

Heathkit SB-102

I. Introduction.

Thank you for purchasing the Scotty's Sled Shed component replacement kit for the Heathkit SB-102 Transceiver.

This kit is intended for unmodified transceivers, 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. Original Manual. Downloadable available at <https://www.vintage-radio.info/heathkit>

Component list:

QTY 2: 22uf 450v radial electrolytic capacitor
QTY 2: 500uf 50v axial electrolytic capacitor (C941/942)
QTY 1: 10uf 160v axial electrolytic capacitor (C945)
QTY 1: 0.05uf 630v axial film capacitor (C938)
QTY 1: 0.22uf 630v axial film capacitor
QTY 6: 0.22uf 250v mylar radial film capacitor
QTY 1: 1uf 250v axial film capacitor
QTY 2: 10uf 50v radial electrolytic capacitor
QTY 2: 0.022uf 400v mylar radial film capacitor
QTY 11: 1n4005 Diodes (replace 57-27)
QTY 4: 1n5711 Schottky Diodes (replace FH-110)
QTY 1: 1n4744a 15v Zener (replaces 56-25)
QTY 1: 1n4740a 10v Zener (replaces 56-67)
QTY 1: 1n34a crystal diode (replaces 56-26)
QTY 1: 1n4149 diode (replaces 56-56)
QTY 1: 200ohm 20 turn potentiometer (carrier null)
QTY 1: 4.7k ohm ½ watt resistor (R116/C116)
QTY 2: 33k 1w resistor (replace R6/R7)

Capacitors sometimes use 3 digit codes. The following codes identify value:

Capacitance Conversion							
picofarad	nanofarad	microfarad	Code	picofarad	nanofarad	microfarad	Code
pF	nF	μF		pF	nF	μF	
10	0.01	0.00001	100	4700	4.7	0.0047	472
15	0.015	0.000015	150	5000	5	0.005	502
22	0.022	0.000022	220	5600	5.6	0.0056	562
33	0.033	0.000033	330	6800	6.8	0.0068	682
47	0.047	0.000047	470	10000	10	0.01	103
100	0.1	0.0001	101	15000	15	0.015	153
120	0.12	0.00012	121	22000	22	0.022	223
130	0.13	0.00013	131	33000	33	0.033	333
150	0.15	0.00015	151	47000	47	0.047	473
180	0.18	0.00018	181	68000	68	0.068	683
220	0.22	0.00022	221	100000	100	0.1	104
330	0.33	0.00033	331	150000	150	0.15	154
470	0.47	0.00047	471	200000	200	0.2	204
560	0.56	0.00056	561	220000	220	0.22	224
680	0.68	0.00068	681	330000	330	0.33	334
750	0.75	0.00075	571	470000	470	0.47	474
820	0.82	0.00082	821	680000	680	0.68	684
1000	1	0.001	102	1000000	1000	1	105
1500	1.5	0.0015	152	1500000	1500	1.5	155
2000	2	0.002	202	2000000	2000	2	205
2200	2.2	0.0022	222	2200000	2200	2.2	225
3300	3.3	0.0033	332	3300000	3300	3.3	335

1uf=105

0.1uf=104

0.01uf=103

0.001uf=102

0.0001uf=101

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 this 50-year-old piece of 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 Original Heathkit 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.

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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.
5. Be sure that all capacitors are discharged.
6. READ THE OEM (Original Equipment Manufacturer) OWNER/INSTALLATION MANUAL!

