I. Introduction.

Thank you for purchasing the Scotty's Sled Shed Component Kit for the EICO 147A 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 except for R13 (1K ohm 5W). 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.**
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 EICO 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/eico/147a

II. Preparation-Multi Section Capacitor board.

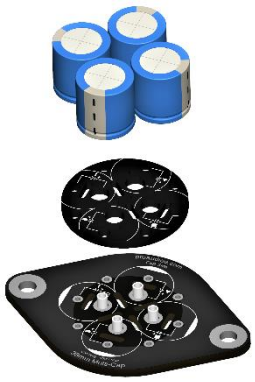
Removal of the existing multi section capacitor board.

1. Note the orientation of the capacitor from the bottom side. The Capacitor has 4 sections, Half Moon, Square, Triangle and Line. There are markings on the bottom of the capacitor near each leg. Take lots of pictures and it may help to make marks with felt pen where each section is oriented.
2. Label wires that are connecting to each section of capacitor. I use a label maker but whatever works for you is great.
3. Desolder each wire as you mark it. I like Chemtronics desolder wick, but you may choose another method. One or more of the twist tabs may be soldered to the chassis, which will take a hot iron and desoldering method.
4. Twist the mounting tabs to line up with the holes and remove the old capacitor.
5. Use the multi-section capacitor circuit board from the kit to mark alignment holes.
    a. Note the orientation of the markings Half Moon, Square, Triangle Line on the board.
    b. Align the board-turret mounting side down (facing the wires you just removed) to be as close as possible to the same orientation of the original capacitor.
    c. Use painters' tape to hold the board in place while marking the mounting holes with a felt pen on the chassis.
    d. Drill a hole, where you marked, with a 5/32" drill bit. Check the hole alignment and proceed to section III.

III. Preparation-Capacitors.

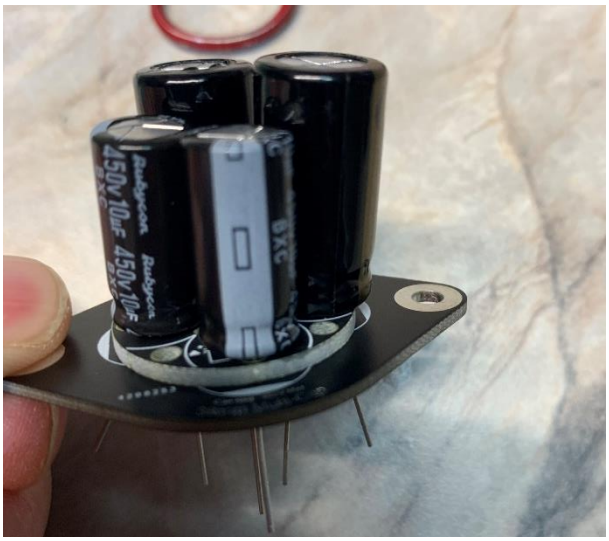
Assembly and Installation guide for the EICO 147A multi-sectional capacitor circuit board.

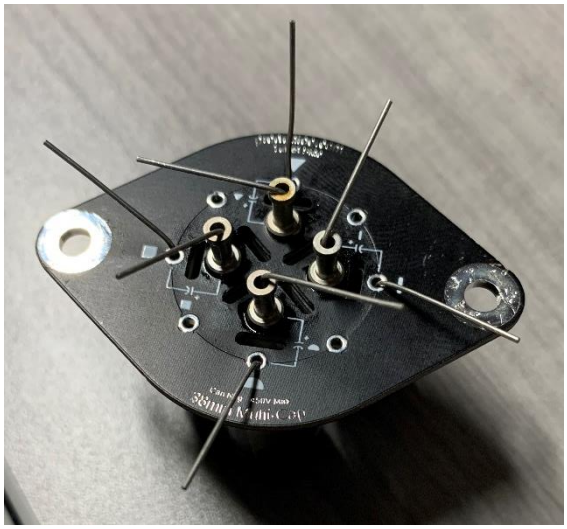
1. Open the bag and check that all components listed on the bag cover are included.
2. Identify the different sides of the circuit board.
    a. The board has two sides. One side is marked "Cap Side" the other side is marked "turret side".
    b. The board is marked on both sides with a Square, Triangle,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



