

## I. Introduction.

Thank you for purchasing the Scotty's Sled Shed Component Kit for Heathkit T-3 Signal Tracer.

This kit was developed to reduce the frustration of trying to source replacement components that sometimes are not available from one location. This causes the customer to purchase a single component from a source where the shipping costs more than the component.

The multi-section capacitors are obsolete. The kit includes a custom designed circuit board to use modern capacitors in place of the obsolete multi-sector capacitors.

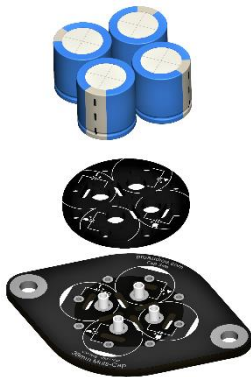
Before you get started there is a list of items to be aware of.

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. The OEM component list is 1/2watt for all resistors. The supply be a mix of ½ and 1watt resistors in your kit depending on supply chain. If the price was the same or less for 1 watt, then we will supply a 1watt resistor.
2. Scotty's Sled Shed LLC is only providing you with components for a DIY installation.
3. The following instructions are only a guide. Experienced users may have a preferred method of installation.
4. **CAUTION: Lethal voltages are present in these devices.** If you are not aware of that by now, you should NOT be performing this upgrade.
5. The probe will have B+ voltage present at "Noise setting". **You have been warned. DON'T TOUCH THE PROBE END WHEN THE SWITCH IS IN THE NOISE SELECTION and Probe Switch is set to AUDIO.**
6. 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 this 50-year-old piece of equipment. You are ON YOUR OWN.
7. Customer assumes all responsibilities and agrees to check all resistances, capacitance, and voltages before and after installation.
8. Customer assumes all responsibility to know how to read a schematic and perform the task this kit requires.
9. Customer assumes all responsibility to SAFELY perform procedures by following the Heathkit OEM manual.
10. You get the point; you are responsible for yourself.
11. Please be sure to download the manual if you do not have it. They are readily available online at: <https://dokumen.tips/download/link/heathkit-t3-signal-tracer-manual-information-mhd22heatht3fullpdfheathkit-visual-aural.html>

## II. Preparation-Capacitors.

Assembly and Installation guide for the Heathkit T-3 multi-sectional capacitor circuit board.

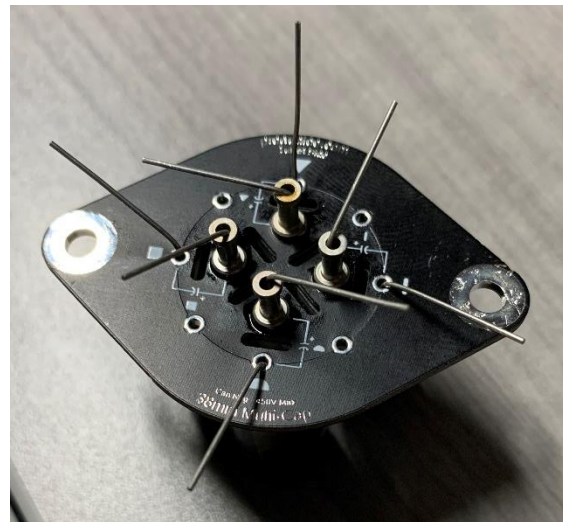
1. Open the bag and check that all components listed on the bag cover are included.
2. Identify the different sides of the circuit board.
  - a. The board has two sides. One side is marked "Cap Side" the other side is marked "turret side".
  - b. The board is marked on both sides with a Square, Triangle, Half Moon and Dash.
  - c. The Spacer Board is also marked with the same symbols which correspond to the original multi-sector capacitor.
  - d. The "Turret Side" is where the long side will mount.
  - e. Capacitors mount on the "Capacitor Side".
  - f. Spacer is bi-directional.
  - g. Below image is the order in which the components are installed.
  - h. Note that the Negative side of the capacitor faces the outside. All the Positive legs mount inside the turrets in the center.



3. Install a turret in one of the 4 center holes. It will only fit in the positive post hole in the center.
  - a. Slightly squeeze turret from the Cap Side to make it oblong to prevent from falling out. Use small snips.
  - b. Add some solder flux to both sides of the board around the pin (optional).
  - c. Solder on the "Turret side". Add some solder to the Capacitor side as well.
  - d. Be careful not to have too long of a dwell time. A good hot iron will make the work fast and smooth.
  - e. Repeat for the other three turrets.
  - f. With snips, cut the terminal flush on the Capacitor side but leave a little nub.
  - g. If you close the hole just snip down a bit more to the board and the hole in the turret will be enough to get the capacitor leg through.



