the 300B section – Take a look at the schematic for this section so you are familiar with the operation – Then lay out the components as shown in the graphic below:



Components: 4 x 1K5, 2 x 3K3, 2 x 220uf 100v.

Section 8: Wiring Power Supply PCB to Driver Board

Refer to the Inter-wiring Chart and follow the graphical charts below to perform the wiring from the power supply to the driver Board.

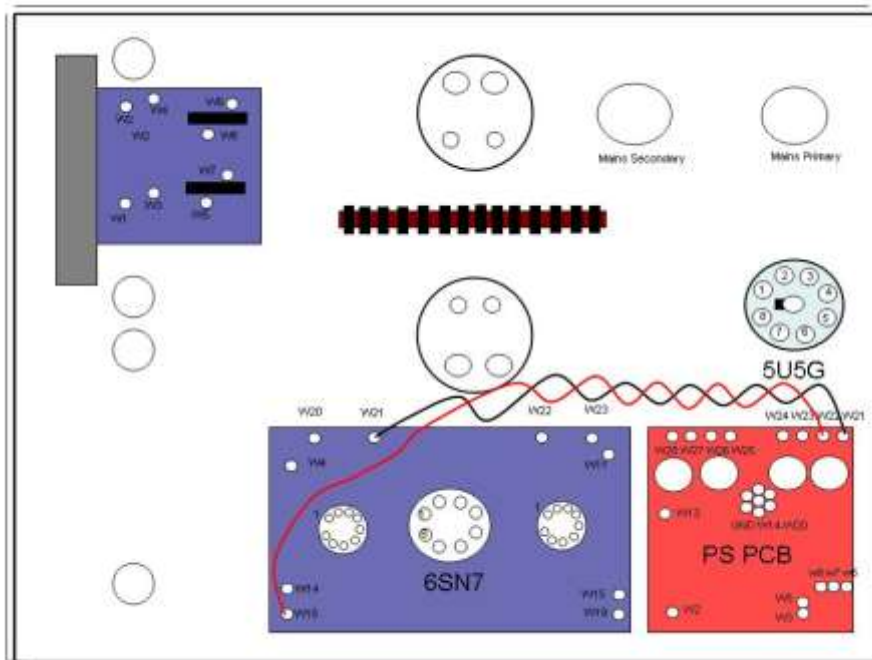


We have supplied you with twisted red/black PTFE wire that you can use for this section – basically start by soldering the RED/Black twisted pairs to the Power supply board.

Then position the board into the chassis and align these wires with the driver board as they will be connecting – see the following chart:

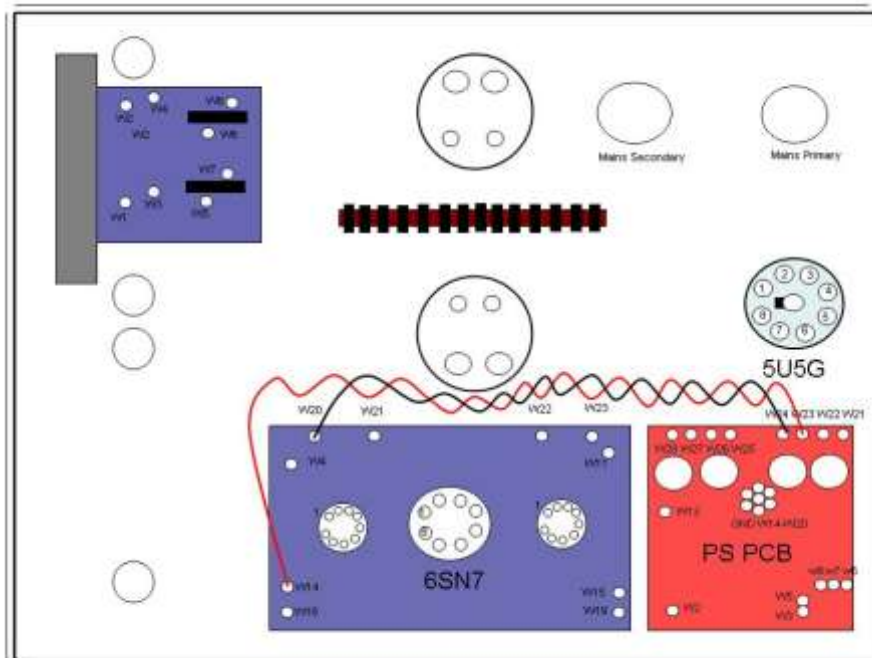
Inter-wiring Chart

PSU Board	Driver Board
W21	Black wire to W21 on Driver
W22	Red wire to W18 on Driver
W23	Red wire to W14 on driver
W24	Black wire to W20
W25*	Black wire to W22 driver
W26*	Red wire to W19 driver board
W27	Red wire to W15
W28	Black wire to W23



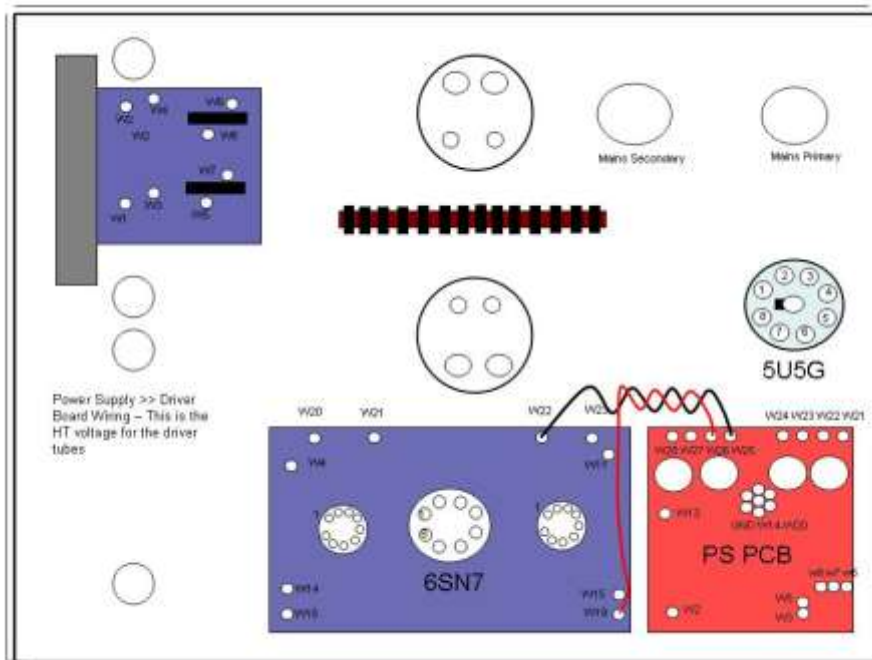
Kit1 300B Single Ended T-199 Mains Transformer

