I. Introduction.

Thank you for purchasing the Scotty's Sled Shed Component Kit for Knight Signal Tracer models 83Y135 and G-690. The units are identical in structure but only the 83Y135 manual is readily available.

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.

If you are missing the probe, I offer a custom probe kit that provides for an easy DIY without the need of hunting down copper tubing or pill bottles. That is listed on my eBay store at: https://www.ebay.com/itm/175892511123

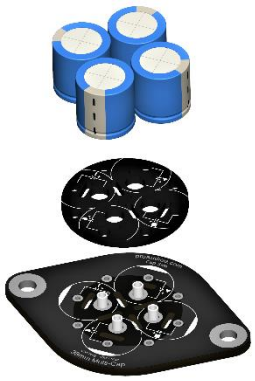
Before you get started there is a list of items to be aware of.

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 R23(1k ohm 1 watt), R21 (470 ohm 2 watt) and R25 (47ohm 1 watt). The supply (all other resistors) could 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 Knight
10. 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://bama.edebris.com/manuals/knight/83y135

II. Preparation-Capacitors.

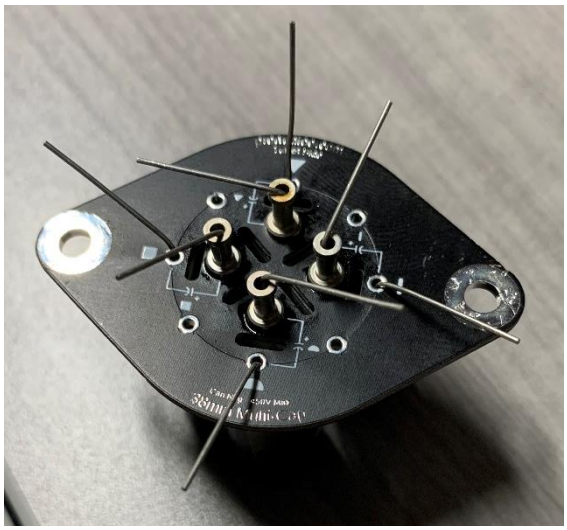
Assembly and Installation guide for the replacement multi-sectional capacitor circuit board.

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 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.

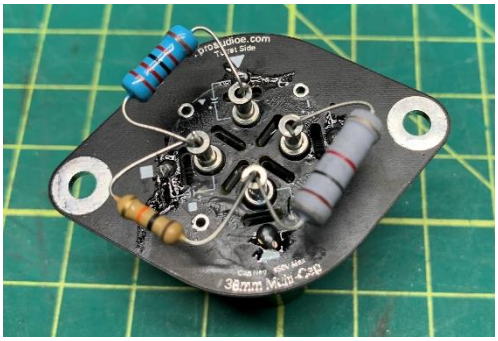


3. Install a turret in one of the 4 center holes. It will only fit in the positive post hole in the center.
    a. Slightly squeeze turret from the Cap Side to make it oblong to prevent from falling out. I use small snips.
    b. Add some solder flux to both sides of the board around the pin (optional).
    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.
    f. With snips, cut the terminal flush on the Capacitor side but leave a little nub.
        i. Short turrets are usually supplied and will **not need to be cut down**. However, if the supply chain is out of the short turrets, we may have to substitute with the longer turrets. Which will 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.

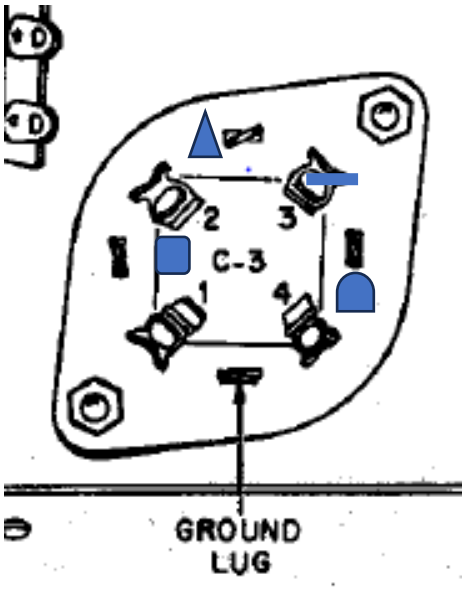
4. Install spacer board on the "Capacitor Side" aligning the symbols on the spacer board with the Multi-Cap Board. If the Turret sits flush or above the spacer board, you have not trimmed enough of the turret off. The turret must sit below the top of the spacer board.
5. Install a 22uF 450 Electrolytic Capacitor with the POSITVE 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.