III. Component replacement

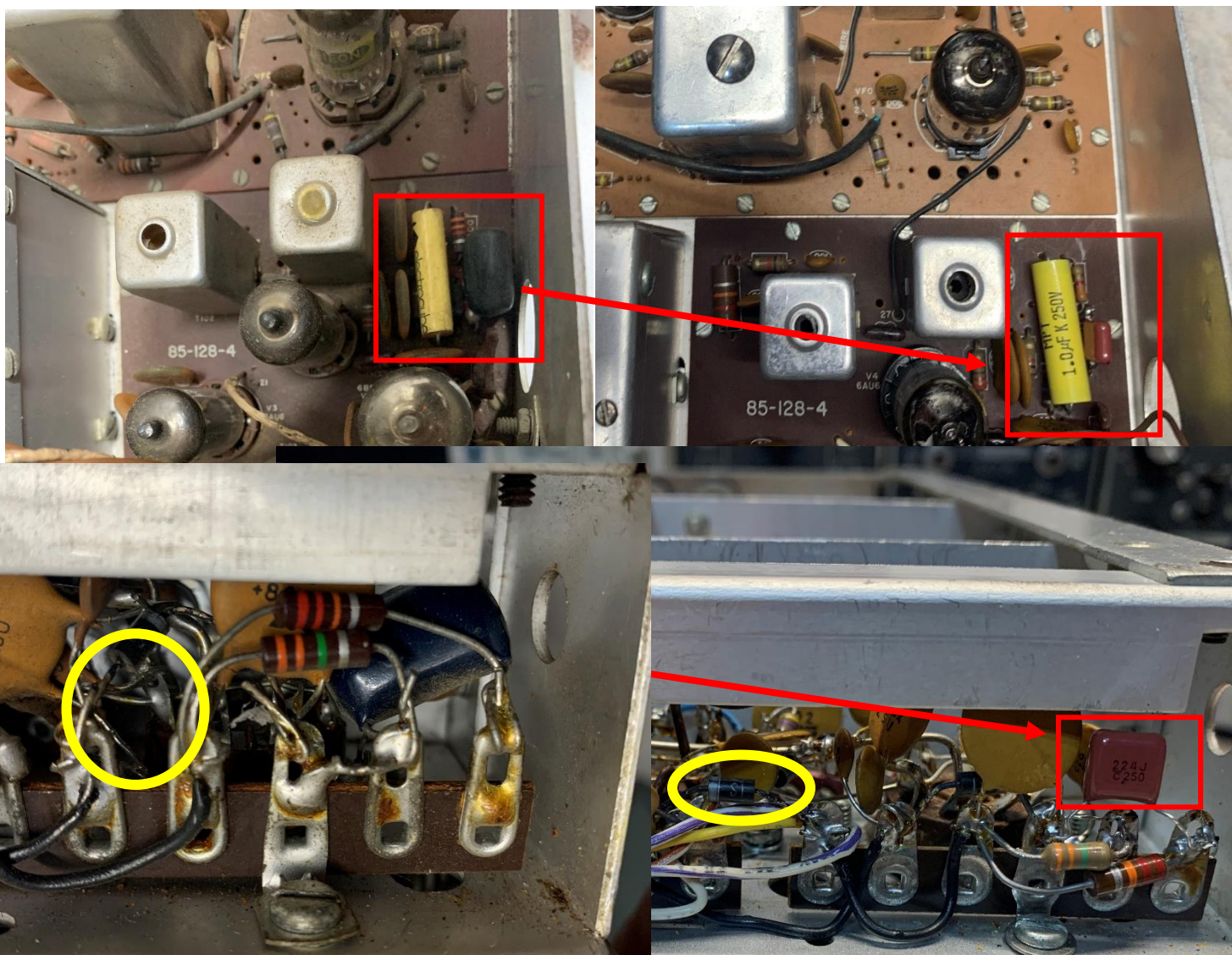
This kit is a basic component swap kit. There are no modifications to the original board. There are supplied replacement capacitors, diodes, a few resistors, and a replacement 200 ohm potentiometer in case your carrier null trimmer potentiometer is bad. The 200 ohm potentiometer will also work to replace the Meter Zero potentiometer.

NOTE: You do not need to install all the components with components from the kit. Your unit may have some components within spec and may not need replacement. The electrolytic capacitors should be replaced if original.

