I. Introduction.

Thank you for purchasing the Scotty's Sled Shed Custom Probe Modification Kit for the Heath Built by Heathkit EUW-27 Sine and Square Wave Generator.

This kit is intended for unmodified power supplies, configured in the original OEM configuration.

This kit was developed to help fellow vintage electronic enthusiasts.

You will need the following to install this kit:

1. Hot soldering iron (to remove chassis soldered original twist tab capacitors)
2. Desoldering tool or wick.
3. Solder
4. Painter's tape
5. Basic tools.
6. Eye protection suggested.
7. Fume extractor suggested.
8. Drill
9. 1/8" and 5/32" drill bit.

Capacitor replacement list. Note some of the new capacitors in your kit may have higher voltages than listed:

QTY 2: 0.1uF 200 (replace with 0.1uf 630V)

QTY 2: 2.0uf 200 (replace with 2.0uf 250v)

QTY 1: 4.0uf 200 (replace with 4.0uf 250V)

QTY 1: 1.0uF 200 (replace with 1.0uf 250V)

Replace C10 and C5 with 47uf 160v axial (amplitude pot).

Replace C4 with 10uf 500v (min) axial cap.

Replacements for the Twist Tab Caps will have bags labeled and instructions are in this document.

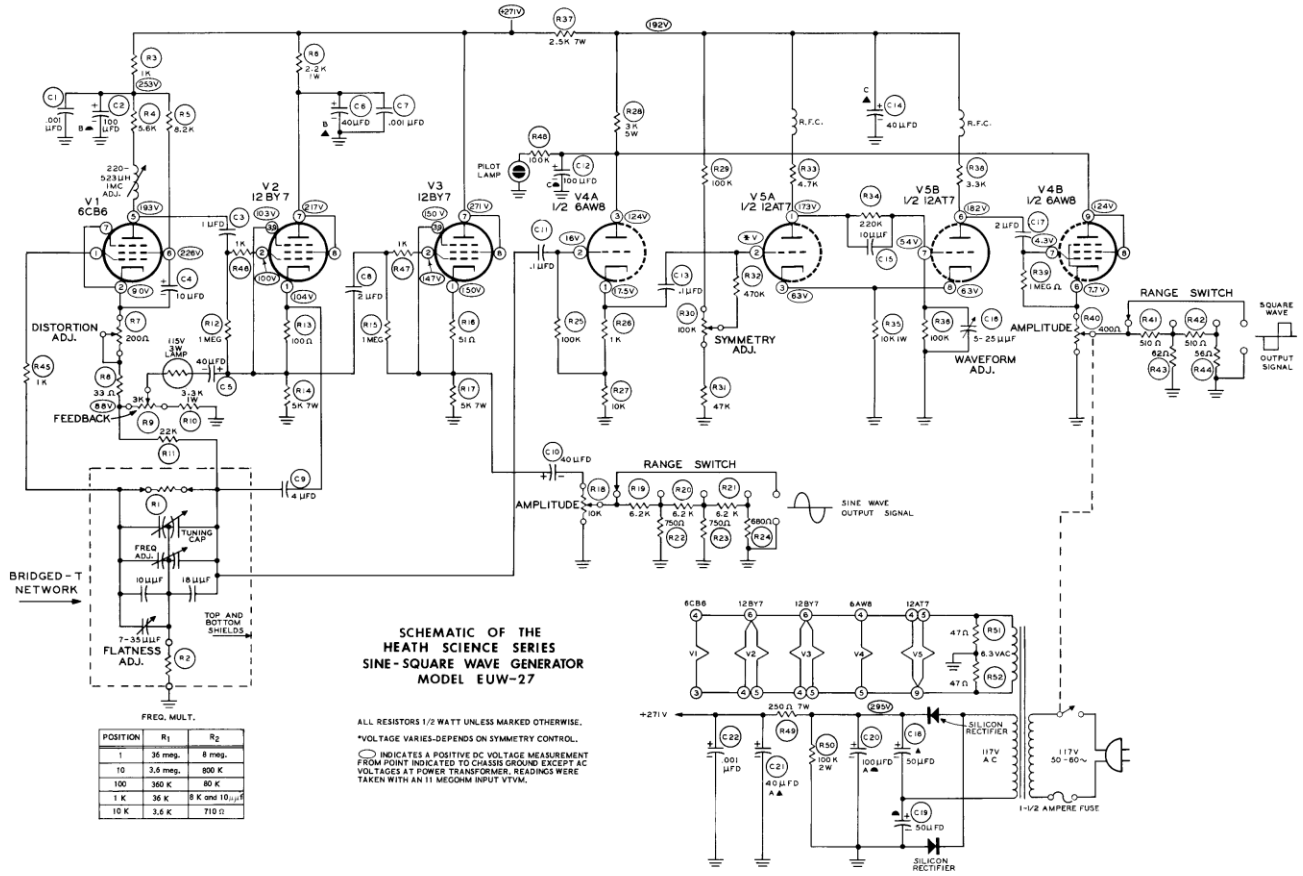
Before you get started there is a list of items to be aware of.