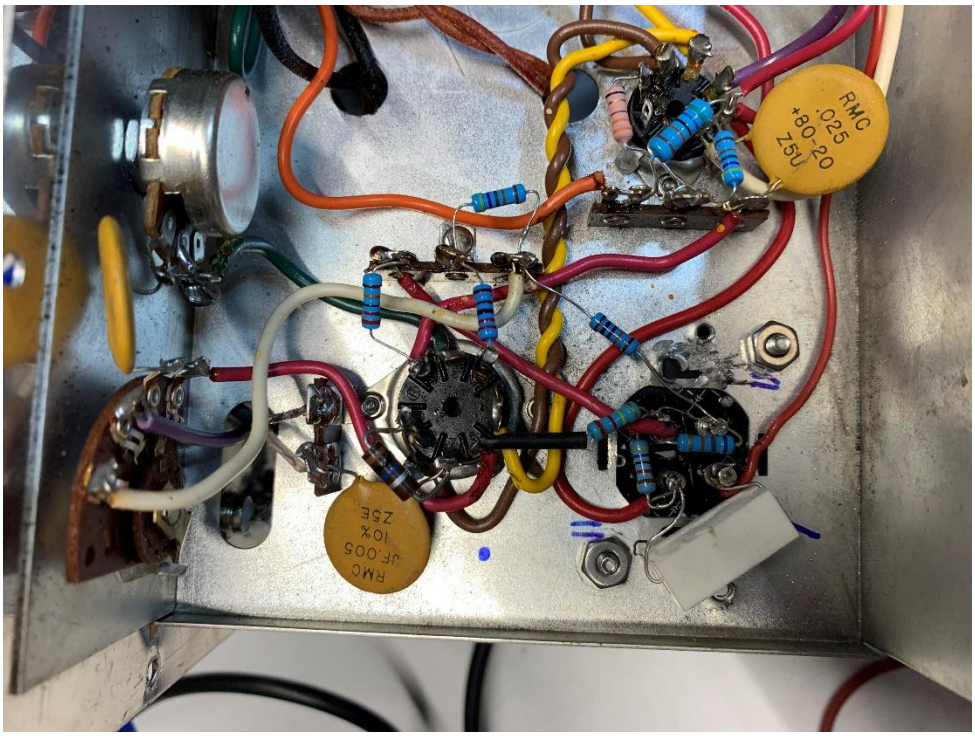
3. Install a turret (if turrets are not installed) in one of the 4 center holes. It will only fit in the positive post hole in the center.
    a. Slightly squeeze turret from the Cap Side to make it oblong to prevent from falling out. I use small snips.
    b. Add some solder flux to both sides of the board around the pin (optional).
    c. Solder on the "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. Usually, short turrets are with the kit and do not need to be cut. But if the supply chain is out, you may get longer turrets that need to be cut down.
    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 (Half Moon) with the POSITVE leg into the Half Moon 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 second 22uF 450V capacitor for Square. Snip off the excess lead lengths.
8. Install the two 10uF 450V capacitors for Triangle and Line the same as step 5 and 6.
9. Clean the chassis around the mounting holes and install the new capacitor assembly (mounts on the top side) to the chassis with the supplied #6 hardware.





10. It may be easier to install the voltage divider resistors on the board before connecting wires.
    a. Install the 1K ohm 5 watt resistor into the turret hole between Square and Half-moon. Solder on the Half Moon leg only.
    b. Install the 47K 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 69K ohm ½ watt resistor in the turret legs of Triangle and Line. Solder both legs.
    d. Finish installation by re-attaching the leads previously marked and removed from the original capacitor.
    e. You may wish to replace R3 (100K) and R4 (220K) as they are often out of spec.



11. 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.

IV. Component removal and installation.

1. 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.
2. The 147A is not an overly complicated design, so replacing resistors and capacitors is straightforward.
3. I find it easier to start replacing all of the large film caps first, one at a time, before replacing the resistors. This makes for a cleaner install and allows you to trace the wires and components easier.
4. There is a 3 lug center common strip included in case you need one to replace a damaged terminal. This is helpful if replacing the two prong power cord with a 3 prong polarized and grounded cord.
5. There is also a courtesy 2 hole #6 ground lug in case you need one.
6. There are three .0022uF 400v capacitors included to replace the original 0.0025uF ceramic discs. These replacements may be mylar (film) or a disc capacitor depending on supply chain at time of the kit build. Seldom will you need to replace the disc capacitors, but replacements are included just in case.
7. Double check your work against the schematic. Before powering on, check the Service List ohms on page 21 of the manual.
8. The extra 1n34A diode is for the probe. If you do not have probes, you can make your own using Philco type probe leads or buy ones pre-made. I highly recommend Mike Kent KK4HXJ custom probes. Purchase at the KK4HXJ eBay store at: https://www.ebay.com/itm/232353371922

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