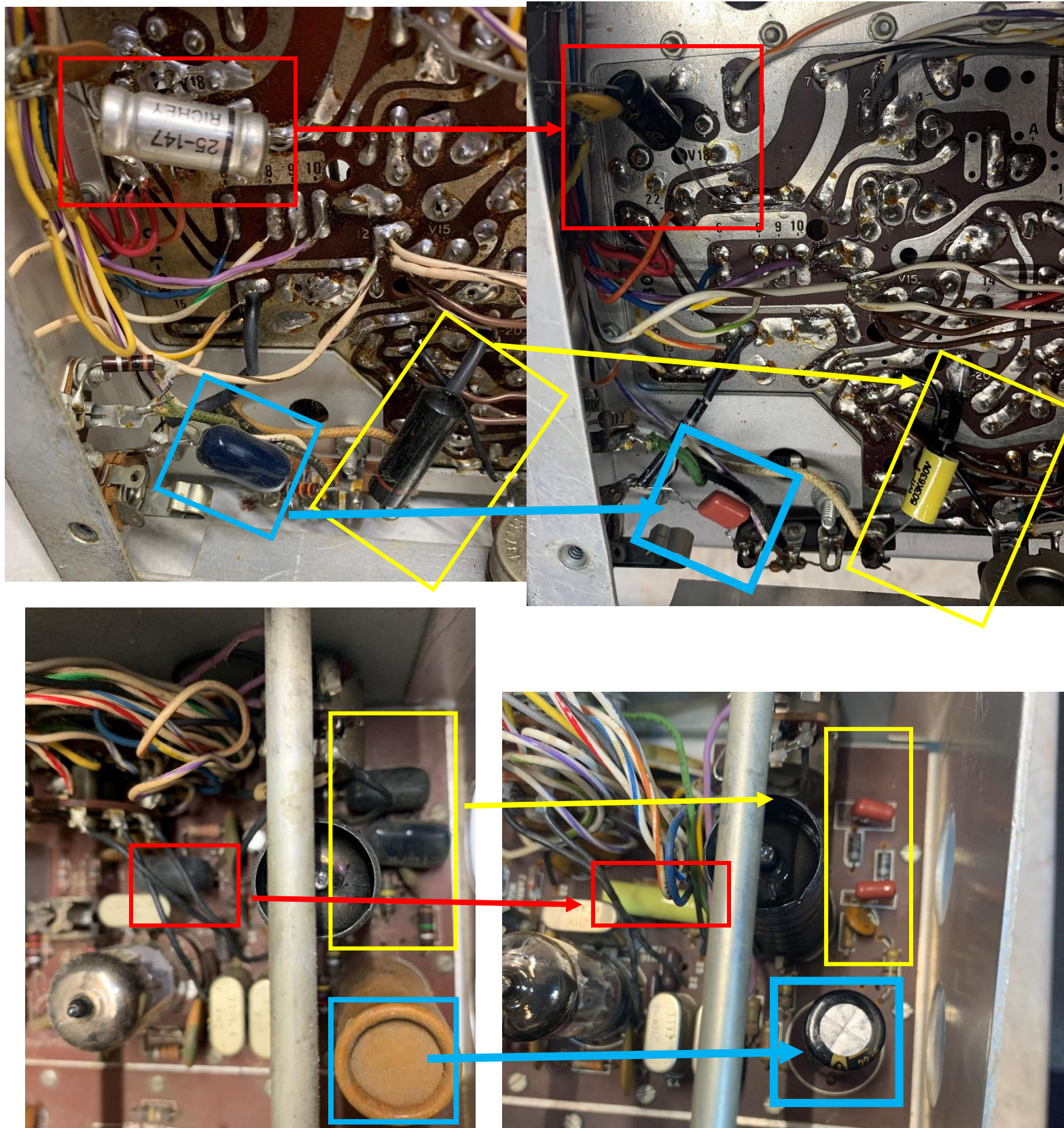
1. There are 7 (blue or brownish orange) 0.2uf mylar capacitors. Replace 6 of the 7 blue or brownish orange mylar capacitors with the 0.22uf mylar capacitors supplied in the kit.
 - a. C907 is on the bottom side of the transceiver, upper left if you are looking from the front.
 - b. C932 is on the bottom side of the transceiver, upper right if looking from the front.
 - c. CR213 on the Bandpass board near R219
 - d. C106 is on the IF circuit board. It is in parallel with R116. There is a replacement 4.7k ohm resistor supplied in the kit if you want to replace both at same time.
 - e. C3 and C25 are on the Modulator board near V1 6EA8 tube.
2. Replace the 7th 0.2uf mylar capacitor, C13 with the supplied 0.22uf 630v axial film capacitor. C13 is on the Modulator board near Y1 and V16 12AU7 tube. The spacing on the board is too long for the modern mylar capacitors, so an axial film cap will be used here.
3. Replace the two 0.02uf mylar capacitors on the Audio Board with supplied .022uf (223) Mylar capacitors (C300/C301).
4. Replace the two 20uf Electrolytics C12 (modulator board) and C304 (Audio Board) with supplied 22uf 450V radial capacitors.
5. Replace the two 10uf electrolytic capacitors C2 (modulator board) and C212 (bandpass board) with supplied 10uf 50v radial electrolytic capacitors.
6. Replace the 1uf 200v axial film capacitor C110 with supplied 1uf 250v axial film capacitor.
7. Replace C906 10uf 150V axial electrolytic capacitor (bottom side of unit near C907) with supplied 10uf 160v axial electrolytic capacitor.
8. Replace C912 .05uf axial film capacitor (bottom of unit near C907) with supplied .05uf 630v axial film capacitor.
9. Replace R6 and R7 with supplied 33kohm 1w(minimum) resistors on modulator board.