1. Due to constant supply chain challenges, Scotty's Sled Shed reserves the right to substitute component OEMs. If there is an orange bodied resistor in installation guide images and you receive a blue bodied resistor, it is due to component substitutions.
2. You may see a blue capacitor in one pic and a yellow capacitor in another picture. Multiple pictures may have been taken over various kits with different capacitor values or manufacturers.
3. Scotty's Sled Shed LLC is only providing you with components for a DIY installation.
4. The following instructions are only a guide. Experienced users may have a preferred method of installation.
5. **CAUTION: Lethal voltages are present in these devices**. If you are not aware of that by now, you should NOT be performing this upgrade.
6. If you do not feel comfortable working around high voltages, please do not perform the upgrade. Find an experienced technician to perform or assist you.
7. Scotty's Sled Shed LLC is NOT liable for any damage caused to your equipment, bench, house, Power supply or that your spouse is mad at you for working on your vintage equipment. You are ON YOUR OWN.
8. Customer assumes all responsibilities and agrees to check all resistances, capacitance, and voltages before and after installation.
9. Customer assumes all responsibility to know how to read a schematic and perform the task this kit requires.
10. Customer assumes all responsibility to SAFELY perform procedures by following the OEM manual.
11. You get the point; you are responsible for yourself.
12. Please be sure to download the manual if you do not have it. They are readily available online at: https://www.vintage-radio.info/heathkit
13. Read the original OEM manual. The process for replacing components will be nearly identical to the original installation.
14. References are made in this guide to component numbers associated with the original manufacturer manual. Customers should familiarize themselves with what the components are. IE C4, C5, D7, R8
15. Some original components were pre 1970 (when the EPA was established). DO NOT CUT OPEN THE ORIGINAL CAPACITORS. There may be toxic chemicals inside. The power supply you have may have been modified.
16. Protect yourself and remember to wear protective eye wear, use a fume extractor, and have a fire extinguisher nearby.

II. Preparation

1. Take lots of pictures and video if you need to, of the original assembly for future reference.
2. Print out/copy an additional copy of the schematic.
3. Ability to label wires/components as needed-tape, label maker, etc.
4. On the extra schematic, it may help to write down where each lead of Capacitors C5, C6, C7 and associated resistors are connected to the terminal strips. Example C5 **(+)** to lug 1, **(-)** to chassis ground.
5. Be sure that all capacitors are discharged.
6. READ THE OEM OWNER/INSTALLATION MANUAL!
7. Solder paste will improve the efficiency of soldering and de-soldering.

III. Schematic



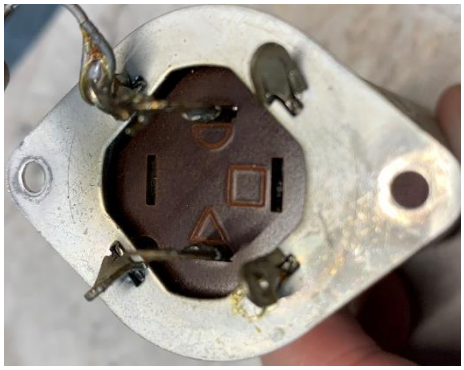
POSITION	R_1	R_2
1	36 meg.	8 meg.
10	3.6 meg.	800 K
100	360 K	80 K
1 K	36 K	8 K and 10 μμf
10 K	3.6 K	710 Ω

