

# TS440S Repair FAQ

I take no responsibility for any damage you cause to your TS-440S. I assume you have excellent soldering skills and a good DMM. This is just a report on how I fixed my TS-440 with info directly from the Yahoo Group KENWOOD TS-440S. I am not a expert nor a certified Electrician. Just a average Ham like you who likes to learn. I take no credit for the solutions. All credit goes to Bill Leahy "coorsbill" from Denver Colorado who answered all my questions about this radio. Thanks Bill!

Good Luck and I hope this file helps at least one person.

10-29-02 by Mike Freeman KC8QNO

Feel free to email me about this file or its contents.

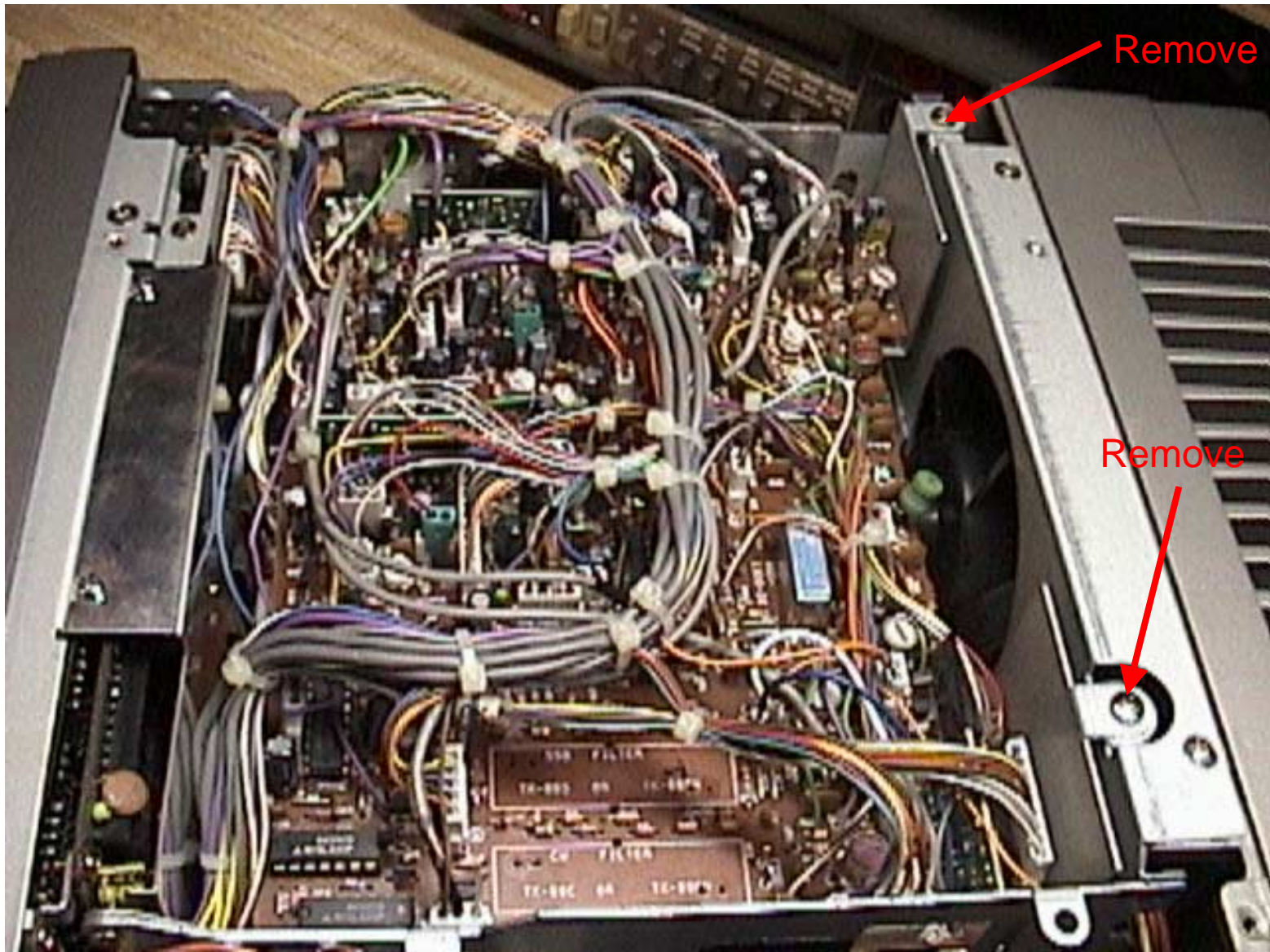
If there are errors, please let me know and I will fix them when I can.

