

## I. Introduction.

Thank you for purchasing the Scotty's Sled Shed Component Kit for Paco Z-80 Signal Tracer.

The Paco is a superb signal tracer that when restored properly is a prized addition to any bench or collection.

The Paco is notorious for rust/oxidized bolts. It is highly suggested you replace all the bolts with #6-32 x 3/8" stainless steel bolts, nuts, and tooth washers. Clean around the areas on the chassis with a wire brush to ensure good ground.

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.

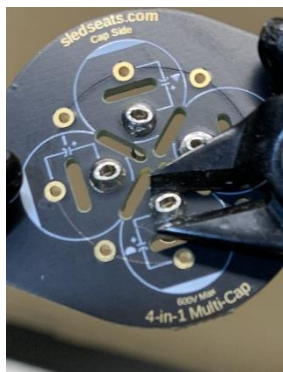
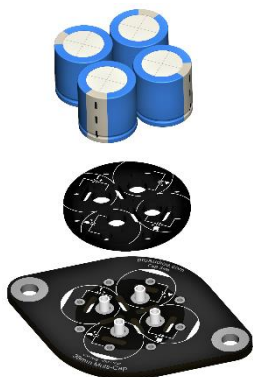
1. Due to constant supply chain challenges, Scotty's Sled Shed reserves the right to substitute component OEMs. If there is an orange bodied resistor in installation guide images and you receive a blue bodied resistor, it is due to component substitutions. In some cases, I may substitute a higher wattage resistor or different capacitor value than original.
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 Paco Z-80 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://bama.edebris.com/manuals/paco/z80>
12. Aftermarket replacement probes are available at: <https://www.ebay.com/itm/332973070353>

## II. Preparation-Capacitors.

Assembly and Installation guide for the replacement multi-sectional capacitor circuit board.

The original C1 is a Multi-Section Twist Tab Capacitor. It was 20-20-10-10 uf. We will replace that capacitor with the supplied 4-in-1 Multi-Cap board with 22-22-10-10 uf capacitors, all 450v.

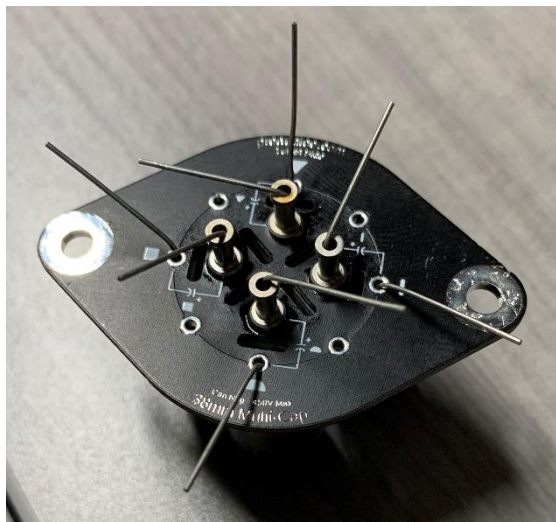
1. Open the bag and check that all components listed on the bag cover are included.
2. Identify the different sides of the circuit board.
  - a. The board has two sides. One side is marked "Cap Side" the other side is marked "turret side".
  - b. The board is marked on both sides with a Square, Triangle, 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 of the turret will mount (install turret from this side).
  - 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.



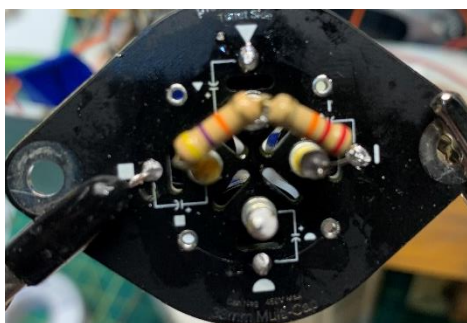
3. Install a turret in one of the 4 center holes. It will only fit in the positive post hole in the center.
  - a. **Slightly squeeze** turret from the Cap Side to make it oblong to prevent from falling out. I use small snips.
  - b. Add some solder flux to both sides of the board around the pin (optional).
  - c. Solder on the "Capacitor side". Add some solder to the Turret 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.
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.