4. Install spacer board on the “Capacitor Side” aligning the symbols on the spacer board with the Multi-Cap Board. If the Turret sits flush or above the spacer board, you have not trimmed enough of the turret off. The turret must sit below the top of the spacer board.
5. Install a 22uF 450 Electrolytic Capacitor with the POSITIVE leg into one of the turrets. The NEGATIVE goes to the outside. The outer hole and entire outer area of the bottom of the board is tied to all 4 Negative Pin leads and the mounting holes of the board.
6. Bend the legs on the Turret Side to get the capacitor to hold the spacer board tight and flush to the Multi-Cap board. Add some solder paste (optional) and solder the NEGATIVE leads ONLY on the Turret Side. Do not solder the positive lead yet.
7. Repeat for the remaining three 22uF 450V capacitors. Snip off the excess lead lengths.



## Heathkit T-3 Signal Tracers: Multi-section capacitor board.

8. It will be easier to install the voltage divider resistors on the board before installing.
  - a. Install the 1K ohm 2watt resistor into the turret hole between Square and Half-moon. Solder on the Half Moon leg only.
  - b. Install the 10K ohm ½ watt resistor in the turret legs between the Square and the Triangle. Solder the two resistor legs on the Square turret only.
  - c. Install the 33K ohm ½ watt resistor in the turret legs of Triangle and Dash. Solder both legs.
  - d. The completed assembly should look as below.

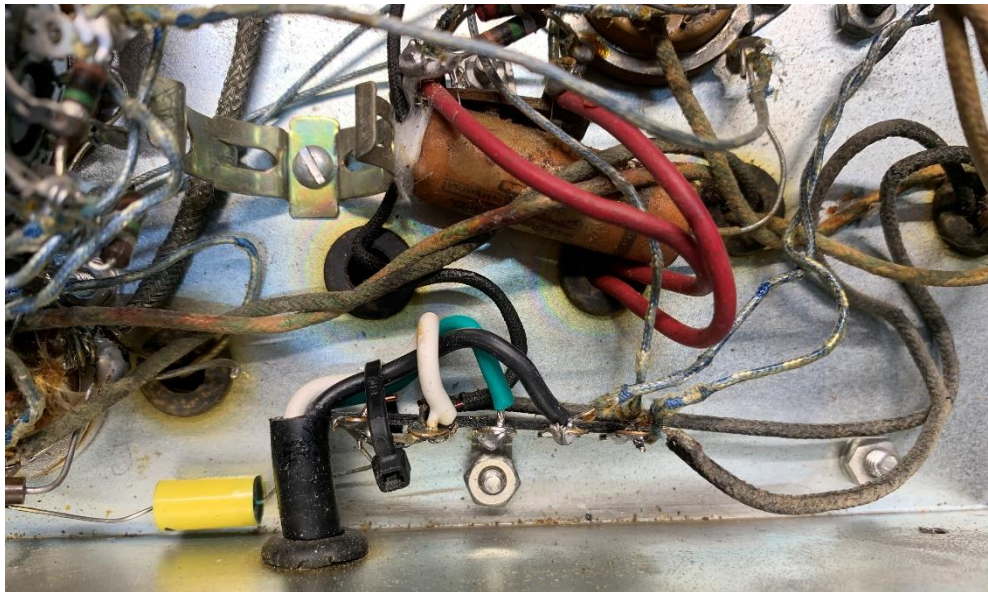


9. If you have an oscilloscope and follow the theory of finding the foil side of film capacitor, do that now to all the film capacitors and mark the foil side. There are several YouTube Videos on this procedure. I do not advocate one way or the other. It is your choice.