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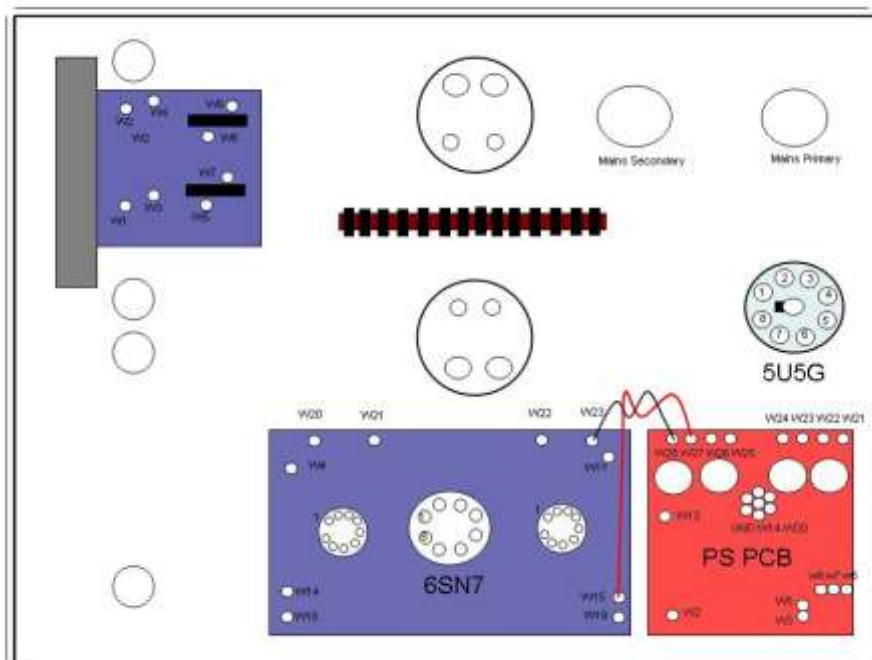
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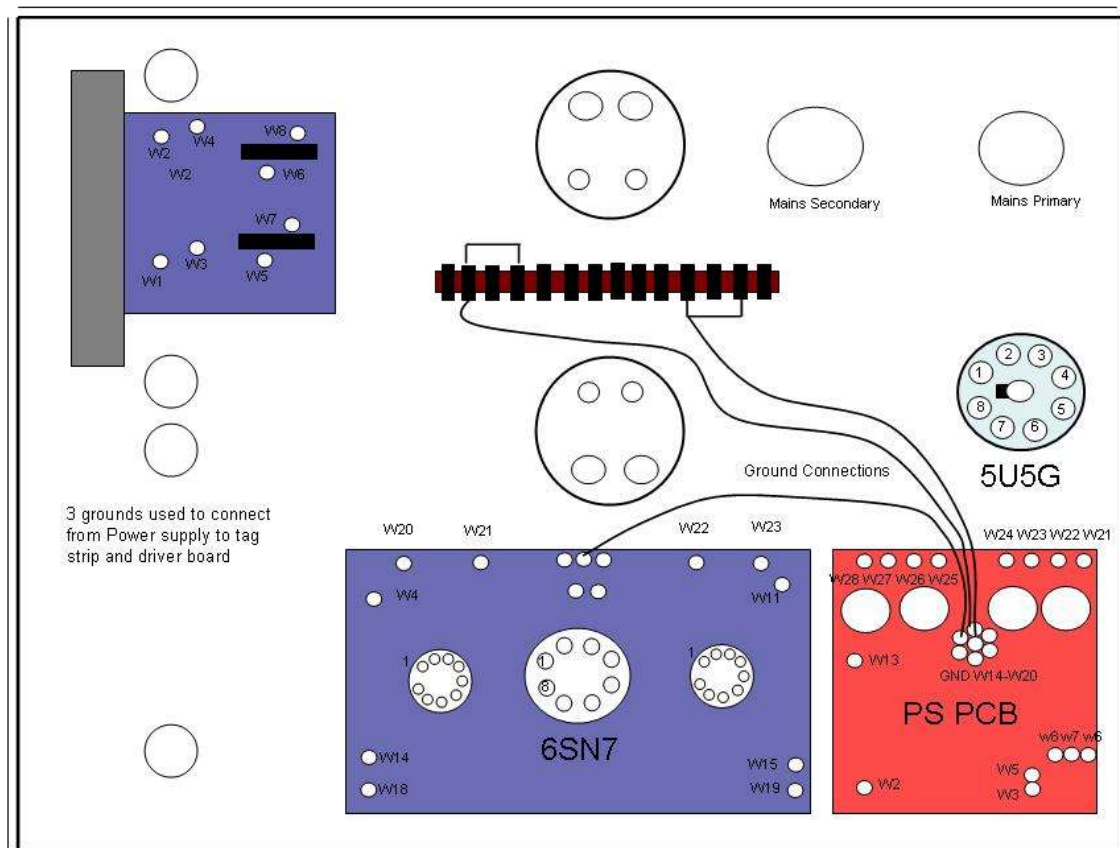
3



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Section 9: Remaining Wiring



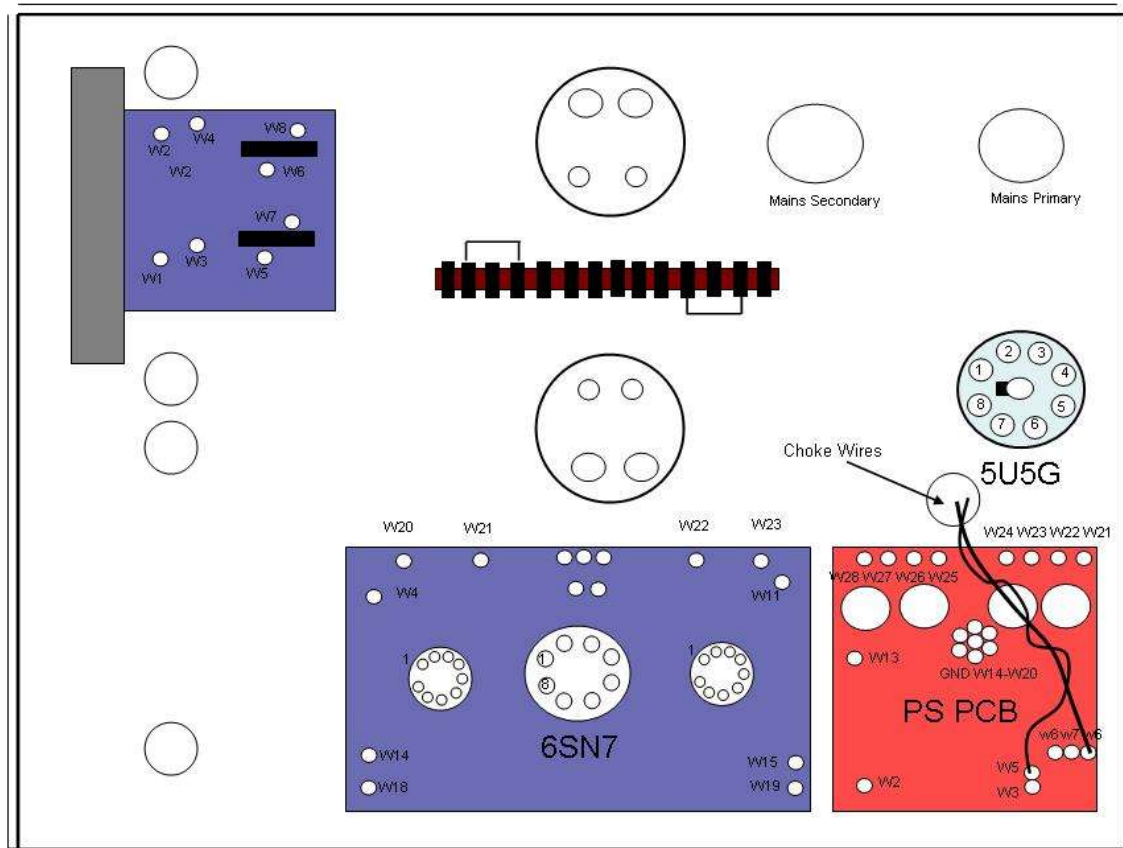
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PSU Board	Destination
W15	Black Wire to W2 ON DRIVER - GND
W16	Black Wire to negative side Cathode on Tag section - GND
W17	Black Wire to negative side Cathode on Tag section - GND

On the above slide you can see the three ground connections that can be made from the Power supply PCB to the Driver Board and then the Hardwiring section

Connect the choke wires to the Power supply board:

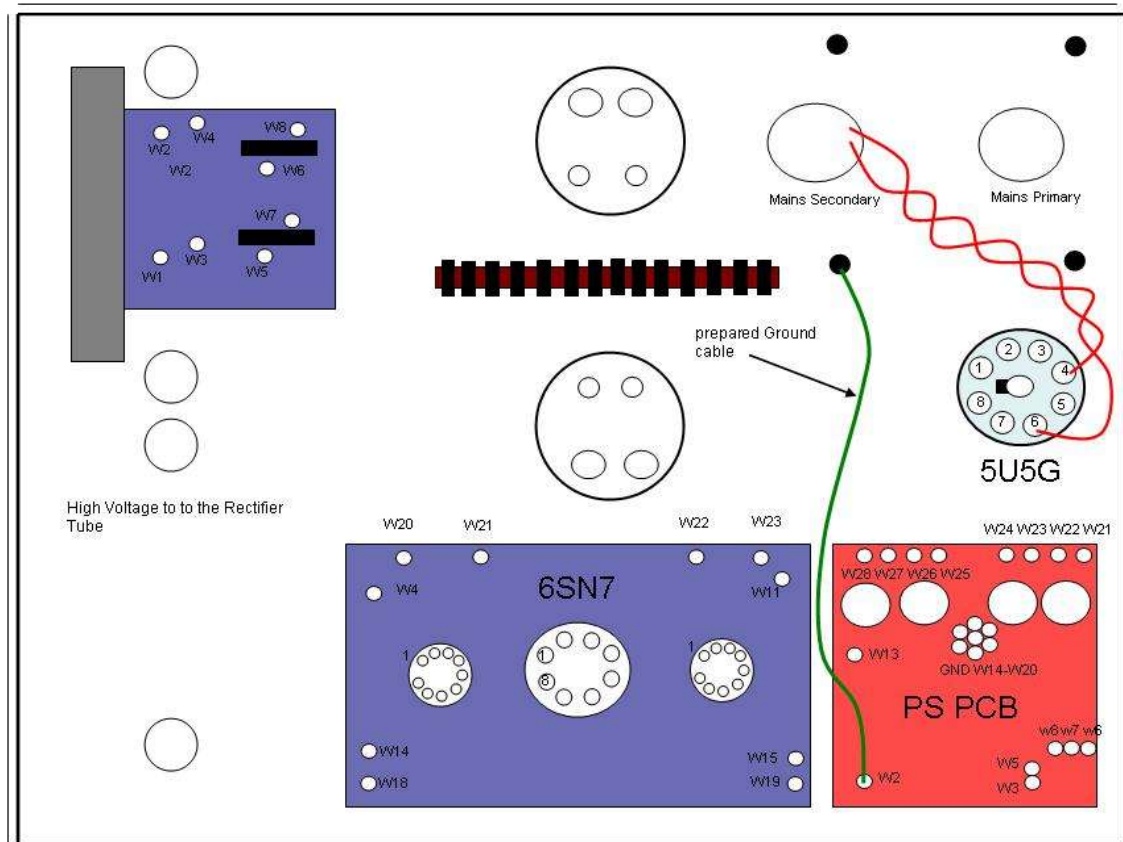


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PSU Board	Destination
W5	CHOKE wire
W6	CHOKE wire

Connect chassis GND to PSU Board and Mains Secondary (red leads) to 5U4G:



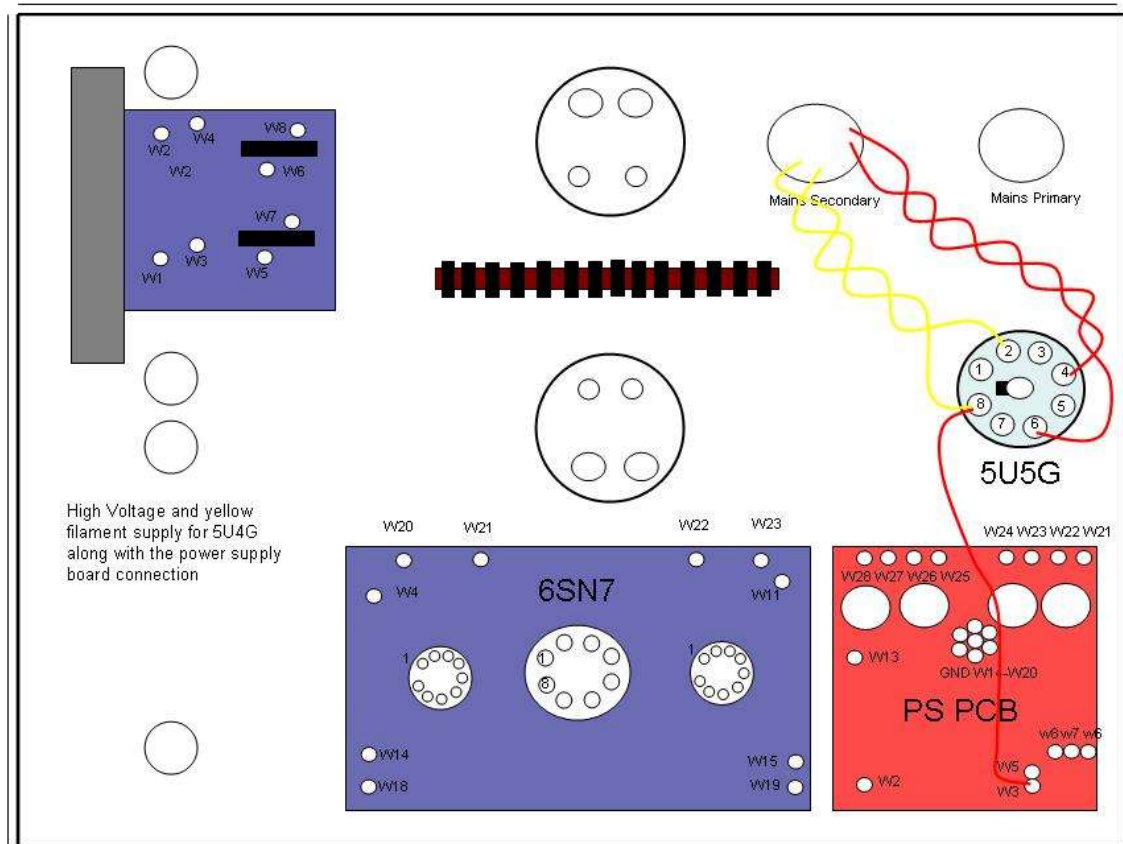
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Start	Destination
W2 – PSU Board	Chassis GND
Red secondary wire (a)	Pin 4 - 5U4G
Red secondary wire (b)	Pin 6 – 5U4G

Note the notch in the 5U4G base and the location of pin 1.

Remaining 5U4G connections:

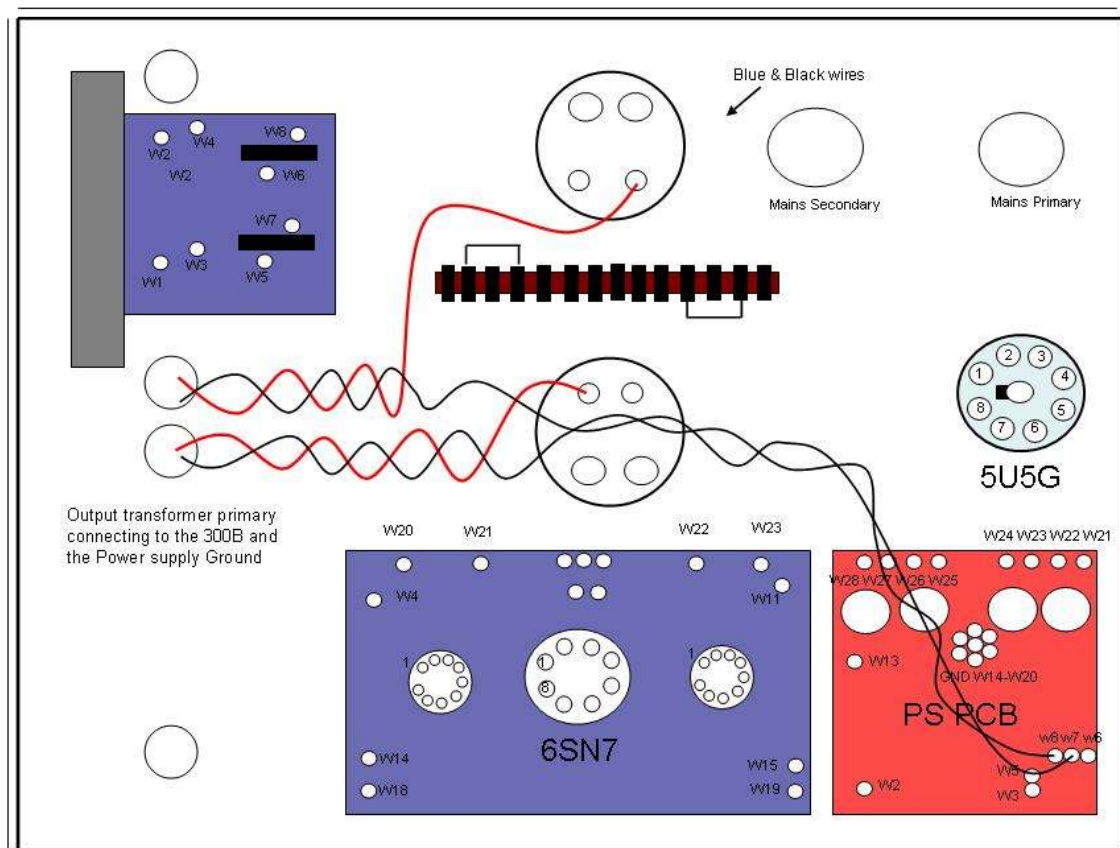


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Start	Destination
W3 – PSU Board	Pin 8 – 5U4G (20cm red wire)
Yellow secondary wire (a)	Pin 2 - 5U4G
Yellow secondary wire (b)	Pin 8 – 5U4G

Connecting the Output Transformers:



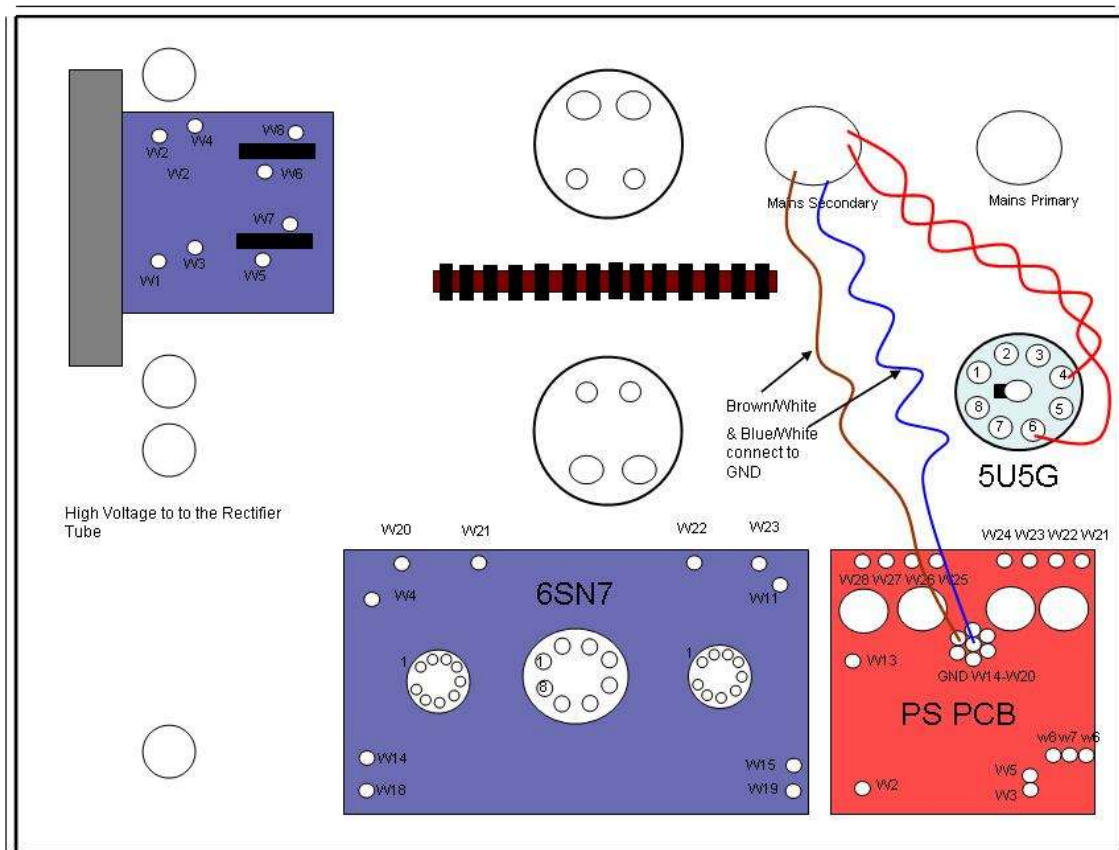
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First, take the **two thin Black wires** from the output transformers, lightly twist them together and lay them across the chassis towards the choke. These will need to be extended to reach the P.S.U. board; solder **25cm additional Black wire** to each. Ensure there are no sharp projections of wire or solder then insulate these joints with the heatshrink tubing provided. It is important that they are well insulated; these wires carry the **450 volts from the PSU Board**.

Start	Destination
Extended black wire (a)	W7 – PSU Board
Extended black wire (b)	W8 – PSU Board
Upper red wire (O/P Tx)	Upper 300B (follow diagram above)
Lower red wire (O/P Tx)	Lower 300B (follow diagram above)

Connect mains secondary centers to PSU GND:



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Start	Destination
W20 – PSU Board	Mains secondary - Blue/White
W18 – PSU Board	Mains secondary – Brown/White

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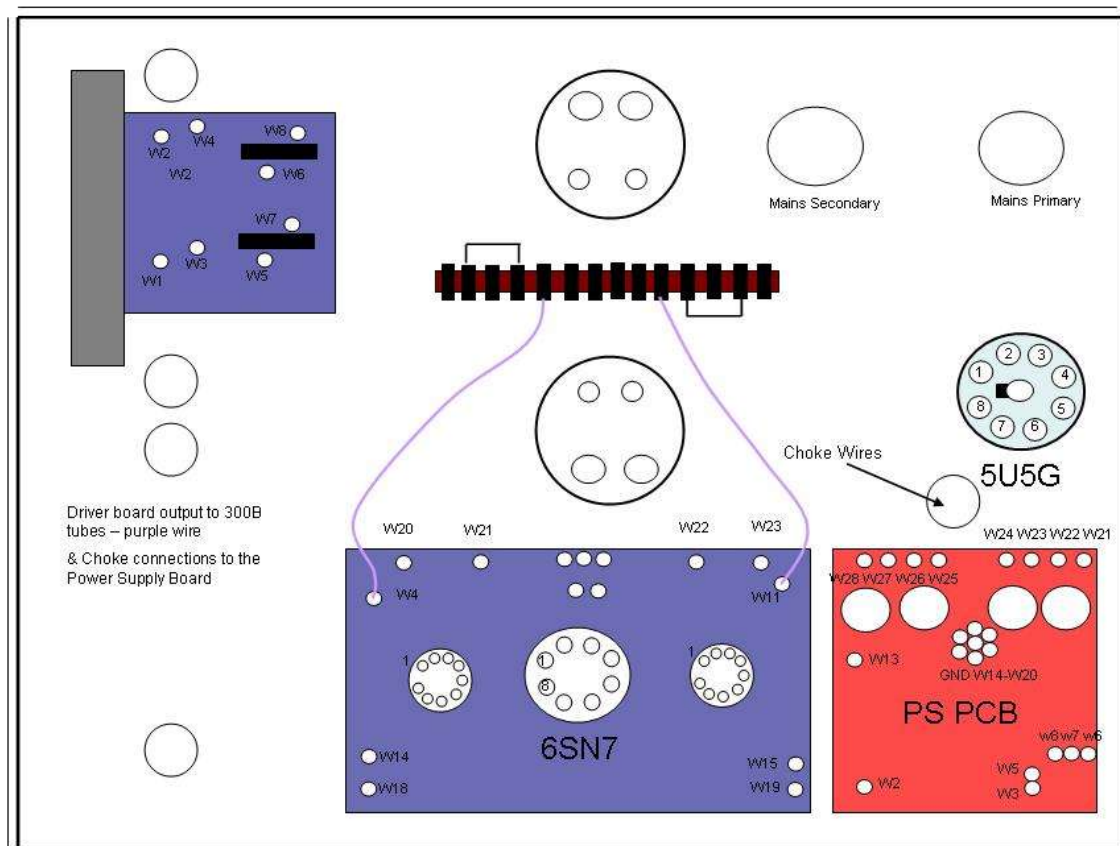