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5. Install one of the supplied 22uF 450 Electrolytic Capacitor with the POSITIVE leg into of the Turret for Half Moon (dome). 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 Square turret with a 22uF 450V capacitors. Snip off the excess lead lengths.
8. The 10uF 450V capacitors will go in the locations for Triangle and Dash (line).



9. (Optional) It will be easier to install the voltage divider resistors on the board before installing.
  - a. Install the 47K ohm ½ watt resistor in the turret legs between the Square and Triangle. Solder resistor to turret, only at the Square Turret. Do not solder Triangle yet.
  - b. Install the 22K ohm ½ watt resistor in the turret legs of Triangle and Line. Solder resistor at Line turret only. Do not solder at Triangle Yet.
  - c. The completed assembly should look as below.



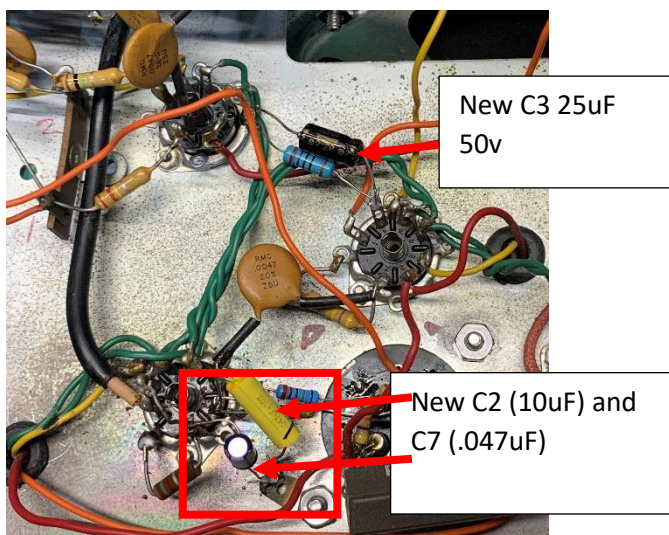
10. The manual labels the 4 sections of C-1 as C1A, C1B, C1C, C1D.
11. (Optional) Write 1,2,3,4 or mark a Square, Triangle, Line, Half Moon on chassis outside the hole where the original capacitor is installed.
12. C1A=Half-Moon (dome)
13. C1B=Square
14. C1C=Triangle
15. C1D=Line (usually blank on originals)
16. The original orientation in the chassis, as seen from the bottom will have Half-Moon and Square facing the outside edge of chassis, with Square on the left, Half-Moon on the right.



### 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 old capacitors and resistors before desoldering will make the work go faster.

1. 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.
2. I find it easier to start replacing all of the tubular 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.
3. Remove the vacuum tubes so you do not damage them when working upside down.
4. There is a supplied 3-lug terminal strip.
  - a. This will allow you to replace Terminal Strip JJ located near Rectifier Tube V5.
  - b. I use the new terminal strip and replace C11 with one leg to the grounded center terminal and the other to the Neutral of the Line In AC power cord.
  - c. If replacing AC cord, with grounded AC cord, the ground would go to the center of the new Terminal strip JJ.
5. Remove C3, the 25uF 25V electrolytic cap from Pin 2 V3 and ground. Replace with supplied 25uF 50v axial capacitor. Positive to Pin 2 of V3 and the negative to chassis ground. I use one of the ground tabs of V1.
6. This is a good time to also replace R16 the 270ohm 1W with supplied resistor.
7. Remove C2, the 10uF electrolytic that is at Pin 7 of V2.
8. Solder the positive leg of the supplied 10uF 50v radial electrolytic to Pin 7 of V2.
  - a. Solder the negative lead to one of the chassis ground lugs of V2 or wait till you replace C1 and use the supplied #6 ground lug when we attach it to one of the bolts at C1.
9. Remove C7, .047uF radial capacitor from V2.
10. Replace with supplied .047uF 630v radial film cap. Soldering one leg to Pin 6 of V2. The other leg to ground or wait till we install the #6 ground lug on the new C1 (same as step 8a above).