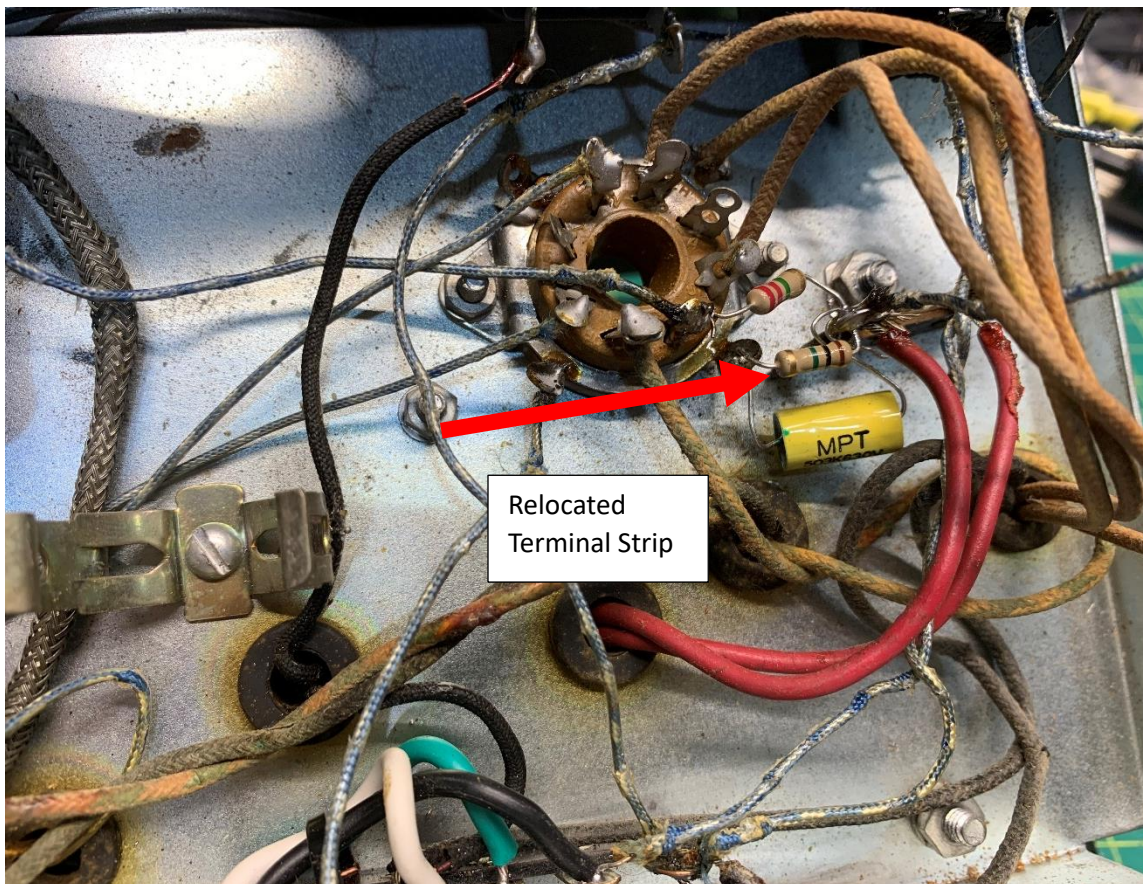
### III. Component removal and installation.

The technique for desoldering joints and removing old legs is a personal preference. I prefer to use a good Chemtronics desoldering wick vs a desoldering iron. Cutting the legs off the capacitors and resistors before desoldering will make the work go faster.

1. I find it easier to start replacing all of the large film caps first, one at a time, before replacing the multi-sector capacitor. This makes for a cleaner install and allows you to trace the wires and components easier.
2. Remove the 1629 Eye tube to get that out of the way first.
3. Remove the 10uF 25V electrolytic cap from Pin 8 of the 12A6 tube and replace it with the supplied 10uF 50 radial electrolytic cap. Pin 1 is tied to ground so this makes an easy spot to solder to for a clean replacement to make some room.
4. **Optional:** There is a 5 lug center common terminal strip provided in case you are upgrading the power cord from a two prong to a three prong grounded plug.
  - a. If doing so, be sure to mark which lead of power cord is terminated to the input side of the On/Off switch. This is where the Hot (black) lead of AC power cord connects on the terminal strip.
  - b. Remove the .05uF 600v film capacitor.
  - c. Mark your wires, desolder and remove terminal strip. Install new terminal strip.
  - d. Reinstall the wires and new 0.05uF 630V film capacitor. Foil side goes to ground, other side ties to neutral of AC power cord and Wattmeter Transformer (black lead).

