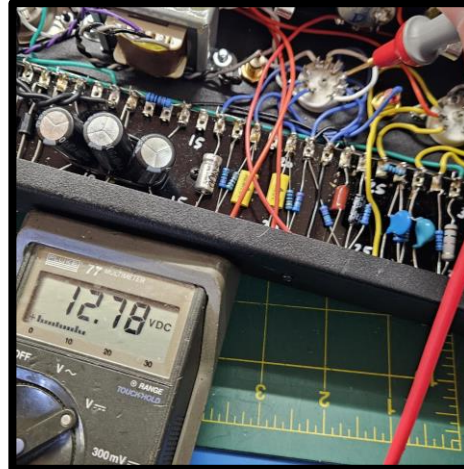


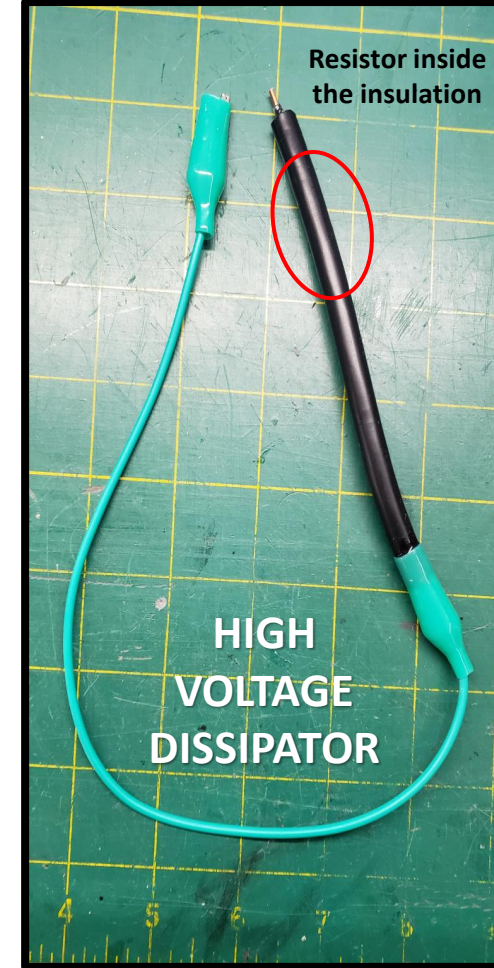
Inspection, Verification and Testing



12AX7 Grid 2 Voltage
RED on Pin 7 = 12.8V



9VAC Adapter



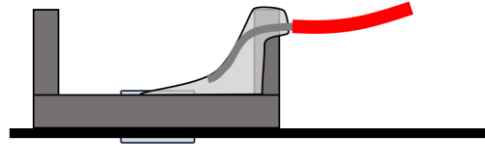
Resistor inside the insulation

HIGH VOLTAGE DISSIPATOR

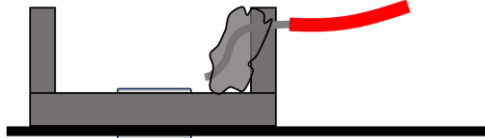
Tools Required:

- Magnification
- Multimeter
- Bent-Nose Pliers
- Soldering Iron
- Wire Strippers, 20 & 18 AWG
- Phillips & Slot screwdrivers

A GOOD solder joint flows to the center, and has a smooth, shiny surface.



A BAD solder joint is rough and dull, and does not flow to the center.



1. Clip the **black** lead of your meter to a transformer bolt on the enclosure.
2. Set your meter to "beep" at *continuity*. Usually this symbol: 
 - If your meter does not have a "beep" function, measure *Ohms*. Ω
 - All "beep" measurements here should measure resistance of less than 1 Ohm.

Start of Hour 7

Soldering & Verification

Tools Required:

- Soldering Iron & Solder
- Wire Strippers for 20 & 18 AWG
- Sharp Razor or X-Acto Blade
- Bent-Nose Pliers
- Magnification
- Multimeter



Austin

Make a High-Voltage Dissipator

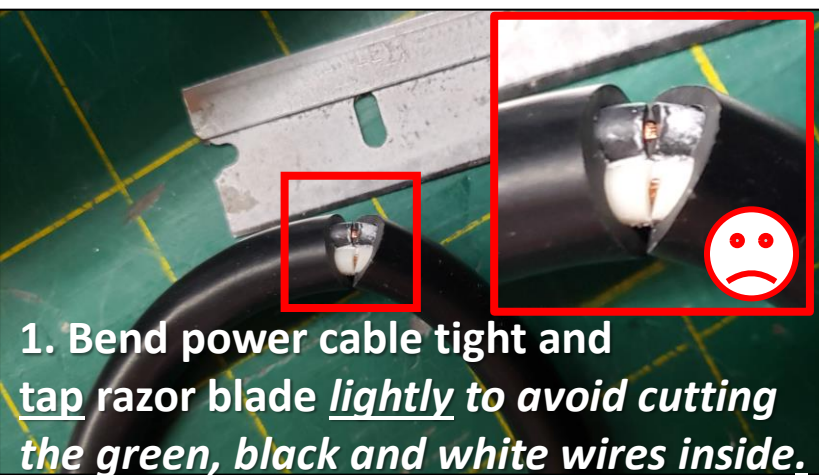
Only takes a few minutes. This tool will dissipate (“bleed-off”) high voltages if you need to troubleshoot. You’ll need the following from your kit:

- 1” Solid Copper Wire
- A 2.2K resistor (**Red Red Black Brown**)
- The Alligator Clip lead
- The 3-prong Power Cord

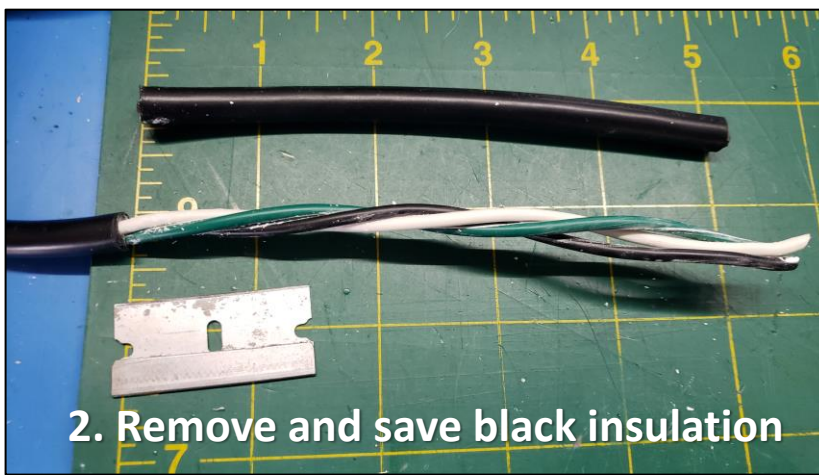
**Image sequence
on the next page**

1. Remove and save 5” of the black power cord insulation.
2. Cut off one alligator clip.
3. Pass the cut end of the alligator clip wire through the empty power cord insulation
4. Strip the cut end of the alligator clip wire, and both ends of the 1” solid copper wire
5. Cut the legs of the resistor to about ½” each (12mm)
6. Solder the 2.2k resistor between the alligator clip wire and the solid copper wire
7. Pull the wire back into the power cord insulation, leaving the tip of the solid wire exposed.
8. Add glue to each end of the insulator to hold it in place, and let it dry overnight.