I recently ran into some problems with my Kenwood TS-440S. Here is a list of my problems.

1. Garbled and Distorted RX audio like its “Under Water”
2. Intermittant operation. I would loose all display and all audio. (also the Dots on display problem is very similar)

I also go through the procedure on how to check VCO 1 and VCO 5, how to check to see if your VCO's are locking properly, and to see if your RF board has leaky Diodes in the band select circuit.

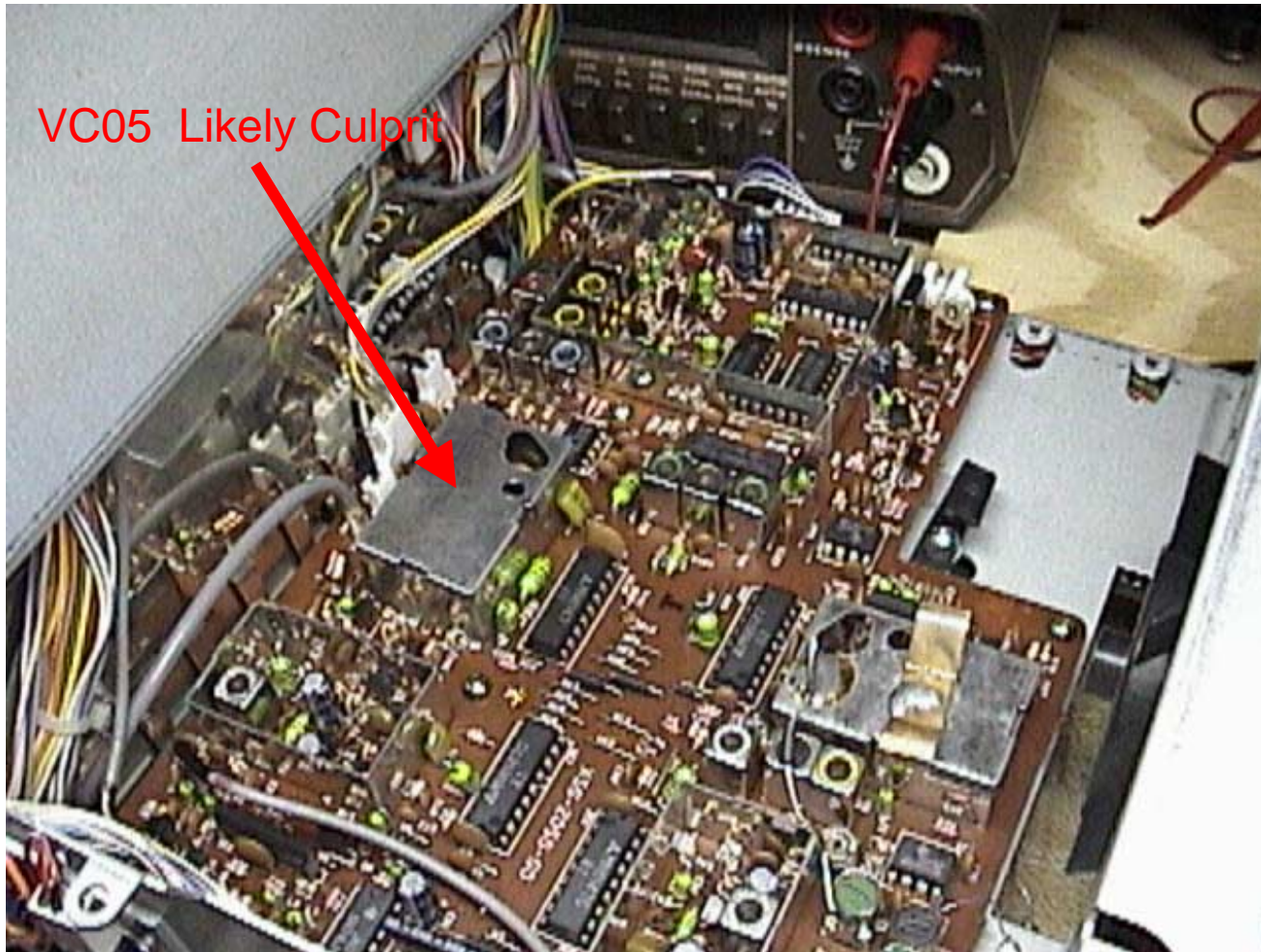
Tools needed: A good DMM (Digital Multi-Meter), Set of Small regular Screwdrivers, small phillips screwdriver, magnifying glass of some sort, Fine tipped 25W solder pin, Solder, tweezers, pick, plenty of light, and a large work table / area.