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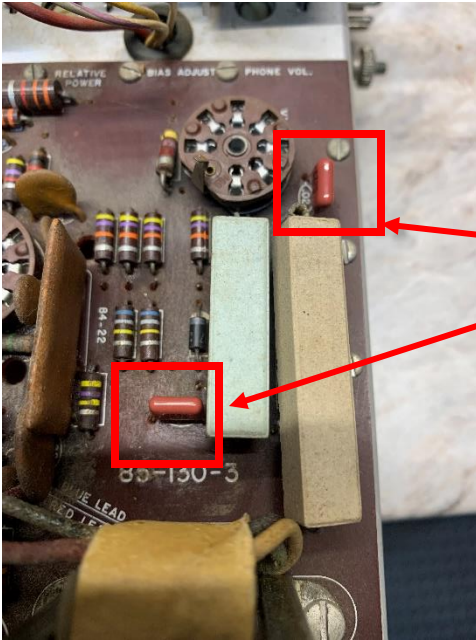
10. Replace Carrier Cull potentiometer (if needed) with supplied 200ohm 20 turn potentiometer. It will be easier to install it on the top side of the board vs underneath.
11. Replace the 4 carrier null diodes CR1, CR2, CR3, CR4 with the 4 supplied 1n5711 Schottky diodes.
12. D202 15V Zener is on the bandpass board.
13. CR201 is a crystal diode on Bandpass board. Replace with supplied 1N34A crystal diode.
14. CR901 is a switching diode on the bottom side under the relay. Replace with supplied 1N4149 diode.
15. The 10 standard silicone diodes are as follows:
 - a. D1&D2 on Modulator board
 - b. D301 on Audio Board
 - c. D101 on IF circuit board
 - d. D201 on Bandpass board
 - e. D901, D902, D903, D904 and D905 are on the bottom side of the chassis.