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Start	Destination
W13 – PSU Board	Mains secondary - Orange/White

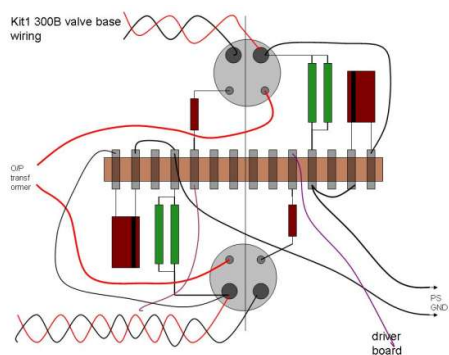
Connect Drive Board output to Tag Strip:



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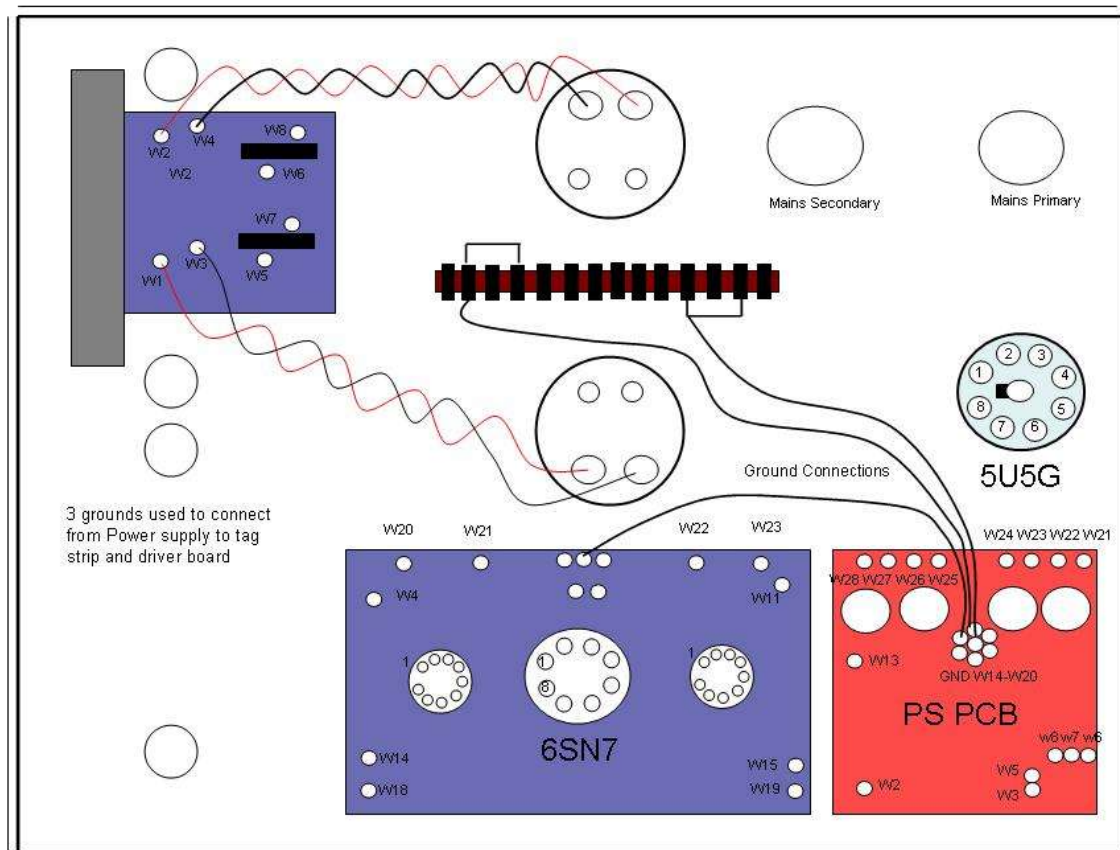
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Start	Destination
W4 – Driver Board	Tag strip position shown in diagrams (use purple PTFE wire)
W11 – Driver Board	Tag strip position shown in diagrams (use purple PTFE wire)



The tag strip positions are those tags that connect up to the 3K3 resistors (i.e. the end that **does not** connect to the 300B tube).

Connect Filament Board output to 300B's:



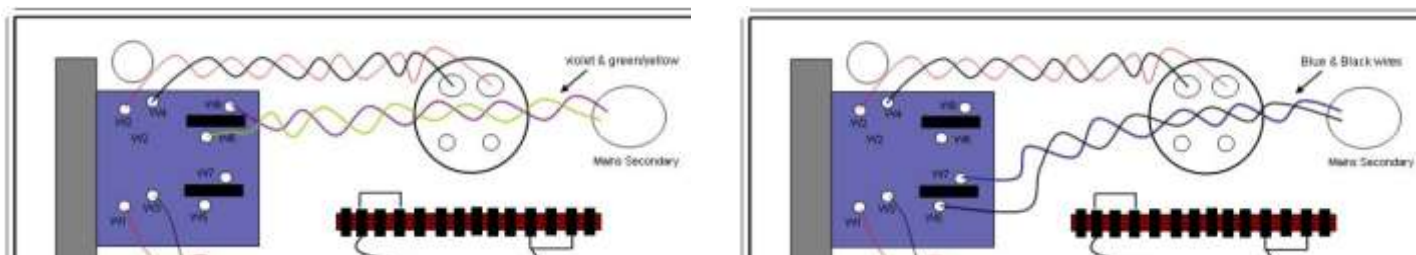
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Use the two twisted red/black PTFE the filament wire pairs to make the following connections:

Start	Destination
W2 – Filament Board	Red wire (a) to Upper 300B as shown above
W4 – Filament Board	Black wire (a) to Upper 300B as shown above
W1 – Filament Board	Red wire (b) to Lower 300B as shown above
W3 – Filament Board	Black wire (b) to Lower 300B as shown above

Connect remaining mains secondary wires to Filament Board:



In this section we will hook up the Mains secondary wires to the Filament Board – this is the AC voltage that goes to the filament board so that it can be converted to DC and then provides 5VDC to the 300B filaments - You will need to make the following connections:

Start	Destination
W8 – Filament Board	Mains Secondary – Violet
W6 – Filament Board	Mains Secondary - Green/Yellow
W7 – Filament Board	Mains Secondary – Blue
W5 – Filament Board	Mains Secondary – Black