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 Line (dash) and Half-moon. Do not solder yet.
    b. Install the 10K ohm ½ watt resistor in the turret legs between the Square and the Half-Moon. Do not solder yet.
    c. Install the 22K ohm ½ watt resistor in the turret legs of Triangle and Square. Solder resistors at Half Moon and Square turrets.
    d. The completed assembly should look as below.



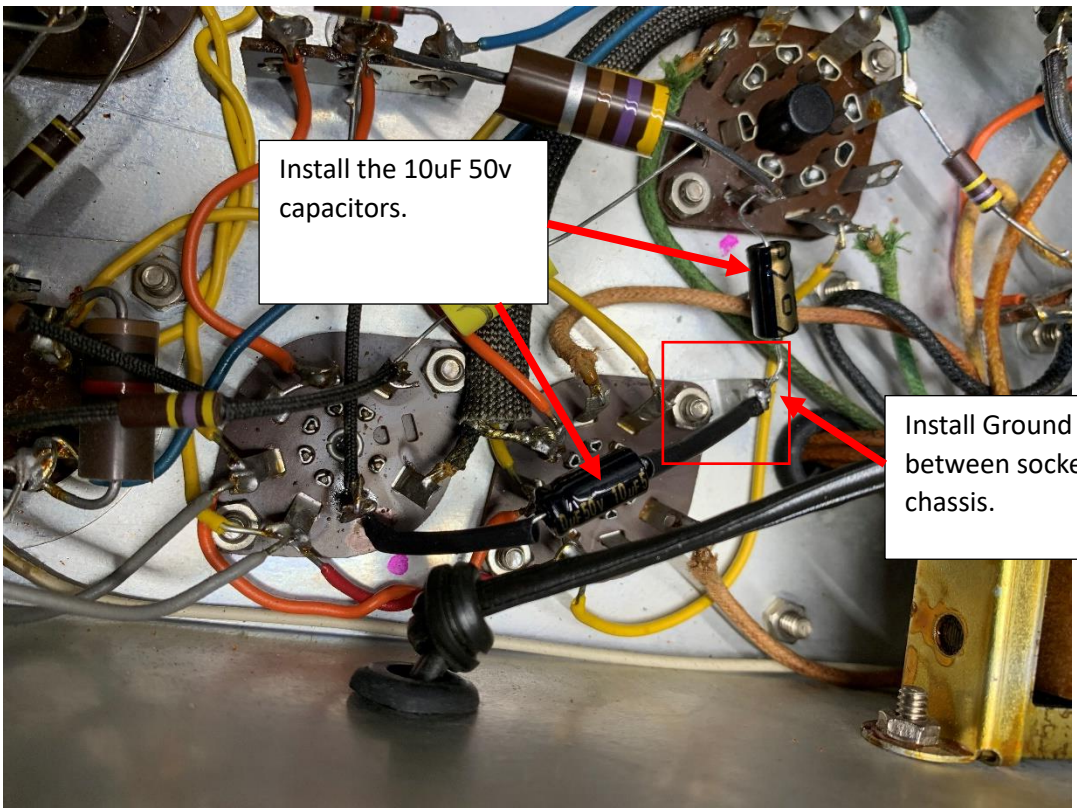
9. If you have an oscilloscope and follow the theory of finding the foil side of film capacitor, do that now to all the film capacitors and mark the foil side. There are several YouTube Videos on this procedure. I do not advocate one way or the other. It is your choice.
10. The manual labels the 4 sections of C-3 as 1,2,3,4. See diagram below to reference the markings on the new board. Write 1,2,3,4 or mark a Square, Triangle, Line, Half Moon on chassis outside install ring.
11. 1=Square
12. 2=Triangle
13. 3=Line(dash)
14. 4=Half Moon(dome).



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. 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.
2. Remove the vacuum tubes so you do not damage them when working upside down.
3. Remove the dual 10uF 25V electrolytic cap from Pin 8 V3 and Pin 2 of V2 tube.
4. Install the #6 ground lug on the mounting hole of V5 between the chassis and tube socket.
5. Install the two new 10uF 50V electrolytic capacitors Pin 8 V3 (+) and ground lug (-) and Pin 2 V2 (+) and the ground lug (-).