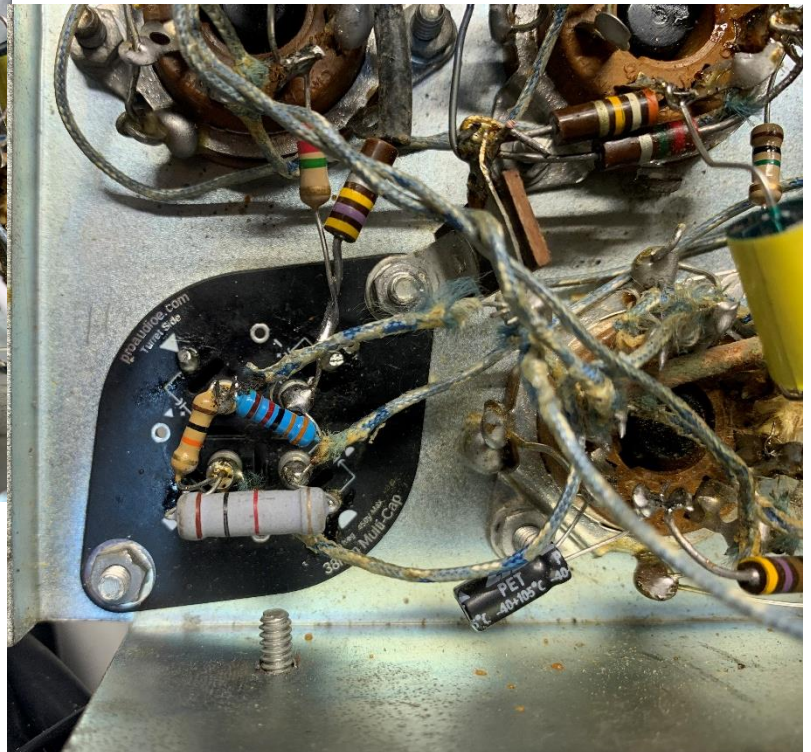
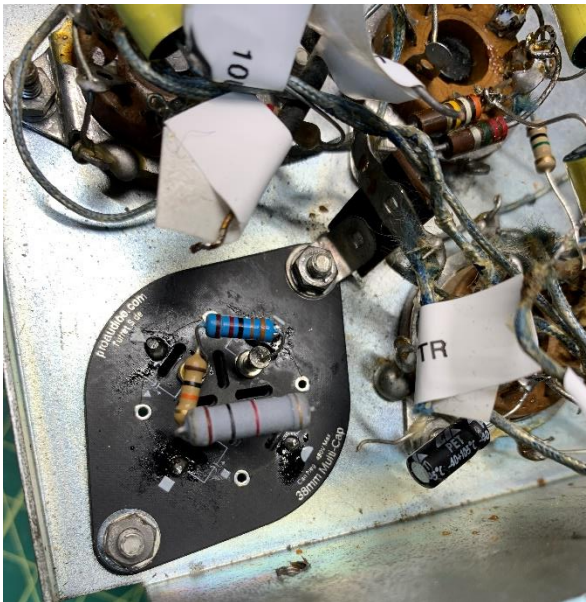


5. Remove the 0.05uf 600V film capacitor that is between the power connection terminal strip and 6X5 rectifier tub.
6. (Optional) Unless your two red leads from the wattmeter transformer are too short you can move the terminal strip to the right of the 6x5 to improve clearance to the eye tube. You would need to drill out the terminal strip mounting hole (5/32") as it's for #6 and transformer bolt is #8.
7. If you move the terminal strip, it may be easier to replace the 1.0M ohm and 2.2M ohm resistors.
8. Be sure to install the new 0.05uF 630v film capacitor whichever way you decide to go with that terminal strip.