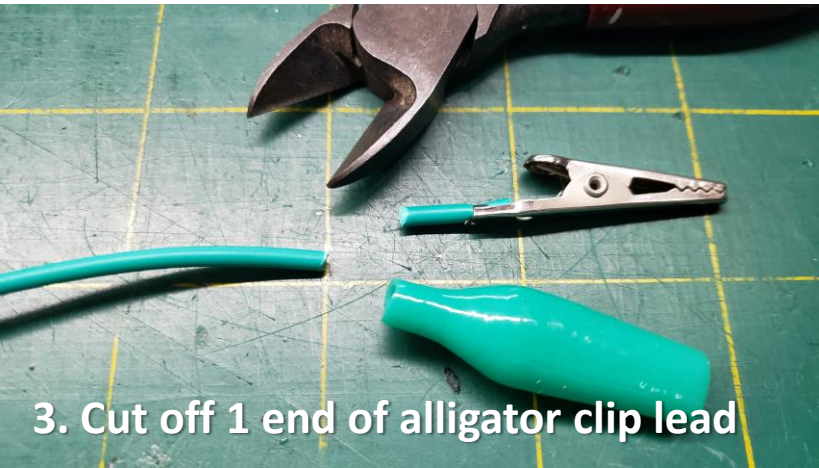
TO DISSIPATE HIGH VOLTAGE: UNPLUG THE REVERB! Then clip the alligator clip to a transformer bolt, and touch the tip to **T7, T10 and T14** for several seconds each.



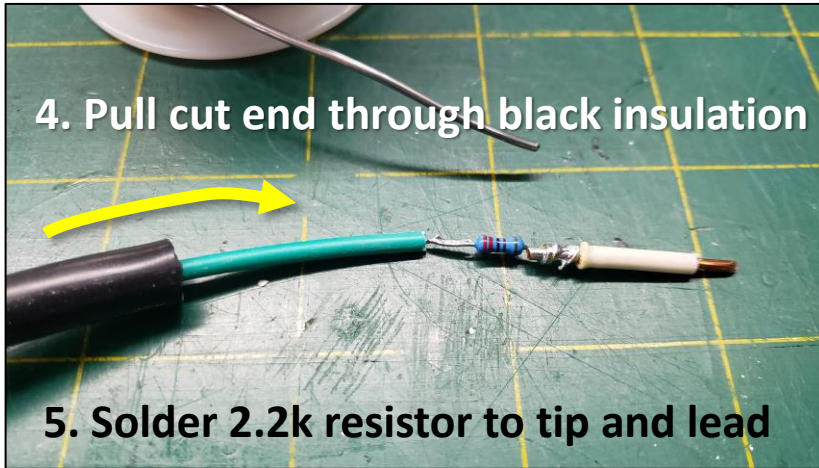
1. Bend power cable tight and tap razor blade *lightly* to avoid cutting the green, black and white wires inside.



2. Remove and save black insulation



3. Cut off 1 end of alligator clip lead



4. Pull cut end through black insulation



6. Add glue. Push back into insulation



7. Glue clip lead cover to insulation



Resistor inside the insulation

Solder the Terminal Board

Every connection on the terminal board must be soldered now.
(Except for the power cord which will be installed last.)

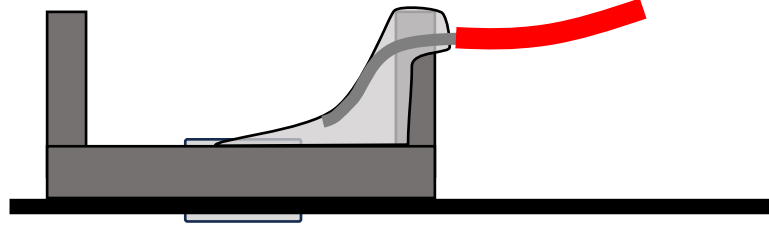
We use 0.050" diameter solder, and we prefer 63/37 Lead solder. You may use whatever solder you prefer. Wash your hands after using any solder.



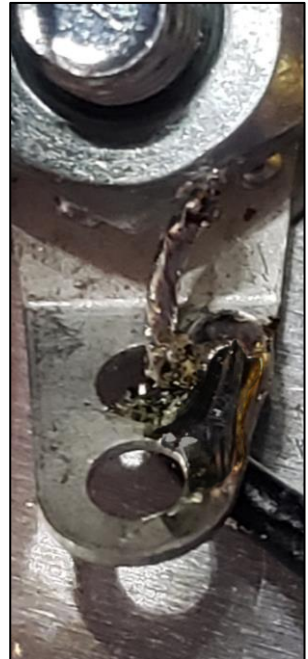
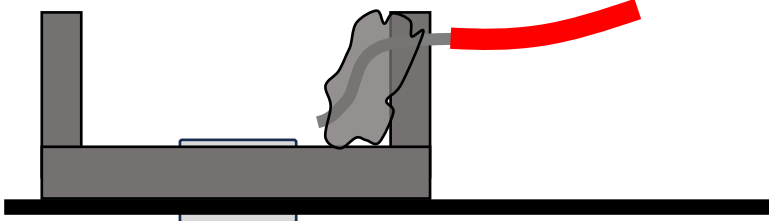
Each terminal has **two** connection points. Verify you have soldered both points.

In the TOP row (T1-T30), solder ALL the top sides, then ALL the bottom sides. Then switch to the BOTTOM row (B1-B30), and solder ALL top, then ALL bottom sides.

A GOOD solder joint flows to the center, and has a smooth, shiny surface.

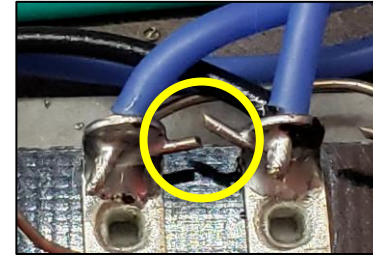
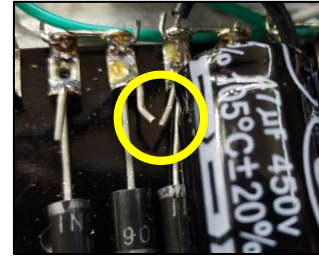


A BAD solder joint is rough and dull, and does not flow to the center.