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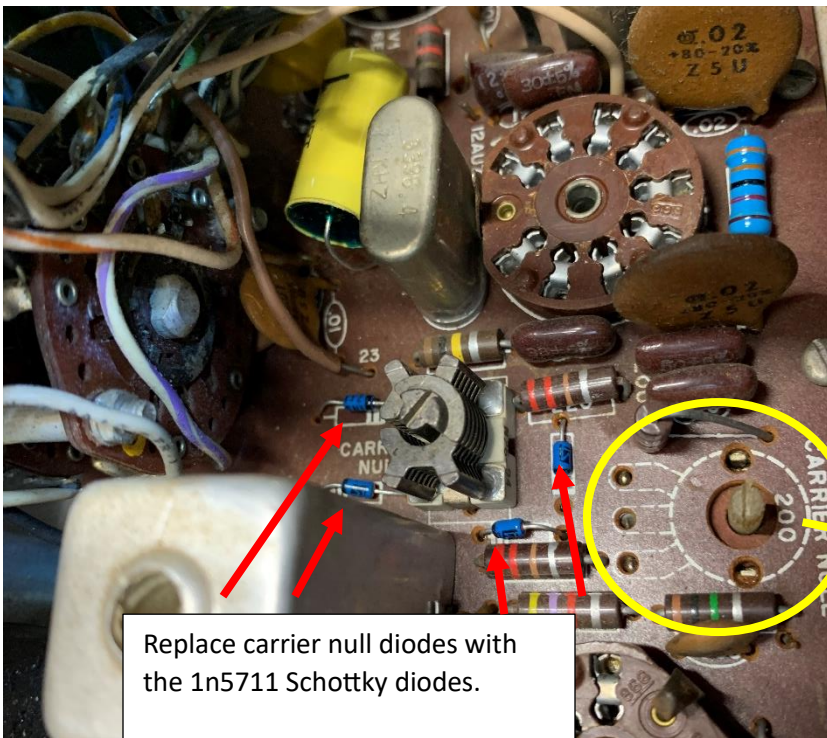
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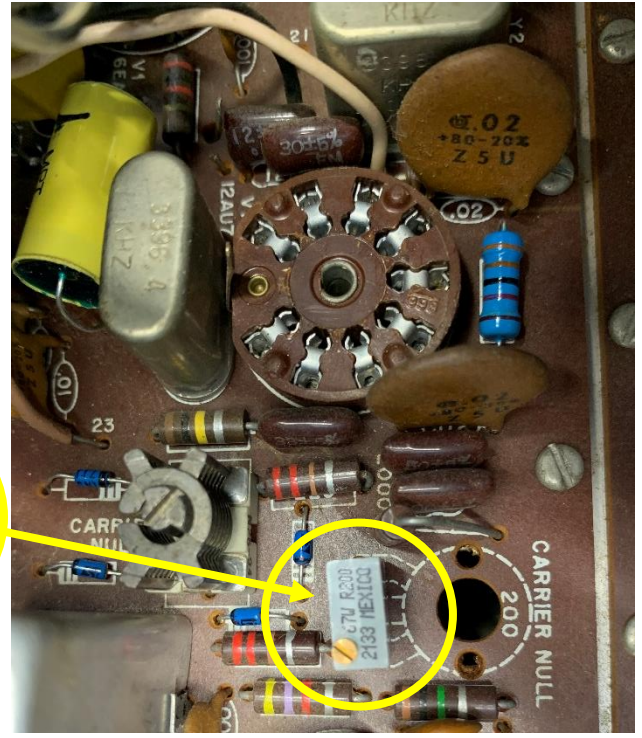
C300 and C301. Replace with 0.022uf (223) 400V Mylar capacitors

For the Carrier Null Potentiometer, if yours is bad, replace with supplied 200 ohm 20 turn potentiometer. It will be easier to solder it on the top side of the board. NOTE: Remove original Carrier Null Potentiometer before installing new 20turn 200 ohm from kit.