This is the TS-440S with no top cover. You can see the IF Board. Remove the two screws to expose the PLL board underneath.

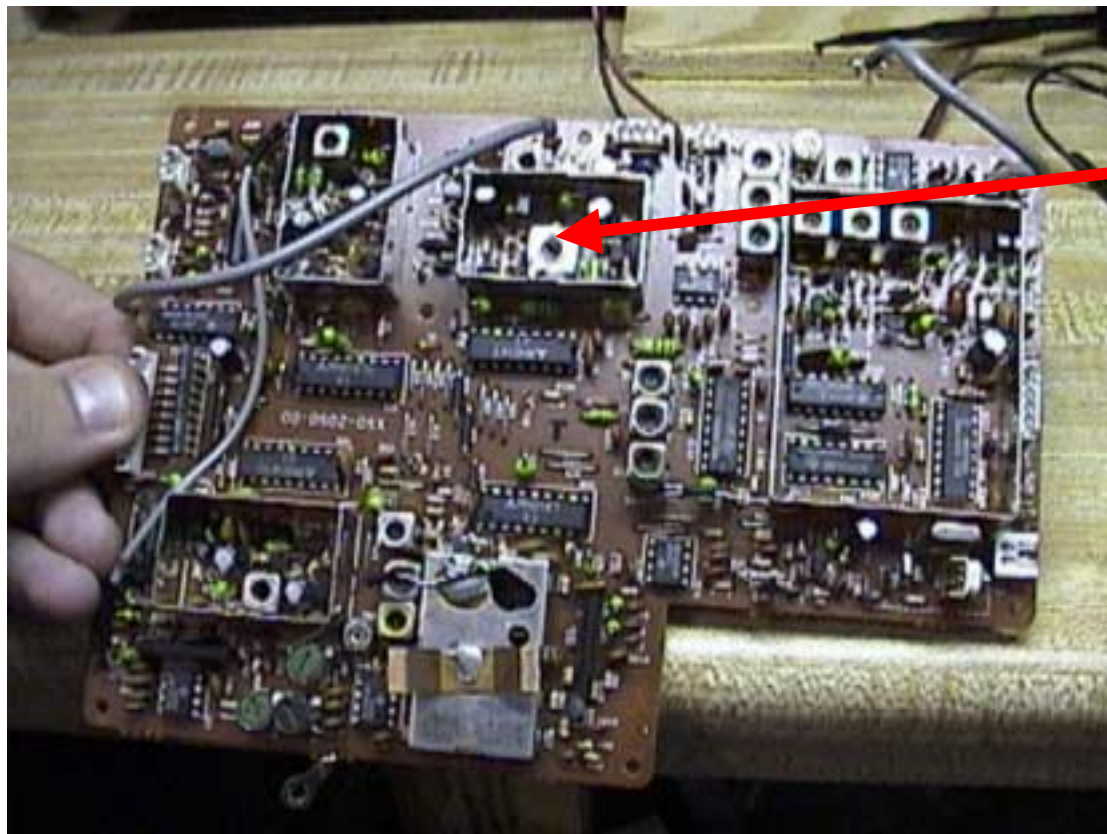


The IF board will swivel up on a hinge exposing the PLL Board. It may be necessary to unplug a few cables on the IF board to get it to lift up.