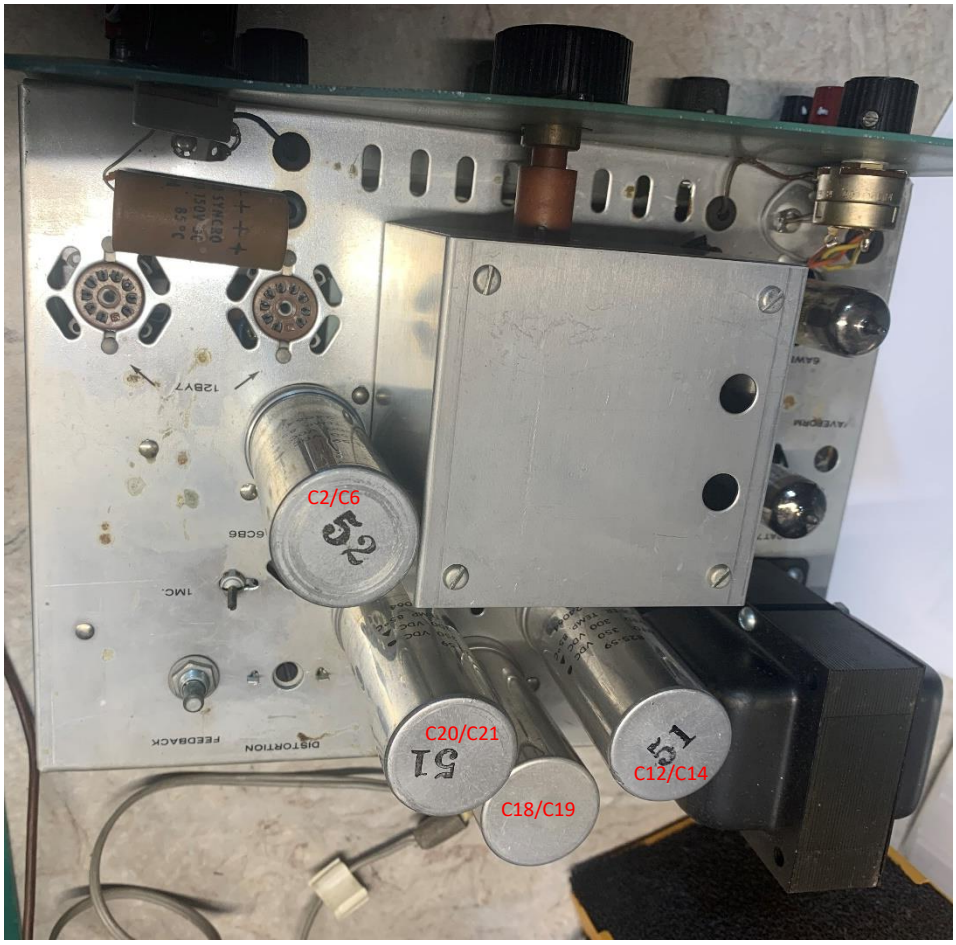
IV. Replace film and axial electrolytic capacitors.

1. It may be easier to replace all the older large film and axial electrolytic capacitors before you replace the Twist Tab Multi-Section Capacitors.
2. If you follow the theory of "finding the foil side of film capacitors", do that now before you start to remove the existing. Many YouTube Videos and Forums discuss this topic. Leave enough lead length in case you do need to move one out of the way for the Twist Tab Capacitors.

V. Locate the Twist Tab Capacitors

Note in the below image of where each Twist Tab Capacitor is. You may want to mark them on the chassis side along with each symbol and the orientation of those symbols. On the bottom of the Twist Tab Capacitor, you will see the markings next to each internal leg. Example C18 is Triangle and C19 is Half Moon. C21 is Triangle, C20 is Half Moon.

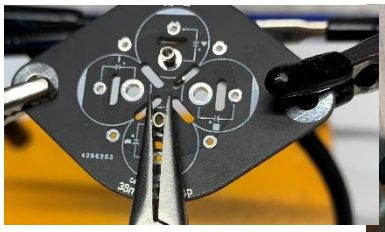


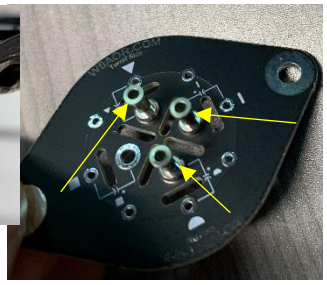


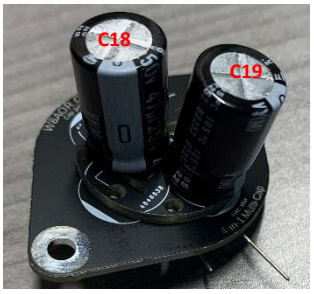
VI. Build C18/C19

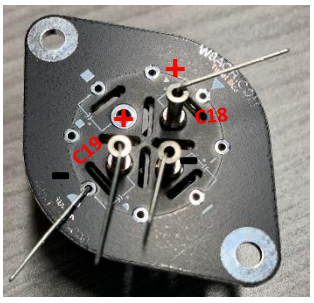
C18/C19 is a unique style of Twist Tab Cap where the two capacitors are in series, not parallel. Please note the steps carefully on how to build the replacement capacitor board. You can use the method for future projects and order the boards separately at my www.w8aor.com website.