Visual Inspection Guide

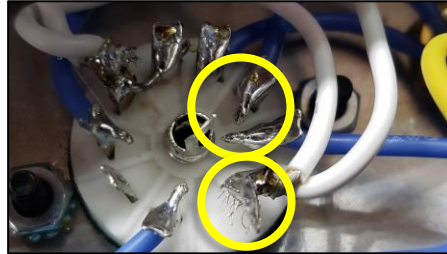
Component legs or jumpers too close to each other



These images should make you uncomfortable!

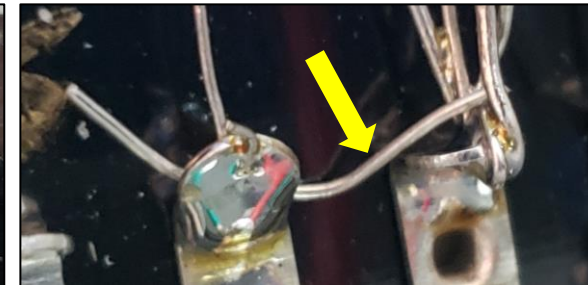
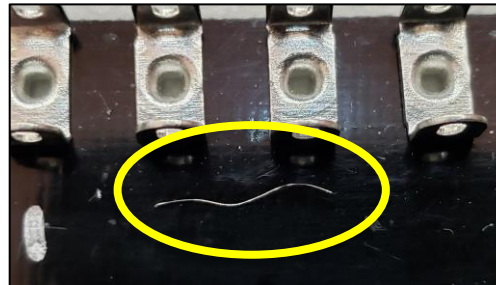
They are “Nervous Notes”

Soldered wires on Tube sockets too close



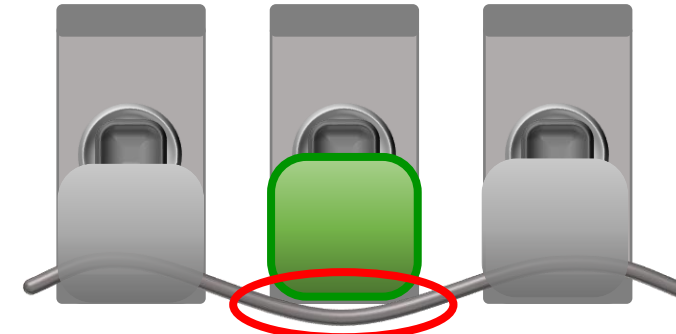
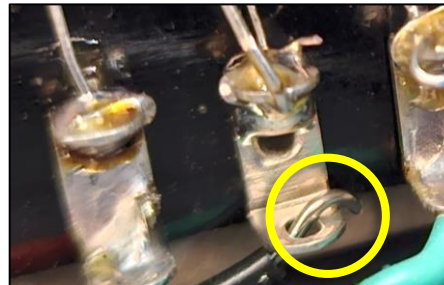
Frayed wires

Tiny pieces of frayed wire, solder, or cut legs inside the enclosure



On the “weaved” ground wire, solder can flow **on** the terminal, but not **behind** the terminal, leaving it unsoldered.

Unsoldered connections



Visual Verification

Before verification with a meter: Use your eyes, light, and **magnification!**

- Spending 10-15 minutes verifying solder points now, can save hours later!
- Unsoldered components will cause problems!
- Visually inspect every one of the 120 terminal solder points on the board: 
- Inspect the control panel too: Jacks, Pots, and Switch

When a visual verification of every soldered joint is finished:

Complete the 4 tasks below, then grab your meter.

(The testing sequence and check-boxes are on the following pages)

1. Turn all three knobs *full-up* (Full Clockwise)
2. Tighten the nuts on the control panel components and RCA Jacks.
3. REMOVE the $\frac{3}{4}$ Amp fuse from its holder, if already installed.
4. REMOVE the lamp from its holder, if already installed.



Each terminal has **two** connection points.
Verify you have soldered both points.

In the TOP row (T1-T30), visually check ALL the top sides for solder, then ALL the bottom sides.
Then switch to the BOTTOM row of terminals (B1-B30) and check ALL top, then ALL bottom sides.

Meter Tests: Diode and Continuity Function

Continuous “Long” Beep vs. “Short” Beep:

1. Set your meter to “beep” at *continuity*. Usually this symbol:  Usually this symbol: 
 2. Verify your meter beeps by touching the **red** and **black** leads together.
- This is an audible, continuous “**Long beep**” – for as long as the leads are held together.

Some points on this circuit are connected to capacitors, which charge-up from the voltage in the meter. Some meters may beep for a short moment (“Short Beep”) then stop. This is not the same as a “Long beep,” and does not indicate “continuity”

In this verification, we want to hear LONG beeps (“continuity”), or none at all. “Short Beeps” are OK, if the beep stops quickly and does not continue.

Meter Tests: Required Before Power Cord

Verified

☐
☐

Verify Grounds:

☐☐

1. Clip the **black** lead of your meter to a transformer bolt on the enclosure.
2. Set your meter to “beep” at *continuity*. Usually this symbol: 
 - If your meter does not have a “beep” function, measure *Ohms*. Ω
 - All “beep” measurements here should measure resistance of less than 1 Ohm.
3. Verify your meter beeps by touching the **red** lead to a different transformer bolt, or a ground lug. (If measuring Ohms, it will be less than 1 Ohm)
4. Touch the **red** lead to *all six* transformer bolts. (3 transformers, 2 bolts on each).
 - ***If your meter does not beep on every transformer bolt:***
 - a. You have a grounding problem, or you didn't install the tooth washers correctly, or
 - b. Your meter is not working or is not set correctly.

Verify your dial is set to continuity:  and the meter beeps when both leads are touched together.
 - Verify tooth washers are on the *inside*. Re-Tighten the bolts on the transformers. Re-test until you have continuity between all ground lugs. (“beep” or less than 1 ohm)
 - **Proper grounding is extremely important for safety and function.**

Meter Tests: (Continued)

Required Before Power Cord

Verify Grounds:

Verified

☐

1. Keep the black lead on a transformer bolt. Touch the **red** lead to the back of each potentiometer: Tone, Mix & Dwell. They will ALL beep.

☐

2. It will beep on all 3 ground lugs: Reverb transformer, power transformer, and the side of the chassis where the star ground lug is.