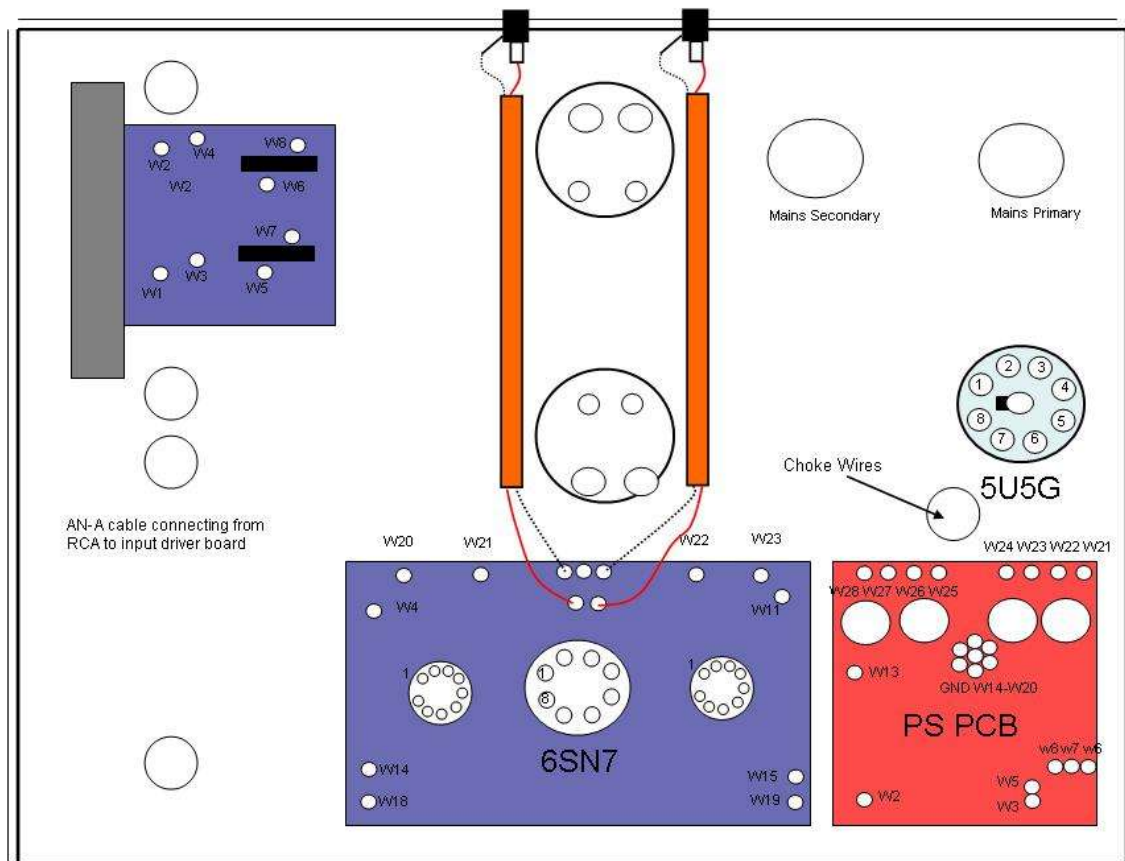
Now, all the connections have been made to the filament board so you can secure the board permanently.

RCA Input Cable Connections



Amongst the final connections to be made are the Shielded AN-A cable from the input RCA's to the driver board.

I suggest that you put some solder on the RCA signal section and GND (Tin these areas) then heat the solder and insert the tinned AN-A cable into position – the RCA end is the one with the red and the white wires.



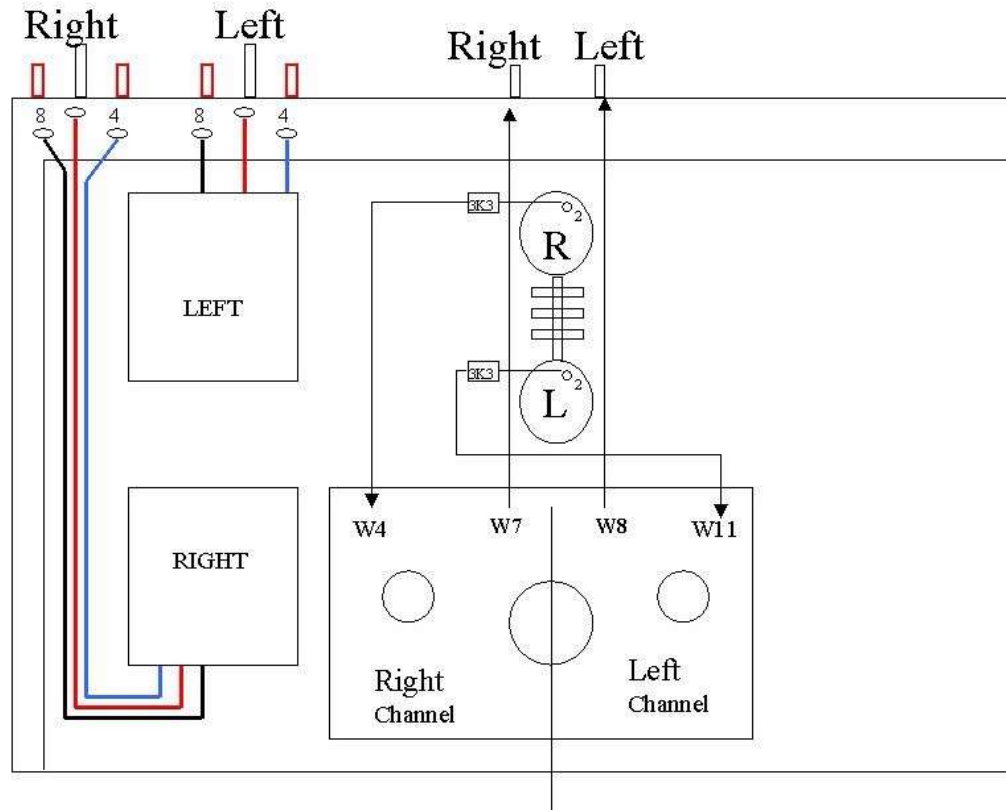
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On the Driver board connect the red signal to W7 and W8 and the grounds to W1 and W3 as shown in the above diagram.

Speaker Post connections (Output transformer secondary's)

The 5th anniversary chassis has just a red and black speaker post for each channel – the output transformer has three colored wires – black, red and blue – so you will want to connect as shown below – in this case if you are using 8 ohm then just the red and the black wires are used and you can trim and put heatshrink over the 4 ohm terminal.



Kit1 as viewed from underneath the chassis

Potentiometer Installation



The last remaining item is to install the Volume Pot.

The original kit1 had the volume pot fitted right into the PCB itself – we have moved the pot now away from the driver board so you will need to extend wires from the pot itself over the Driver board VP1 section.

Connect the extended wires from the POT to the driver board as if the pot was being inserted directly into the PCB.



If you would like to configure the kit as a power amplifier with no volume pot then you can install 47K resistors in the Driver board as shown opposite (only one channel shown – so you would need 4 resistors (2 for each channel)).

That completes the build of the kit1 – now we need to do some visual checking – I would suggest going through the slides of all the inter-wiring – then check the next section – Inter-wiring Checklist.

Section 10: Inter-wiring Checklist

This section provides a good checklist to review to make sure that all the correct internal connections have been made from the three boards – go through each page to ensure all is checked off!