1. Empty the contents of the bag labeled C18/C19.
2. Note that the Oval PC Board and the round spacer have markings with Half-Moon, Square, Triangle and Line (Dash) just like the original Twist Tab Multi-Section Capacitors.
3. Note that the oval PC Board also has **+** and **–** symbols next to each set of slots for the symbolled areas.
4. Also note that there is a Turret Side and Capacitor Side labeled under the logo. The turret side is where you install the Solder Turrets and Capacitor side is where you mount the capacitors, with the spacer between capacitors and the PCB.
5. Install a turret from the Turret Side into the holes for Half-Moon, Triangle and Line. The turrets will only install into one of the 4 center holes.
6. Flip board over and slightly squeeze the end sticking through on the Capacitor side with pliers or snips. It only takes a little pressure. Just enough to make it oblong so it doesn't fall out. You will insert capacitor leads into the center of turret in the next steps.
7. Apply solder paste (optional) and solder turrets in place on the Capacitor side. DO NOT FILL THE HOLLOW CENTER WITH SOLDER.
8. On the Capacitor side, align the spacer symbols with the PCB symbols and set on the PCB.
9. Insert one of the 47uF 250V capacitors with the Positive leg into the hollow end of turret from Capacitor Side and the negative lead into the smaller hole labeled (-). This will be C19. Bend leads over on the Turret Side to hold in place. Trim leads and solder only the negative lead, do not solder the Positive lead yet.
10. Insert the other 47uF 250V capacitors with the Positive Leg into the hollow end of turret marked Triangle, and the negative lead into the hollow turret in line. Bend both leads over the turret ends. Do not solder either lead yet.
11. It should now look like the below image. Set aside with the label C18/C19.









VII. Build C2/C6, C20/C21, C12/C14

The other three Twist Tab Capacitors are built identically. The 100uF capacitor is larger than the 47uf capacitor. It is a tight fit on the PCB, but they will fit together. These are standard parallel built "can common" or "common ground."

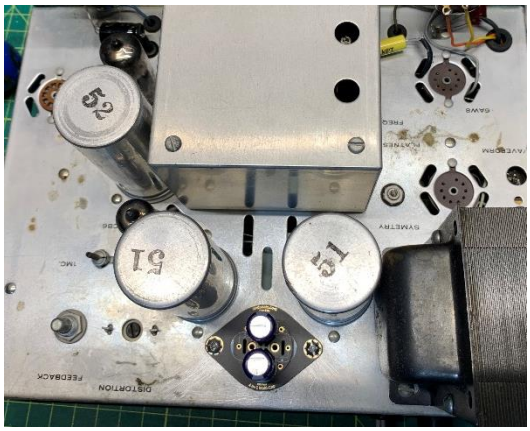
1. As before, locate bag labeled C2/C6.
2. Find the Turret and Capacitor Side of the PCB.
3. Install a turret from Turret Side into Half Moon and Triangle.
4. Squeeze to make oblong and solder turrets, but do not fill the hollow center.
5. Aling Spacer on Capacitor side and install 100uF into the Half Moon Positive and Negative slots.
6. Install 47uF into Triangle Positive and Negative slots.
7. Bend over leads, trim and solder only the negative leads.
8. Repeat for the other two capacitors.
9. Mark with label and set aside.
10. Should look like below.