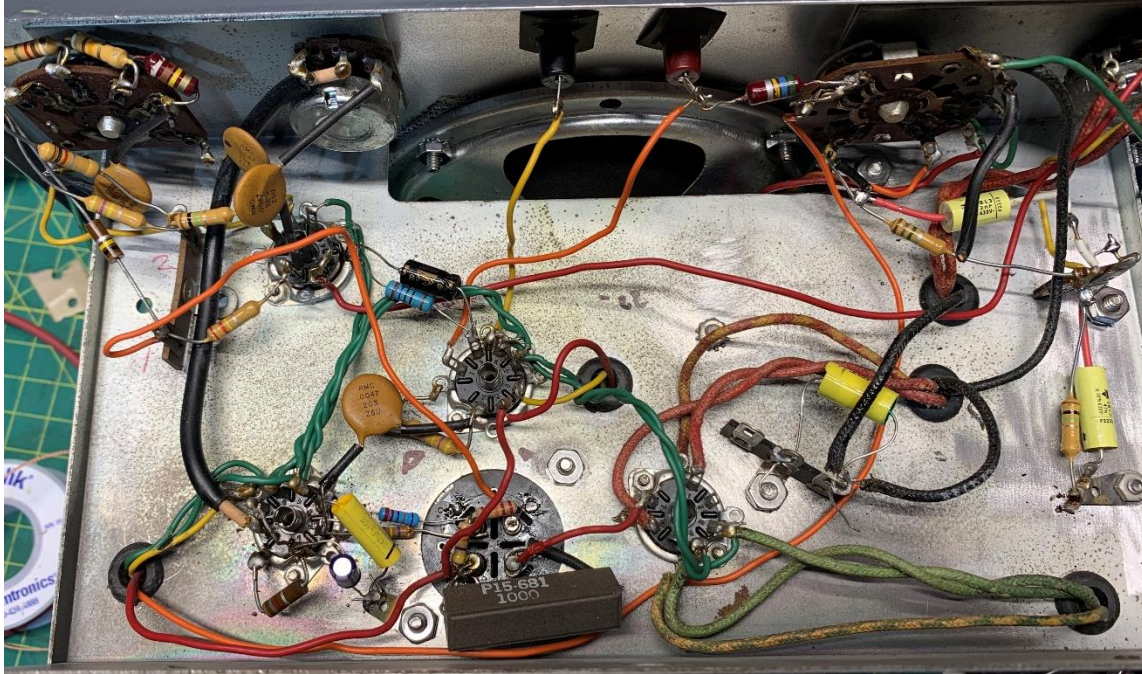
**IV. C1 Replacement.**

1. Mark all wires and resistors of which post (Square Triangle Half Moon or Line) 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. The two resistors R12(470k) and R13(220k) that connect to Triangle of C1 to Pins 6 and 5, respectively, of V2 will not reach new C1. So, remove those two resistors and replace them with supplied, soldering the leads only at V2.
  - c. Desolder R22, 1k ohm 7watt from C1. This can usually be reused, but a 1k 10W is supplied in your kit.
  - d. Remove the multi-sector capacitor. These are usually rusted so discard. There are two new stainless steel #6-32 hardware in your kit.
  - e. Clean the surface area around the mounting holes top and bottom side chassis with a wire brush.
  - f. Install the new C1 Multi-Cap PCB board, with the Moon facing near V2 (bottom right), Square facing bottom left, Triangle toward V2 and Dash facing toward V3. Assembly is best as top mount. Alignment should be very close to original as marked in Section II, Step 10 previously.
  - g. Use supplied hardware to add star washers between head and board (bottom left hole and install a #6 ground lug on the under side direct to chassis and install #6 nut.
    - i. This is the ground lug you would solder the leads of R11 and C2 if you do not already use a ground tab of V2 in Section III steps 7,8 and 9 above.
  - h. Install hardware for top mounting hole with toothed washer on top of board and under chassis.
  - i. Solder the associated leads and resistors to the correct terminal as noted in step 1a above. NOTE: It is important that the correct lead goes to the correct terminal.
  - j. Resistors R12 and R13 from step 1b above, connect to Solder Turret Triangle of C1.
2. Replace all out of spec resistors.
3. Double and triple check your connections are going to the right spot.
4. 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.
5. If you have the original RF and Audio Probe, you can replace the diode with the 1N34A and the 0.0068uF axial capacitor from the kit. There is also a spare 47k ohm resistor for the probe included in your kit.

Final install should look like below picture.

Be sure to install your AC power cord if you have not already.

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

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