Filament Board

W1 W3	5v output to 300B filament PIN 0v output to 300B Filament PIN	5V DC output
W2 W4	5v output to 300B pin 4 red 0v output to 300B L/H pin 3	5V DC output
W5 W7	Mains Secondary Green/Yellow Mains Secondary Voilet	AC input AC input
W6 W8	Mains Secondary BLK Mains Secondary BLUE	AC input AC input

PSU Board

W1	
W2	Green prepared wire to Chassis GND
W3	Pin 8 of 5U4G rectifier valve
W4	Not used
W5	CHOKE wire
W6	CHOKE wire
W7	Black wire from O/P tx primary
W8	Black wire from O/P tx primary
W9 W10 W11 W12	Not Used
W13	Center tap to 5687 heaters Orange/White
W14	Not USED
W15	Black Wire to W2 ON DRIVER - gnd
W16	Black Wire to negative side Cathode on Tag section- gnd
W17	Black Wire to negative side Cathode on Tag section- gnd
W18	Center Tap for HIGH VOLTAGE Brown/White
W19	Note Used
W20	Connects center tap for 6SN7 Blu/White DRIVER
W21	Black wire to W21 on Driver
W22	Red wire to W18 on Driver
W23	Red wire to W14 on driver
W24	Black wire to W20
W25	black wire to W22 driver
W26	red wire to W19 driver board
W27	red wire to W15
W28	black wire to W23

Driver Board

W1	RCA GND from RIGHT signal
W2	Black wire from W15 on PSU (GROUND)
W3	RCA GND from LEFT signal
W4	purple PTFE to 3k3 resistor to R/H 300B
W5	black jumper to W12 on driver board
W6	black jumper to W16 on driver board
W7	red from RCA cable right signal
W8	red from RCA cable left signal
W9	connects black jumper wire to W17 on driver
W10	connects black jumper wire to W13 on driver
W11	connects PTFE purple to 3K3 300B grid resistor L/H
W12	see above
W13	see above
W14	connects red wire to W23 on PSU
W15	connects red wire to W27 on PSU
W16	see above
W17	see above
W18	connects red wire to W22 on PSU
W19	connects red wire to W26 on PSU
W20	connects black wire from W24 on PSU
W21	connects black wire from W21 on PSU
W22	connects black wire from W25 on PSU
W23	connects black wire from W28 on PSU

Section 11: Testing and Power-On Phase

Once all the visual checks have been done we can prepare for the power on phase

1. Insert the 2A slow blow (5x20mm) fuse into the fuse drawer and insert in the IEC socket
2. When the 0 is pressed against the chassis then the unit is off

A few OHM meter checks are in order – first check that the heat sink is NOT CONNECTED to any of the regulator pins (LM1084) on the filament board.

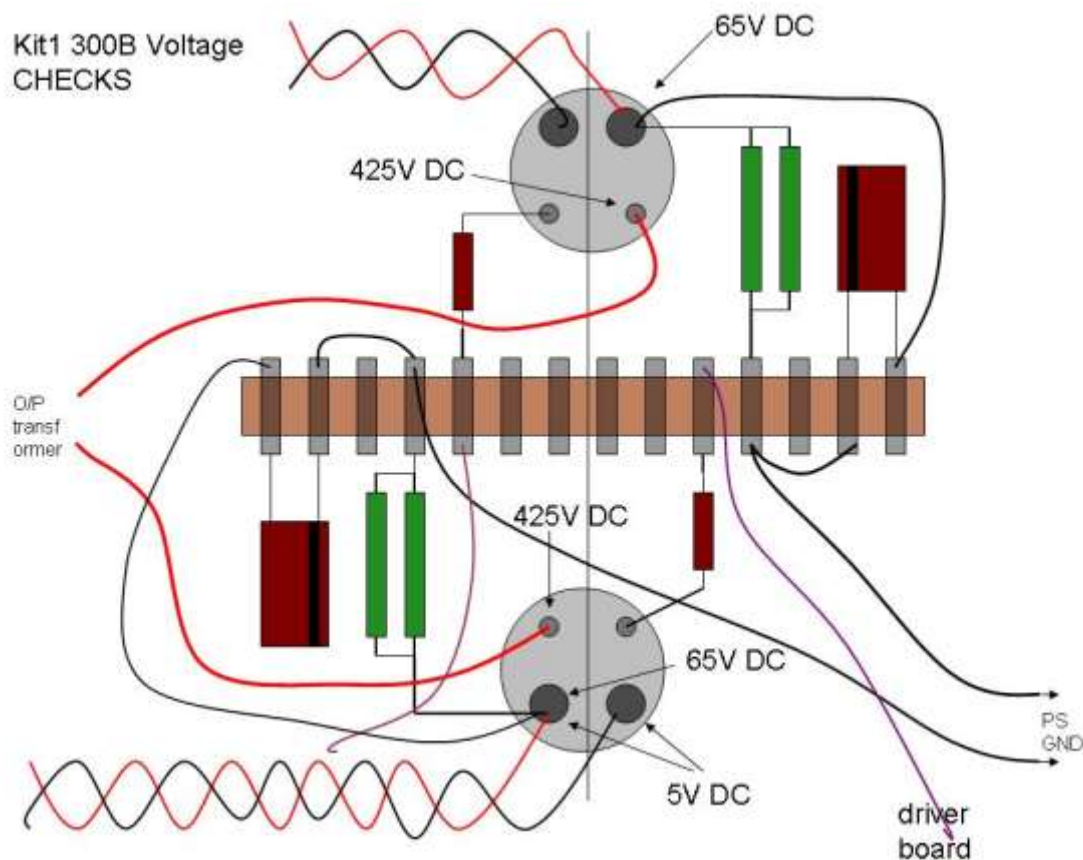
I suggest that you turn on the amp with no tubes in position and prepare to read some DC voltages...

If the fuse does not blow then you should be able to make some voltage measurements – be careful when measuring and do not lean on the chassis etc... follow proper electrical safety guidelines.

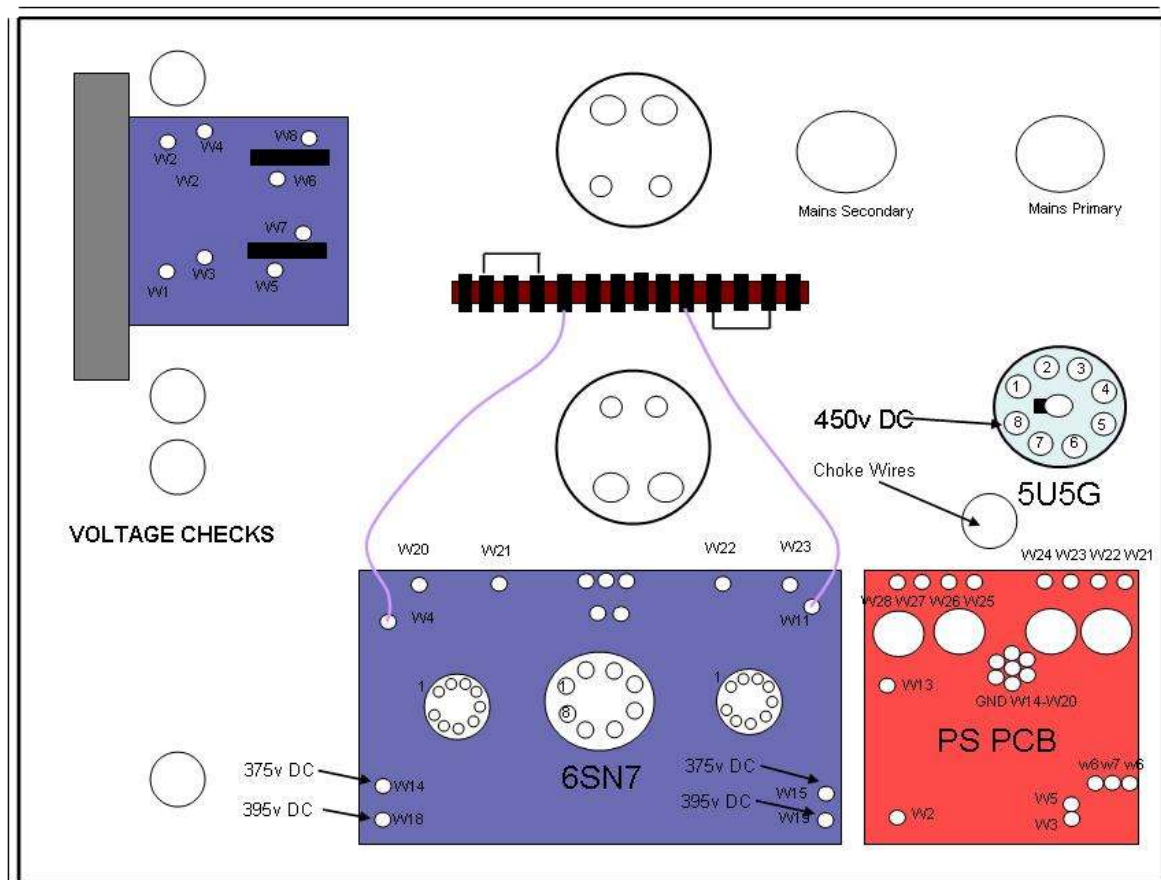
The first thing to check would be the 5V DC on the fat pins of the 300B bases.