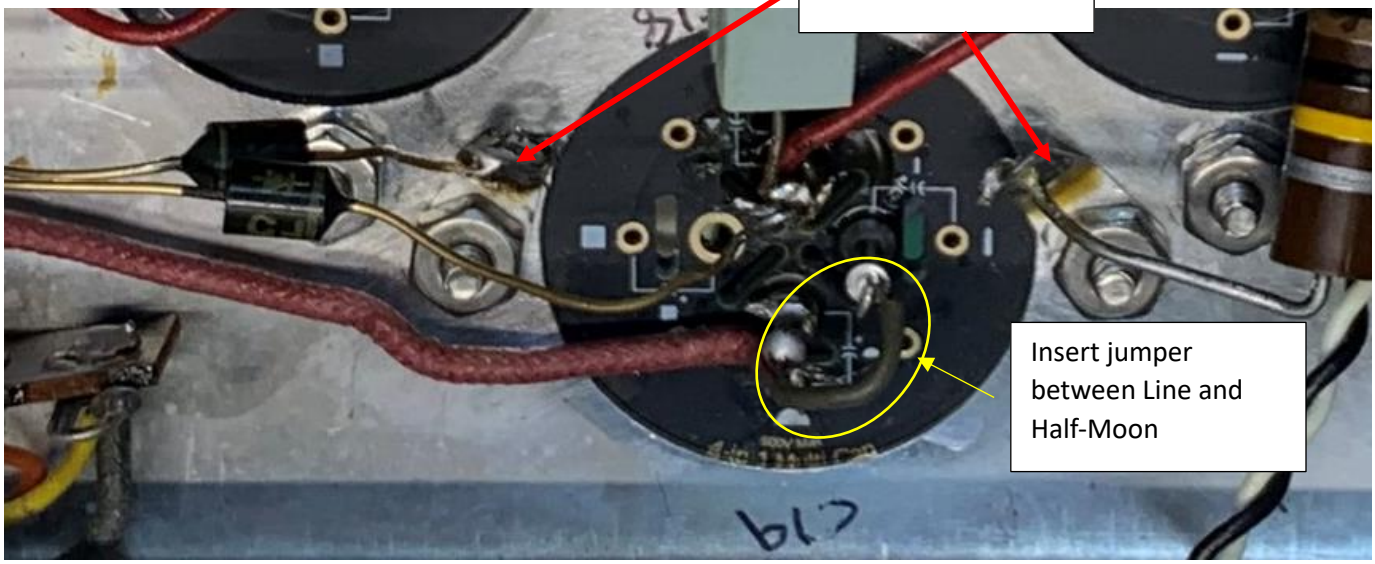
VIII. Replace C18/C19

1. Mark the wires going to C18/C19 of where they go. For example, rectifier cathode attached to C18+ label as Triangle +. Red transformer lead MN + (for half-moon positive). The anode of Rectifier Diode goes to the grounded chassis lug, can mark as GND for Ground. Etc. Take lots of pictures to reference back to.
2. Unsolder all the connections after you marked them to C18/C19.
3. Drill out the rivets for the metal flange holding in the capacitor and remove.
4. Drill out the holes with 5/32" bit.
5. Debur the edges and clean with wire brush on both sides around the holes. This is needed for the PCB to make a good chassis ground.
6. Install the new PCB C18/C19 with #6-32 SS hardware. Make one of the toothed washers contact the exposed copper of the PCB around mounting hole. The other washer on chassis side from underneath.
7. There are two supplied #6-32 Ground lugs. You will need to use at least one to reconnect the leads going to GND from the 100k ohm resistor and the Anode of one of the rectifier

diodes. If you wish, drill another hole in chassis that is conveniently for both or use one of the bolts of the #6-32 SS hardware you installed for PCB C18/C19.

8. Half-moon should face the outer edge of chassis.
9. Make a jumper wire from supplied hookup wire to connect between the turrets from Line and Half Moon. The wire will fit inside the hollow turret.
10. Solder at Line only.
11. Reconnect the red transformer wire to the turret for Half-Moon. Solder transformer wire and jumper at Half-Moon.
12. Connect the wire from C20, the 250ohm 7w resistor, and the Cathode of Rectifier diode to the turret at Triangle and solder.
13. You can replace R50 with supplied 100k ohm 2w resistor. Solder one end only to the ground lug installed.
14. Solder the Anode of the other rectifier diode to the #6 lug or you can solder it direct to chassis ground, or any terminal strip that has a grounded common lug. There are replacement rectifier diodes in your kit in case you want/need to replace them.
15. C18/C19 installation is complete.