☐

3. It will beep touching the outside of the Input & Output jacks, on the front panel. (Not stuck inside... Touch the nut and washer)

☐

4. It will beep on the outside of both RCA jacks

- **IF ANY OF THE ABOVE POINTS DO NOT BEEP:** *You have a ground problem:*
 - *Bolts are not tight, or tooth washers installed incorrectly.*
 - *Review and verify ground connections until you have confirmed grounding continuity.*

Meter Tests: (Continued)

Required Before Power Cord

Verified Verify Terminal Board



1. Test all the bottom row Terminals the same way.
 - You will get beeps (“continuity” to ground) on **ONLY** the following Terminals:
 - B1, B2, B3, --B8 through B17--, B24, B29, B30
 - *Possibly* B5. Some meters beep below 200 Ω .
2. ***If any of the Terminals above do not beep, -- OR --***
If you get beeps on any bottom-row terminals not listed above:
There is a ground problem.
 - Verify ALL the component legs are soldered, and you did not miss any.
 - If you cannot discover what the problem is, and any points in Step 1 above still do not “beep,” describe what is happening in photos and an email to:
DiyRibbonMic@yahoo.com

Meter Tests: (Continued)

Required Before Power Cord

Verified



Verify Terminal Board (Continued)



1. Put the red lead on Terminal board top lug T1. It will not beep.
2. Test all the top row Terminals the same way. NONE will long-beep.

- **If any Terminals on the top row long-beep:**

- Verify the component legs are not touching the enclosure, or other solder points on the Terminal board.
- If any point on the top row of the Terminal board still long-beeps, and you cannot verify what the problem is, STOP, then describe what is beeping in an email to:

DiyRibbonMic@yahoo.com



- *If your meter doesn't beep and you are verifying low OHMS, these measurements are OK:*

- 1.5k (1500 Ω) on T16, T17, T24 & T28 --and-- 1k (1000 Ω) on T29 & T30:

Meter & Visual Verification Checklist

Verify Power Switch: NO POWER CORD CONNECTED, No FUSE, and NO AC POWER YET!

Verified



- Clip the meter to T1 and T3, same continuity setting. ➡⎓)))
- Power Switch ON will beep, Switch OFF will stop beeping

Verify Power Transformer Primary Winding:



- Clip the meter to T1 and T4
- Power Switch ON will beep, Switch OFF will stop beeping

Verify the Fuse:



- Add the $\frac{3}{4}$ Amp fuse to its holder
- Clip the meter to T1 and T2
- Power Switch ON will Beep, Switch OFF will stop beeping

Meter & Visual Verification Checklist

Verify the 12AT7 and 12AX7 Plate Voltage Supply Wiring:

Verified ☐ Keep the meter on continuity  and listen for the beeps:

- Put the **black** lead on T14, the **red** lead will beep on the following terminals:
 - T22, B21, B22, B27

Verify Power Transformer Secondary Windings:

☐ Set your meter to measure OHMS Ω

The following measurements verify the transformer windings are soldered to the correct terminals:

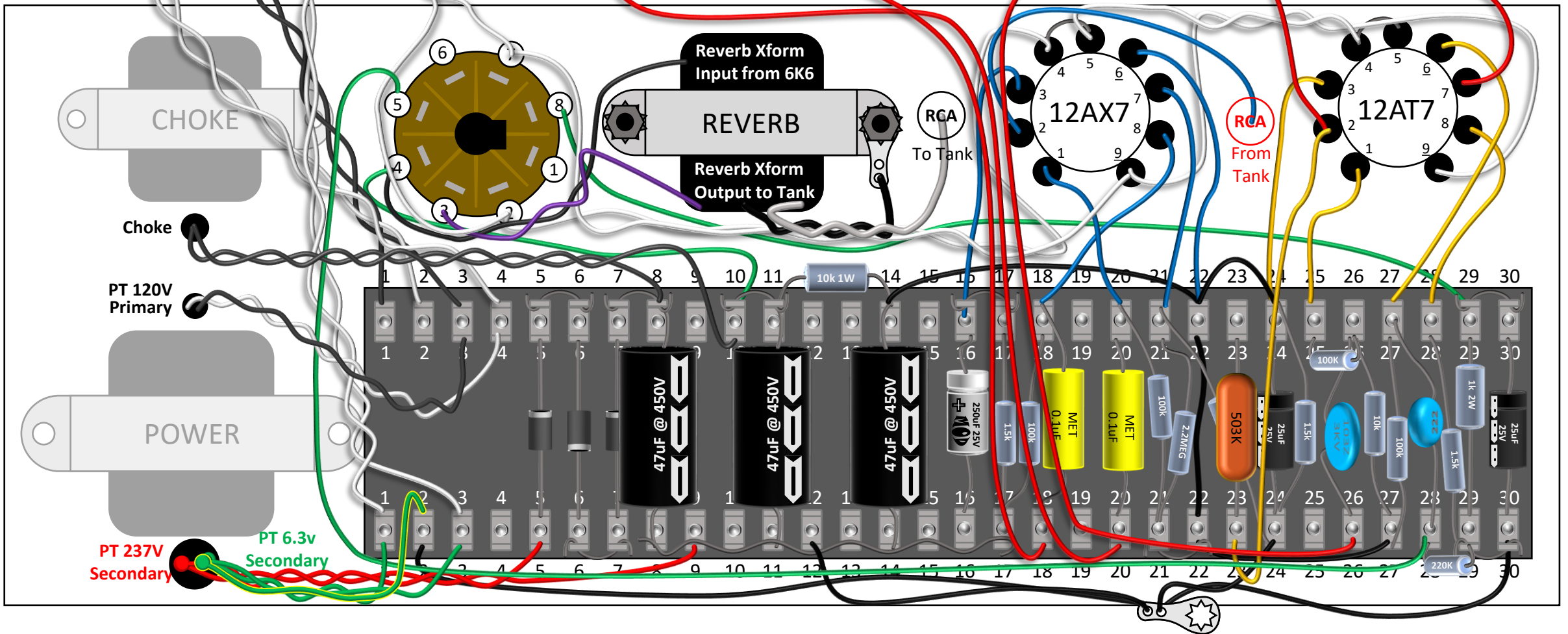
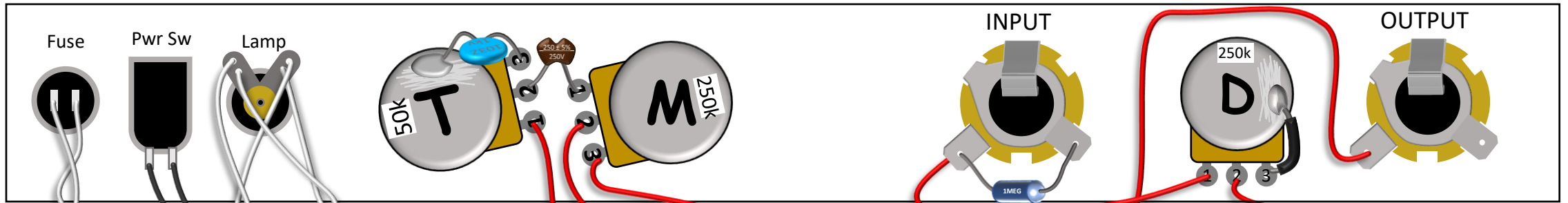
- ☐ • Between B1 and B3 will be about 0.2 Ω . Not zero, *barely higher* than zero.
 - The measurement will be slightly higher than just touching the meter leads together
- ☐ • Measurement across B5 and B9 will be about 190 Ohms (+/- 10 Ohms)

Meter & Visual Verification Checklist

Keep your meter set to measure OHMS Ω

Verified

- ☐ • Measure 10k across R9 between T11 & T14
 - You may need to reverse red & black and hold for a few seconds for this to measure correctly. It is connected to large capacitors.
- ☐ • Measure 220k between 6K6 Pin 8 & Pin 5
- **Re-verify** the rectifier diode orientation:
 - The two outside diodes point UP
 - The inside diode points DOWN
- **Re-verify** the crimped ends of all SIX electrolytic capacitors are soldered to the top row of terminals, and the “negative” arrow stripes point to the bottom row.