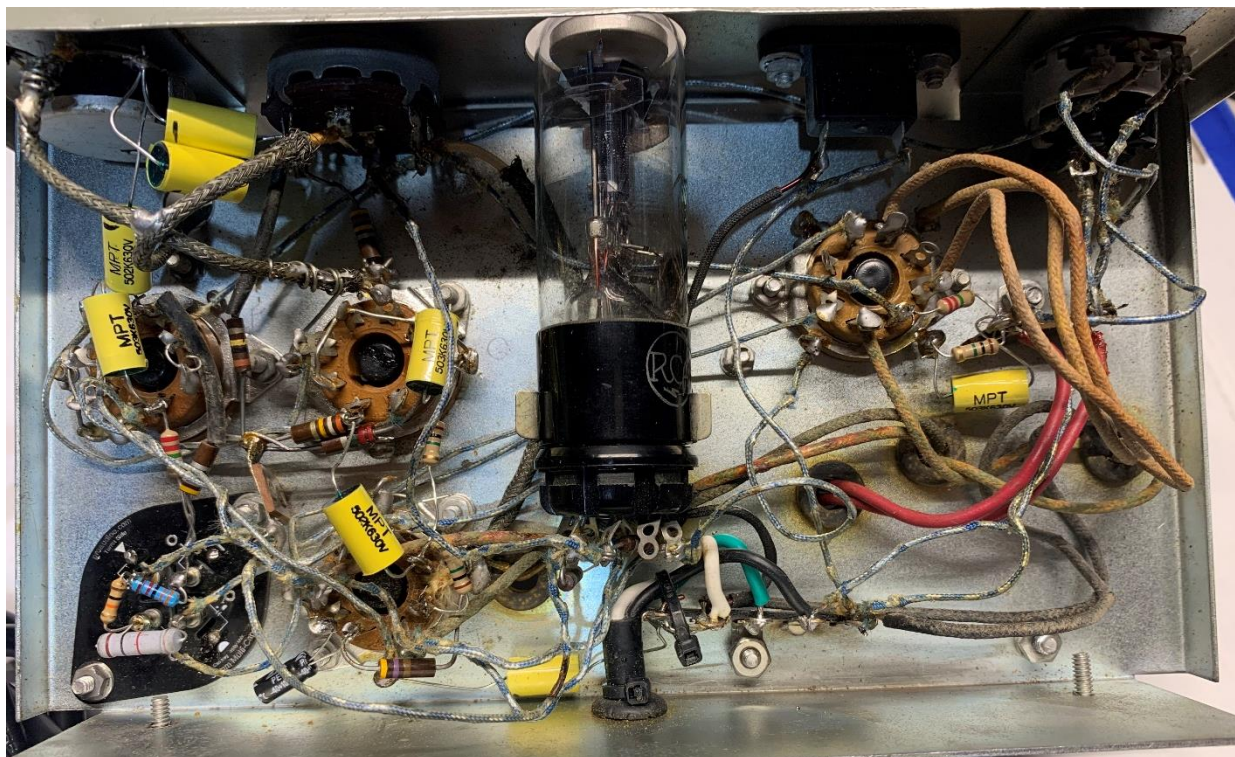


9. Continue replacing the remaining film capacitors. There is a total of four 0.05uF and five 0.005uF capacitors.
10. Replace any out of spec resistors as you go along.

11. Mark all wires and resistors of which post (Square Triangle Half Moon or Dash) of the original multi-sector capacitor are mounting to. I prefer to use a label maker or painter's tape.
  - a. Some wires or resistors may not be accessible until another wire or resistor is moved. Mark one, remove one, repeat.
  - b. Desolder the resistors connected to the multi-sector cap. You do not need to remove the 1K 1W, 10k or 33k that are solder to the multi-sector cap tabs.
  - c. Remove the multi-sector capacitor. Save the mounting hardware.
  - d. Clean the surface area around the mounting holes top and bottom side chassis with a wire brush.
  - e. Install the new multi-sector cap with the Moon facing 12A6 tube, Square facing rear left, Triangle and Dash facing toward 12C8 tube. Assembly can be top or bottom mounted.
  - f. Use the original mounting hardware and be sure to tighten the nut and bolt for good ground.
  - g. Solder the associated leads and resistors to the correct terminal as noted during removal. NOTE: It is important that the correct lead goes to the correct terminal despite all four capacitors are the same value. The voltage divider resistors provide the proper voltages to the specific components in the circuit.



Final installation should look like this:



12. Please refer to the OEM manual to complete the installation.
13. Double and triple check your connections are going to the right spot.
14. Double check all your capacitor and resistor values. It is easy to swap a 1K and a 10K ohm resistor or a 0.05uf and a 0.005uf capacitor.
15. If you have the original RF and Audio Probe, you can replace the diode with the 1N34A and the 0.02uF capacitor from the kit.
16. Included is also a new probe label if the original RF $\leftrightarrow$  Audio label is damaged or missing.

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](mailto:mysledshed@yahoo.com)

Please be professional in your communicate.

Thank you, and good luck!

73's

Scott

W8AOR