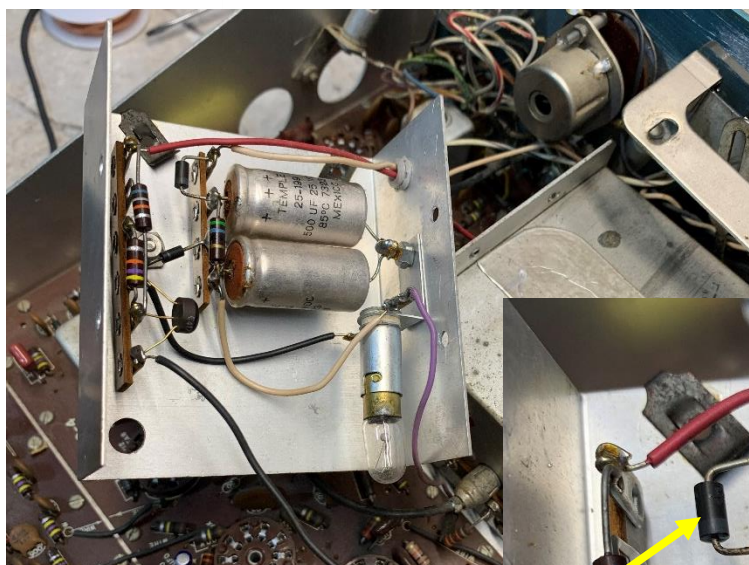
Follow tuning procedures in OEM manual "Transmitter Alignment."



Replace carrier null diodes with the 1n5711 Schottky diodes.

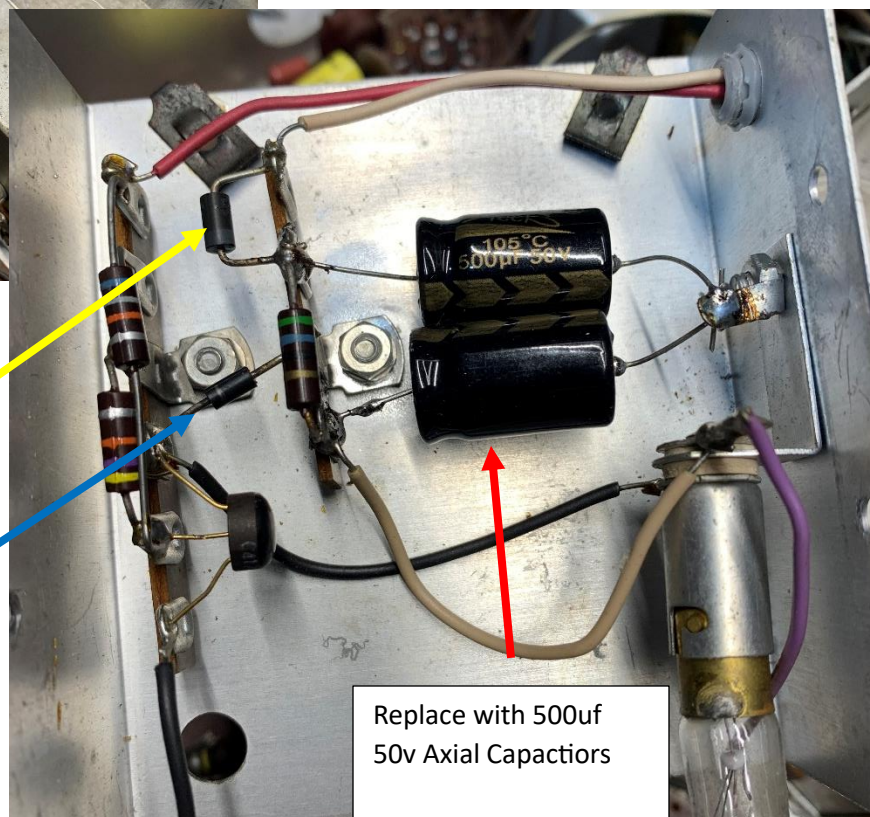


LMO Power Supply



57-27 replace with
IN4005.

10V Zener, replace
with 1N4740A.



Replace with 500uf
50v Axial Capactors

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

Customer pics of final installations are always welcome.

If you find an error in this document, please kindly let me know: support@w8aor.com

Thank you, and good luck!

73's

Scott

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