End of Hour 7

.....

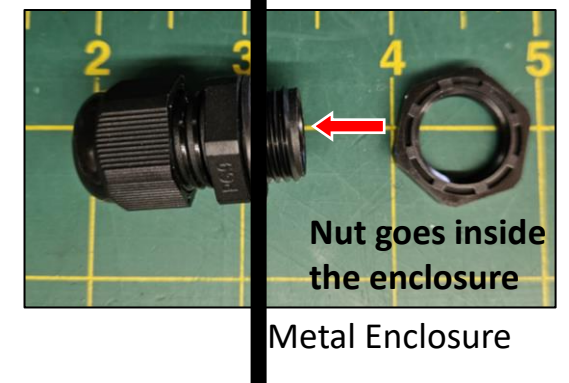
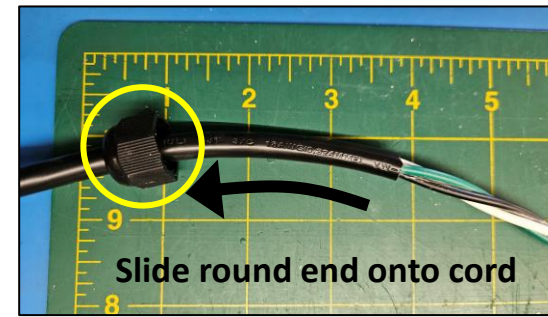
Start of Hour 8 *

3-Prong Power Cord

- Install the Power Cord. **Do not plug-in to the wall!!**
 - The Power Cord is the **FINAL** item to be installed, *AFTER* visually confirming the wiring, and measuring continuity points and resistance with a meter.
 - Route the 3-prong power cord through the enclosure and tighten the strain relief
- **Verified** ☐ The **Black** wire goes to T1. There is already another **black** wire soldered to this terminal.
- ☐ The **White** wire goes to T2. There is already another **white** wire soldered to this terminal.
- ☐ The **Green** wire goes to Ground Lug on the Power Transformer
- ***The builder shall not apply wall voltage until all circuits are 100% verified and the complete verification checklist on the previous pages is checked-off.***
- Installing the power cord is a legal agreement between the builder and ARM, LLC that the builder has:
 - 100% verified and checked-off every item on the checklist and
 - Verified with a functioning electrical meter that the continuity and resistances match those in the instructions.

Diagram is on the following page

3-Prong Power Cord:



1. Install the Strain relief in the enclosure, Large side outside.

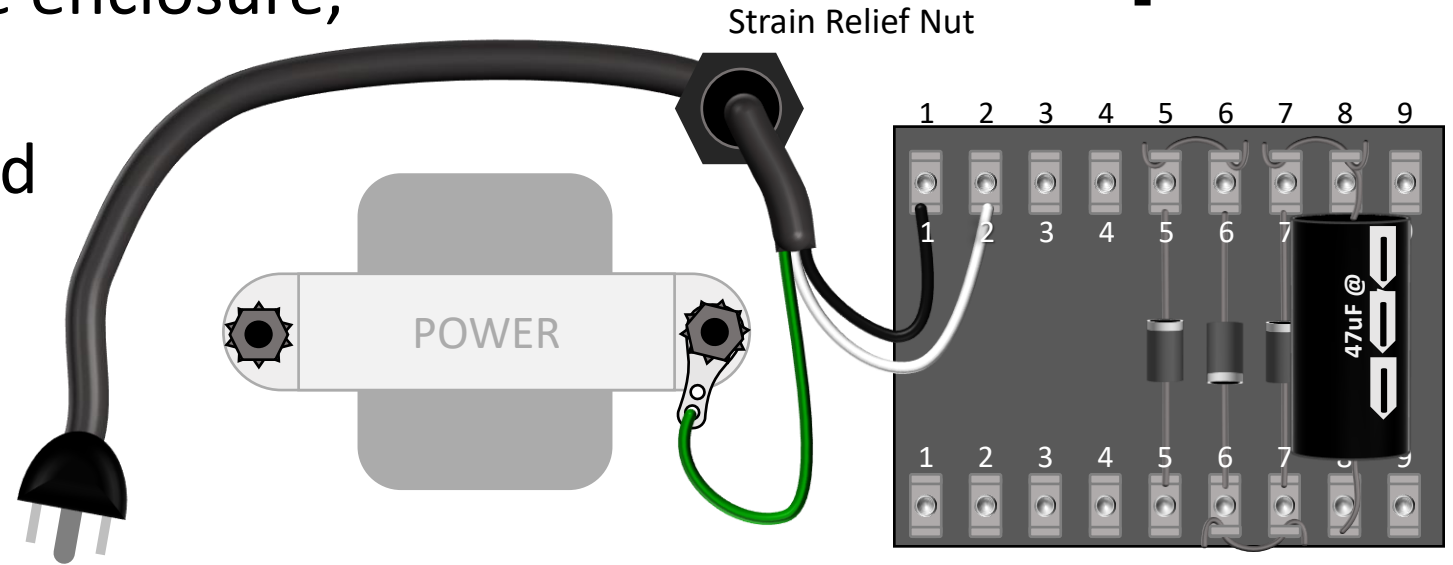
2. Pass the stripped power cord through the strain relief

3. Solder as follows:

- **Black** is Hot (T1)
 - *White* is Neutral (T2)
- **Green** is Chassis Ground (Lug on Power Transformer)

4. Verify:

- The **Black** wire goes to T1 - *which already has a **black** wire soldered.*
- The *White* wire goes to T2 - *which already has a *white* wire soldered.*



Use the Low-Voltage Adapter

- The Low Voltage Adapter prevents blowing fuses or burning components.
- It delivers 9VAC and 0.4A: **About 10% of 120VAC, 15A wall voltage.**
- **Tubes are NOT INSTALLED yet.**
- If the light comes on, there is a critical power wiring problem.
- This adapter only finds power wiring errors. *It does not verify signal or tubes.*



9VAC Adapter

A bright light indicates mis-wired AC Power, or a short circuit to ground.

Very Bad!
Unplug immediately.