IX. Replace C2/C6, C12/C14, C20/C21.

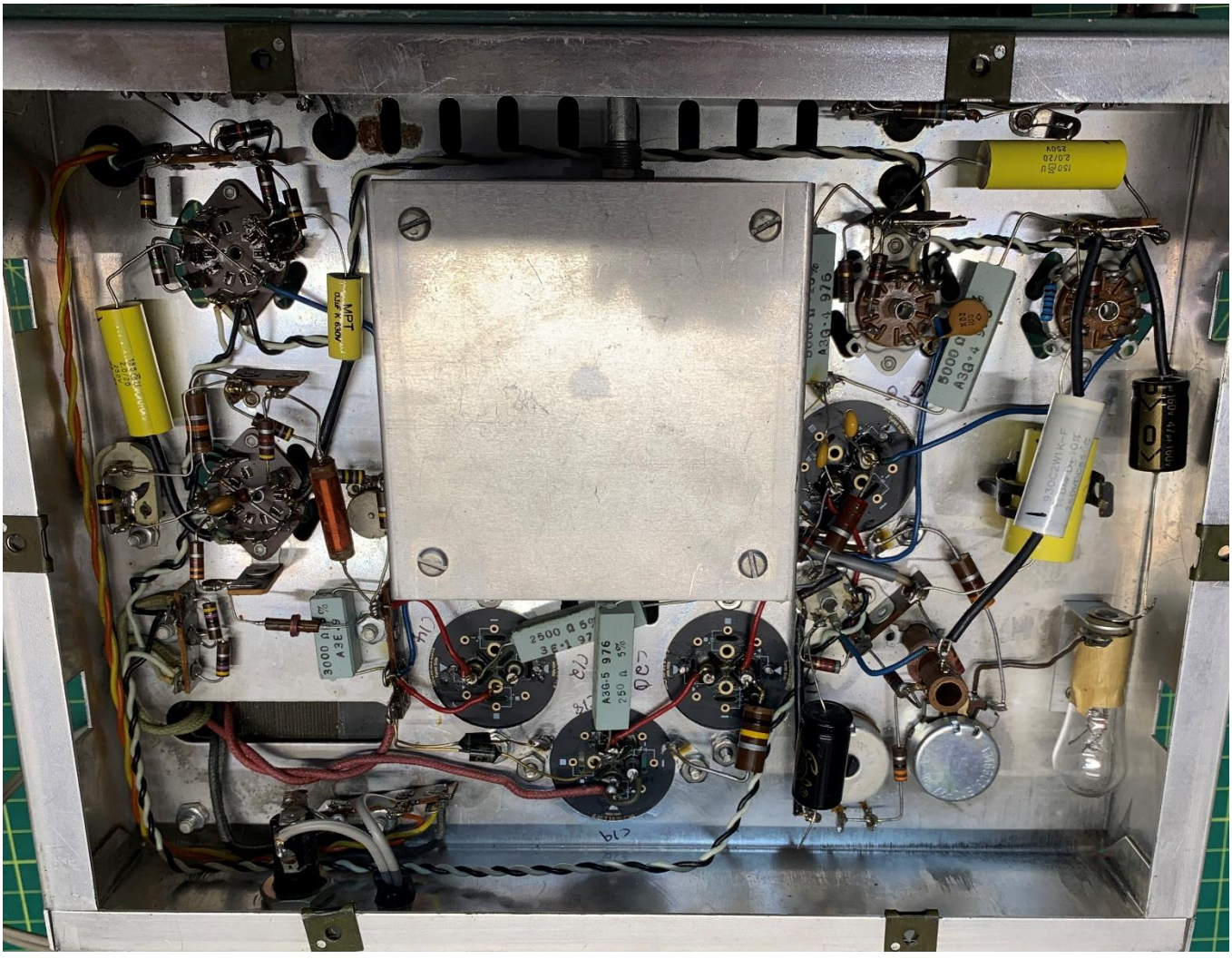
The procedure for replacing the last three twist tab caps is nearly the same as replacing C18/C19. The main difference is there is no jumper to add between the turrets as the capacitors are common chassis ground.

It is a one for one swap. You may note when installing that the orientation of symbols may be off by 90'. This is because the twist tab caps can be installed in the flange in one of four different configurations of 90'.

There is an extra ground lug for C2/C6 to make it easier to move the resistors to ground that were connected to the twist tabs.

1. Mark your wires.
2. Desolder
3. Drill out Capacitor.
4. Drill out mounting holes, debur and clean with wire brush.
5. Install new PCB capacitor assembly.
6. Reconnect wires/components and solder.

Finished image for reference.



I welcome feedback on any tips or tricks you find to make the project go faster.

I would like to see customer pics of final installations.

If you find an error in this document, please kindly let me know at mysledshed@yahoo.com

Please be professional in your communique.

Thank you, and good luck!

73's

Scott

W8AOR