Then check the 6.3V AC on the 6SN7 (7 & 8 pin) valve base and the 5687 (4 & 8) filaments.

Once the unit is powered up then lets check the following voltages:



Use the graphic below to measure the other key DC voltages in the kit:



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If all your DC voltages are looking good then we are almost there.

Here is a chart view of the key voltages in the kit

High Voltage (H.T.) on pin1 of 300B	425 Volts
H.T. out of PSU Board (W7/W8 PSU BOARD)	435 Volts
300B Cathode Voltage (pin 3)	70 Volts
H.T. to 5687 Valve (W14 & W15 Driver Board)	395 Volts
H.T. to 6SN7 Valve (W18 & W19 Driver Board)	375 Volts
Pin 9 (from Below) of 5687	200 Volts
Pin 6 of 5687	8.4 Volts
Pin2 and Pin 5 of 6SN7	175 Volts
Pin 3 and Pin 6 of 6SN7	4.8 Volts
W13 of PSU Board	85 Volts

Final Tests

If you have completed the kit and all the DC voltages are checking out correctly then you may want to do a sound test – we have provided an audio test CD with a 1Khz signal on it – play the CD into the kit1 – and hook up the dummy loads (8ohms) provided.

Increase the volume of the kit and use your ohm meter to measure the output AC voltage across the dummy loads – you should see it increase and decrease as you adjust the volume.

If the amplifier seems to be working correctly and you are feeling confident then we suggest you try hooking the unit up to some speakers – I would try the amplifier first on a low end pair of speakers – try some familiar music and get a feel for if the amplifier is operating correctly.

The sound of the kit1 will change quite a bit over the first month as it burns in – you will also smell the transformers burning in – this is normal.

The tubes we supply with the amplifier are good for burn in and test – after a few months you may want to invest in some higher end 300B's such as Sophia Princess or TJ Meshplates – you can also try some NOS 5U4G & 6SN7.

Hope you had fun with your build – send us some pictures and a small review and we will be happy to post on the web site.

Many thanks
Brian Smith

Appendix

The appendix contains auxiliary information. That is information that is either common to most project manuals or any last minute pieces of information that did not make it into the manual in time. It may also contain pull-out circuit diagrams that may be handy to have outside the manual etc.

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

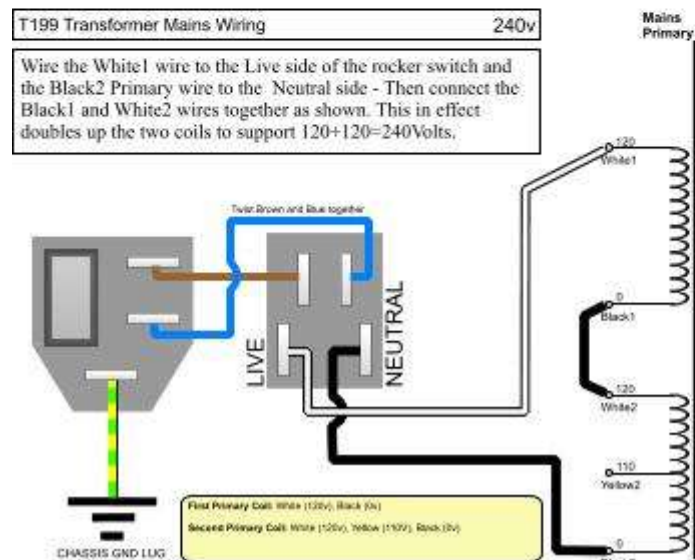
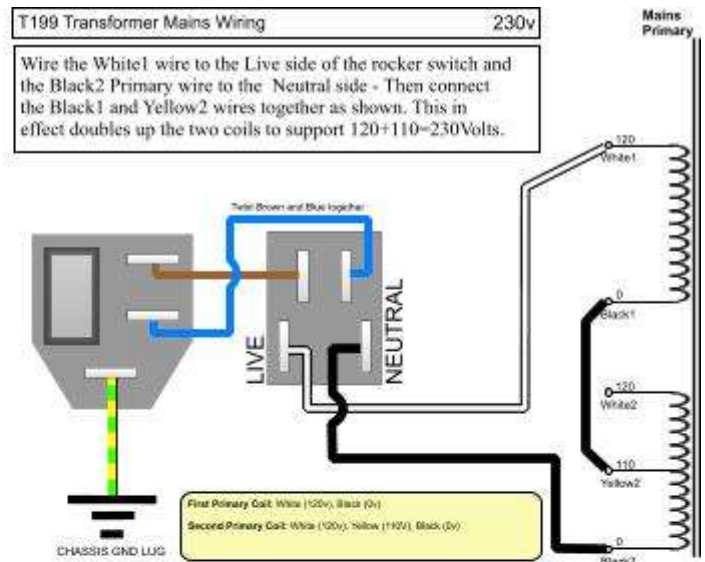
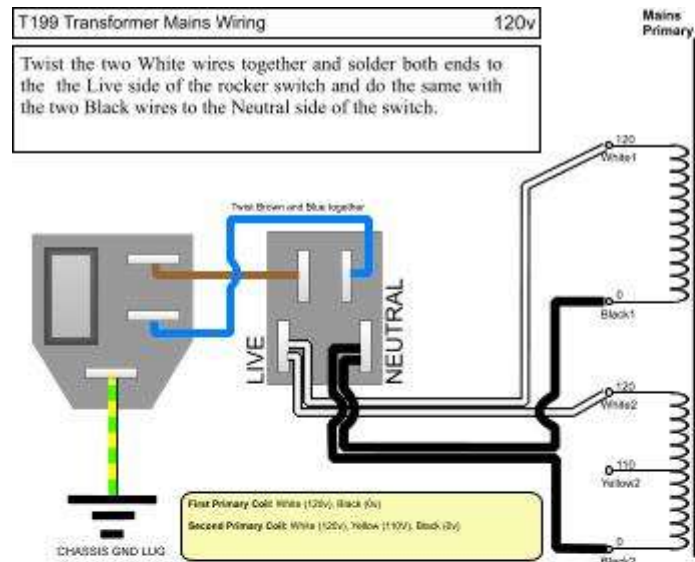
100R				
	1	0	0	x 1
680R				
	6	8	0	x 1
820R				
	8	2	0	x 1
1K				
	1	0	0	x 10
2K2				
	2	2	0	x 10
2K7				
	2	7	0	x 10
3K3				
	3	3	0	x 10

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).

AC Wiring Guide (T-199 Mains Transformer)

The following diagrams show the mains wiring configurations for the various world voltages. It is recommended that you cross out the ones that don't apply to you so that you can't follow the wrong one.



Full Schematic