A dim light can indicate mis-wired DC Power, or a short circuit to ground.

Also Bad!
Unplug immediately.

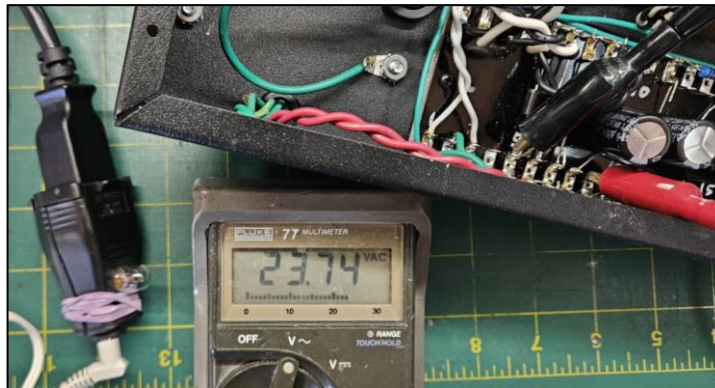


- If the light comes on (even dim), unplug the adapter, dissipate the voltage, and inspect your wiring.
- If there is no light, continue to the following pages and confirm low voltages on your circuit.

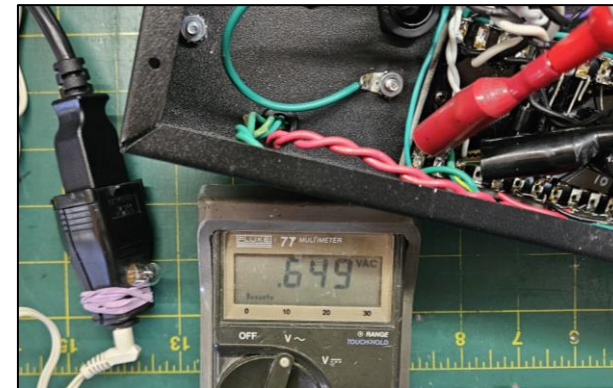
Verify AC Voltages

The Low Voltage Adapter delivers about 10% of wall voltage. It is “safer” than wall current, but you can still get shocked. Always keep one hand in your back pocket to prevent voltage from passing through your chest.

- Verify the POWER Switch is OFF
- Turn your meter to AC Volts (“VAC”)
- Connect the leads where shown, then turn the POWER switch “ON”
- Verify the AC Voltage, then turn off the POWER switch before moving the leads



Secondary AC Voltage
Across B5 and B9 = 23.7V



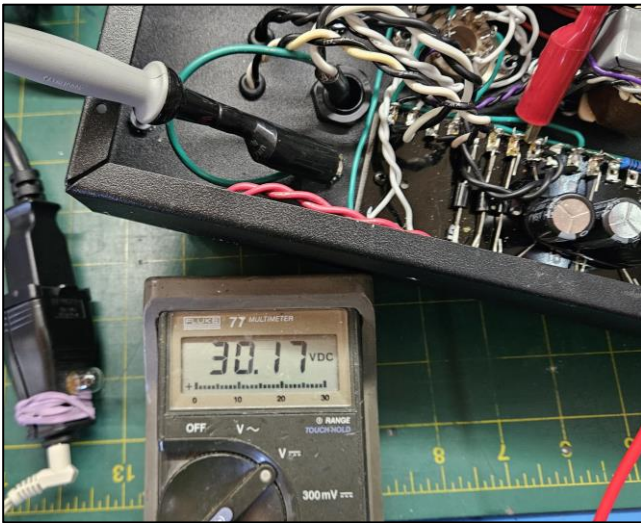
Tube Heater Voltage
Across B1 and B3 = 0.65V

Remember, the voltages here are about 10% of the actual working voltages.

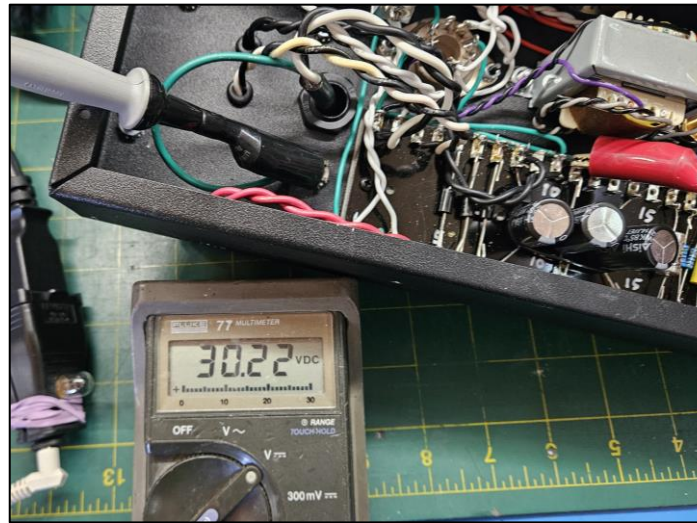
Verify DC Power Supply Voltages

- Verify the POWER Switch is OFF
- Turn your meter to DC Volts (“VDC”)
- Put one hand in your back pocket
- Connect the black lead to the power transformer lug with the green ground wire
- Turn the POWER switch “ON”
- Take great care not to short-out the circuit by slipping off the connection or dropping your meter leads into the circuit.

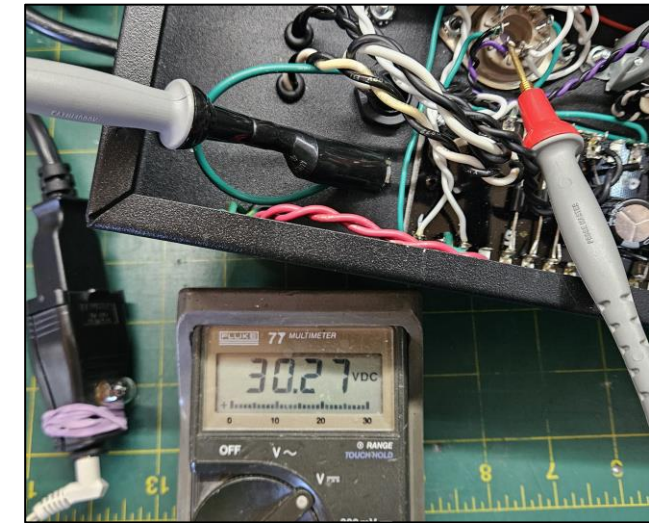
Remember, the voltages here are about 10% of the working voltages