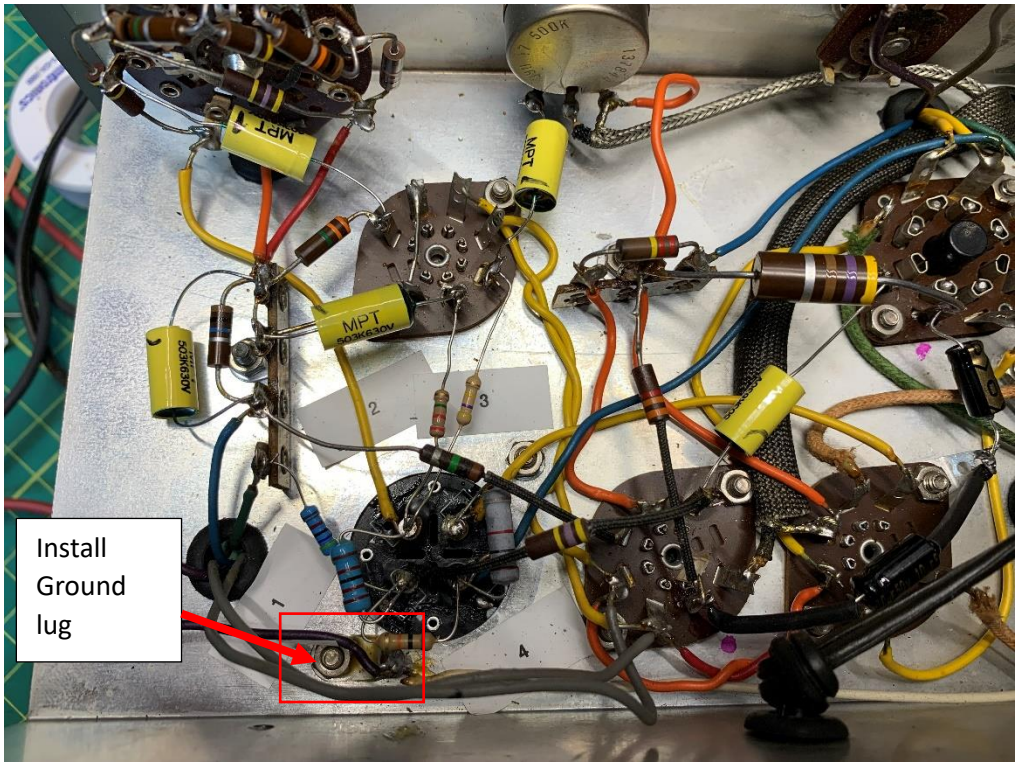


6. Mark all wires and resistors of which post (Square Triangle Half Moon or Dash) of the original multi-sector capacitor are mounting to. I prefer to use a label maker or painter's tape.
    a. Some wires or resistors may not be accessible until another wire or resistor is moved. Mark one, remove one, repeat.
    b. There are two wires going to the ground solder tab or tabs. One should be Purple from Pin 4 of the 6E5 eye tube. The other is tied to a ground lug between the on/off switch and T-3 (why they added another ground lead I don't know???). Label these two wires "GND" for Ground. Remove the leads.
    c. Desolder the resistors connected to the multi-sector cap. You can choose to just cut off R-11, R-22, and R-23 on the C3 as you will be replacing with the assembly you created in section II step 8.
    d. Remove the multi-sector capacitor. Save the mounting hardware.
    e. Clean the surface area around the mounting holes top and bottom side chassis with a wire brush.
    f. Install the new multi-sector cap with the Moon facing near V2 (bottom right), Square facing rear left, Triangle and Dash facing toward V1. Assembly is best as top mount.
    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.
    h. Install hardware for top mounting hole with star washer on top of board and under chassis.
    i. 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.

j. Replace all out of spec resistors.

7. Please refer to the OEM manual to complete the installation.
8. Double and triple check your connections are going to the right spot.
9. 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.
10. If you have the original RF and Audio Probe, you can replace the diode with the 1N34A and the 0.0039uF (390pF-replaces 400pF) capacitor from the kit. There are also spare resistors for the voltage divider assembly in the probe included in your kit.



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