Unloaded Rectified Voltage
RED on **T7** = **30V**



Unloaded Rectified Voltage
RED on **T11** = **30V**

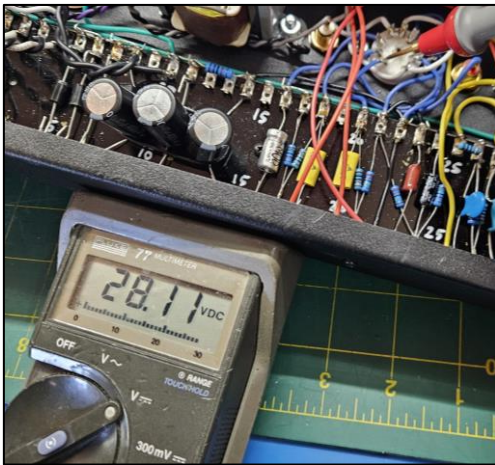


Unloaded Rectified Voltage
RED on **6K6 Pin 3** = **30V**

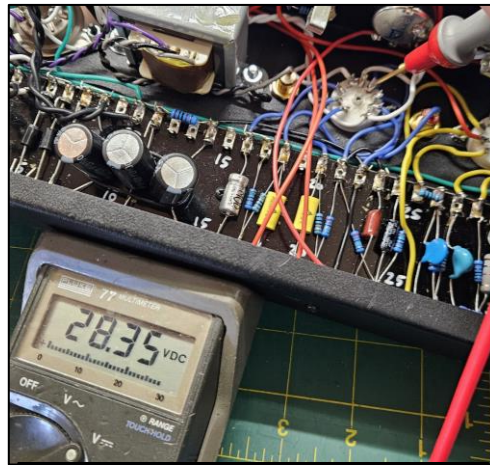
Verify DC Plate Voltages

- Keep the black meter lead on the Ground Lug
- Keep one hand in your back pocket
- Take great care not to short-out the circuit by slipping off the connection or dropping your meter leads into the circuit.

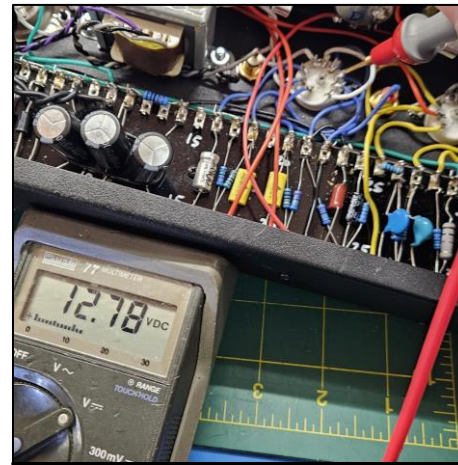
Remember, the voltages here are about 10% of the working voltages



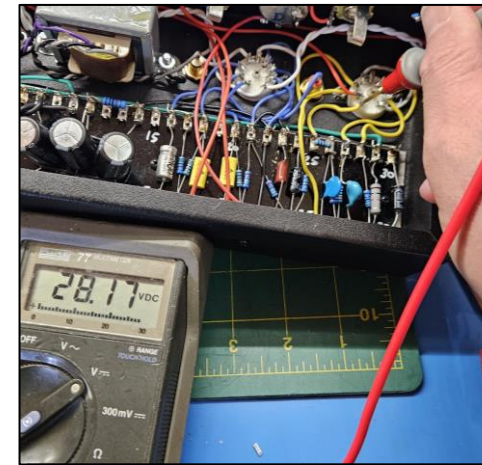
12AX7 Plate 1 Voltage
RED on **Pin 1 = 28V**



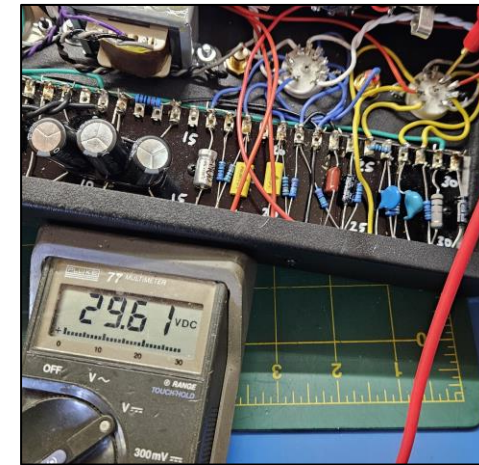
12AX7 Plate 2 Voltage
RED on **Pin 6 = 28V**



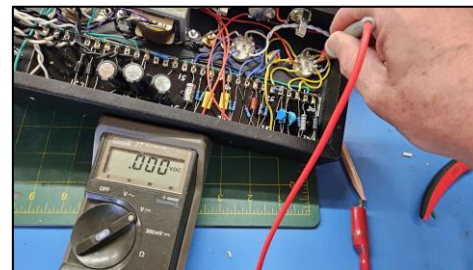
12AX7 Grid 2 Voltage
RED on **Pin 7 = 12.8V**



12AT7 Plate 1 Voltage
RED on **Pin 1 = 28V**



12AT7 Plate 2 Voltage
RED on **Pin 6 = 28V**



12AT7 Grid 2 Voltage
RED on **Pin 7 = 0V**

Power-On Test (Read ALL before starting)

A Power Strip, protective eyewear and insulating gloves are recommended

- *Remove metal necklaces and wedding rings!*
- Install the light bulb. Make sure it seats all the way into the lamp base. Twist to lock.
- *No Tubes*, No guitar cables plugged-in, No RCA cables plugged-in.
- Verify your Reverb is unplugged from the wall, then turn the Power Switch to **ON**.

Place the enclosure upside-down (Tubes Up) on a clean non-conductive bench.

- ***With the power strip OFF, and one hand in your back pocket:***

- Plug-in the power cord to a power strip.
- Flip the power strip switch to “ON” and pay attention:
- Verify the lamp on the control panel illuminates.

**Look and listen for
smoke or noises.**

- If the lamp does not illuminate, or there is smoke or electrical noise:
 - ***Immediately turn off the power strip***, then unplug the wall cord.
 - Wait no less than 5 minutes. Take a walk. Check your email. Breathe.
 - ***Do not touch any internal circuit components***. There may be high voltage on them.
 - Only after 5 minutes, keep the enclosure tubes-up, and verify the lamp is installed and seated
 - Verify the fuse is not blown.
 - If the fuse is blown, do not continue. Email me at DiyRibbonMic@yahoo.com for help.
- If the lamp is on and there is no smoke or noise, advance to the next page.

Audio Test

- Turn off and unplug the power cord from the wall.
- Install the Tubes: **6K6**, **12AX7**, and the **12AT7** “at” the edge of the enclosure
- Install the dual RCA Cable between the chassis and reverb pan
- White cable goes to the INPUT of the reverb pan
- Red cable goes to the OUTPUT of the reverb pan
- ***Remove the foam inside the reverb pan***
- Plug-in a guitar to IN, and an amplifier to OUT.
- Turn on the amplifier and adjust to a low volume.
- With one hand in your back pocket, Plug-in the AC power cord.
- Turn on the power switch. **Look and listen for smoke or noises.**

Continue to next page →

Audio Test (continued)

- If the lamp does not illuminate, or there are noises or smoke:
 - Immediately turn off the power and unplug the wall cord.
 - Unplug the guitar cables from both the amplifier and your reverb.
 - Wait no less than 5 minutes, and do not touch internal components.
 - Remove the fuse and verify it is not blown.
 - If the fuse is blown, do not continue. Email me at DiyRibbonMic@yahoo.com for help.
- If there is no sound from the reverb unit:
 - Verify the guitar cables are plugged-in to the correct input/output jacks
 - Verify the red & white RCA cables go to the correct input/output on the pan
 - Verify you have removed the foam from the reverb pan.
 - Verify the amplifier and guitar volume are up
 - Verify the guitar cables are good, and the amplifier is working
 - If there is still no sound, or the sound is faint or not as expected:
 - Email me at DiyRibbonMic@yahoo.com for help.

Troubleshooting

[Click here to make a High-Voltage Dissipator](#)

Tube amplifiers can be very dangerous to troubleshoot!

Troubleshooting problems in high-voltage circuits is best left to expert technicians and builders who fully understand how to read a schematic and use a multimeter. Dangerous voltages can remain for hours after it is unplugged.

It is 100% true that when everything is connected correctly, your reverb will work. *If the low voltage tests were correct but it doesn't work, some signal component has not been connected correctly... Usually a soldering error.*

The best advice for new builders is a visual check for connection problems like:

- You missed soldering a terminal or a leg of a component (or you didn't solder something well enough)
- Wires or component legs are going to the wrong terminals.
- Wires or component legs are touching something close to them.
- A polarized component like a diode or a capacitor is in backwards
- A small tube has a bent pin, or the large tube socket is installed upside-down (keyway rotated 180°)
- There are "solder blobs" or cut pieces of component legs shorting two terminals

Compare to the diagrams in these instructions

TO DISSIPATE HIGH VOLTAGE: UNPLUG THE REVERB! Then clip the alligator clip to a transformer bolt, and touch the tip to **T7, T10 and T14** for several seconds each.

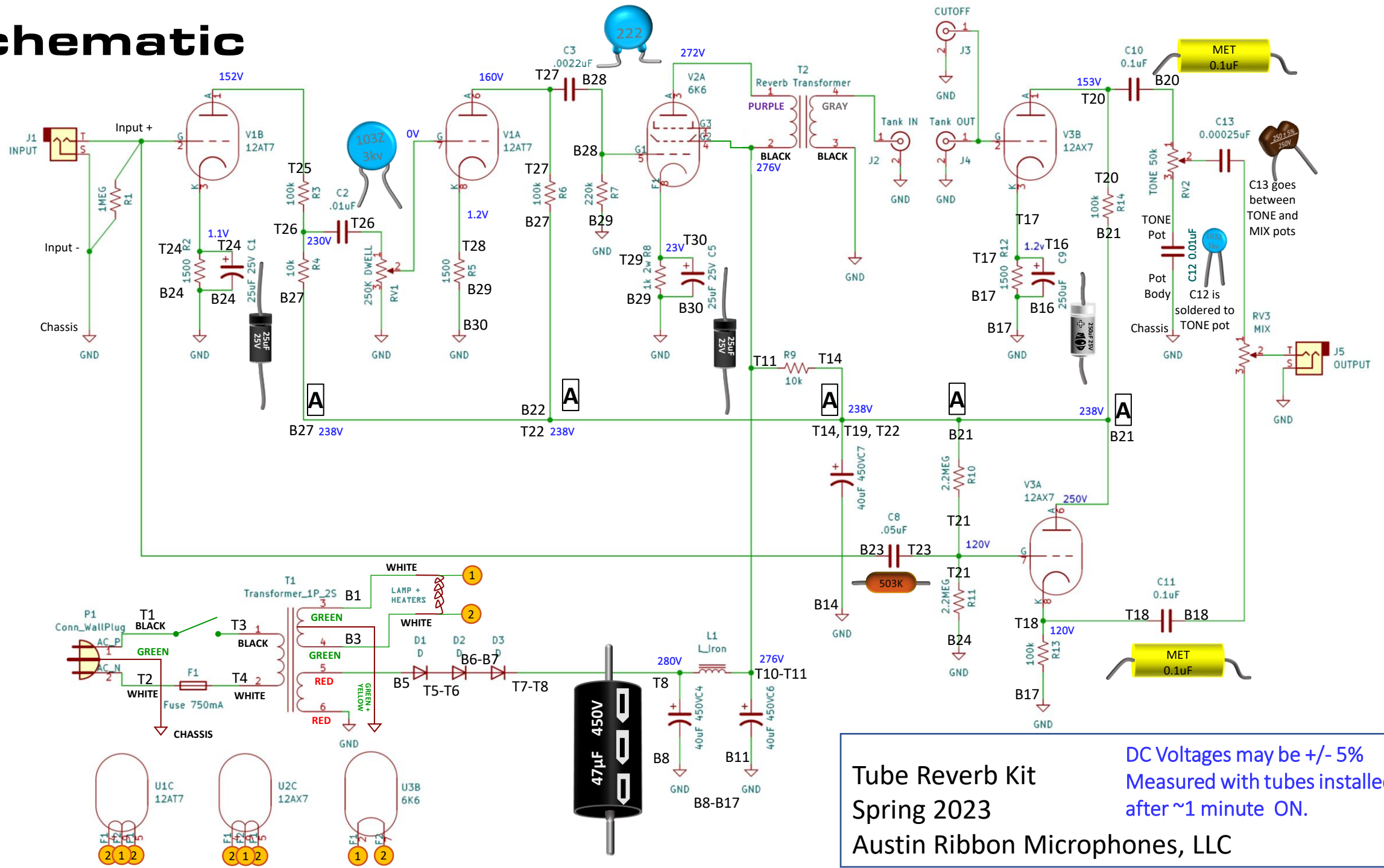
Final Assembly

- Unplug from the wall and **diffuse all high voltage before handling.**

TO DISSIPATE HIGH VOLTAGE: UNPLUG THE REVERB! Then clip the alligator clip to a transformer bolt, and touch the tip to T7, T10 and T14 for several seconds each.

- Install the enclosure in the cabinet with two #8 x 1½” bolts and #8 K-Nuts
- Install the power cord “R-Type” strain relief to the wood cabinet.
- Install the handle with four 1¼” screws
- Install the four, 1¼” rear panel screws and trim washers.
 - The screws go into the ¾” square dowel corner pieces
- Gently hammer the “Austin” logo into the center of the grillcloth-covered front panel.
- On the back of the front panel, install the reverb pan “**connectors UP**” in the center of the panel, with 4 white rubber grommets and 4 self-drilling screws.
- Install the RCA cables between the enclosure and the reverb pan.
- Install the front panel, with four, #8 x 1½” screws and trim washers.

Schematic



End of Testing and Assembly



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