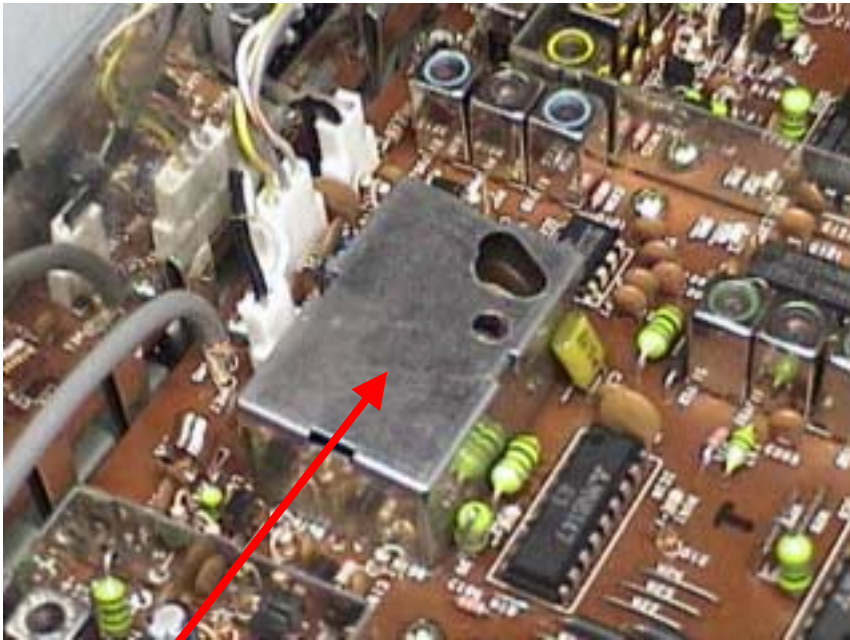
PLL board. Located under the IF board.

VCO5 has a stabilizing compound “glue” to help secure the components during mobile operation. After time this compound can get conductive and cause problems in the RF board and PLL board. If it is brown or shows a few volts when you probe it to ground then its bad.



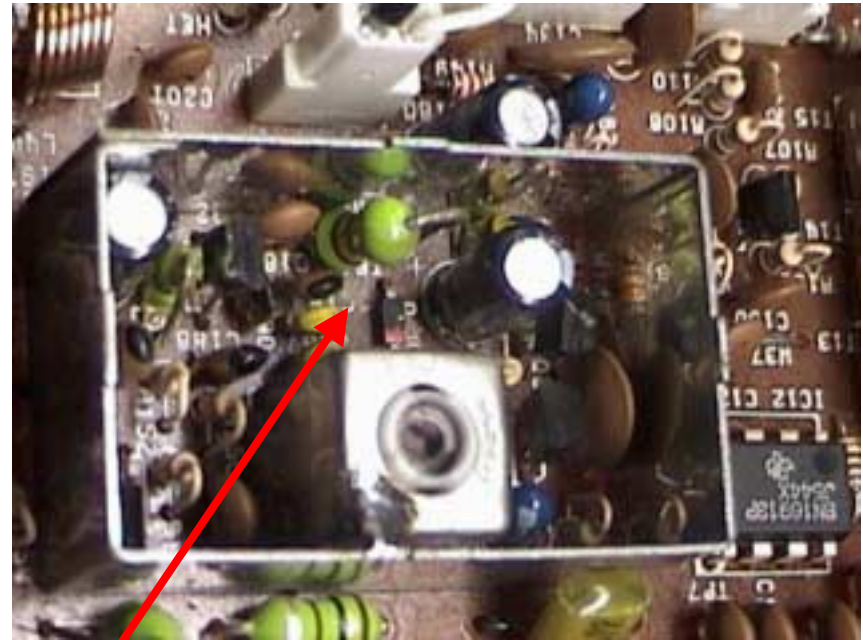
VCO5 (cover removed see next page)

Remove the PLL board from the TS440S. Remove all screws and unplug all cables. Be very careful not to break anything. Also remember where all the cables went. Draw on a piece of paper if it helps you out. I had this board out so many times I memorized everything. (hopefully you do not have to do that like I did!)



VCO5 on PLL board with top still on.

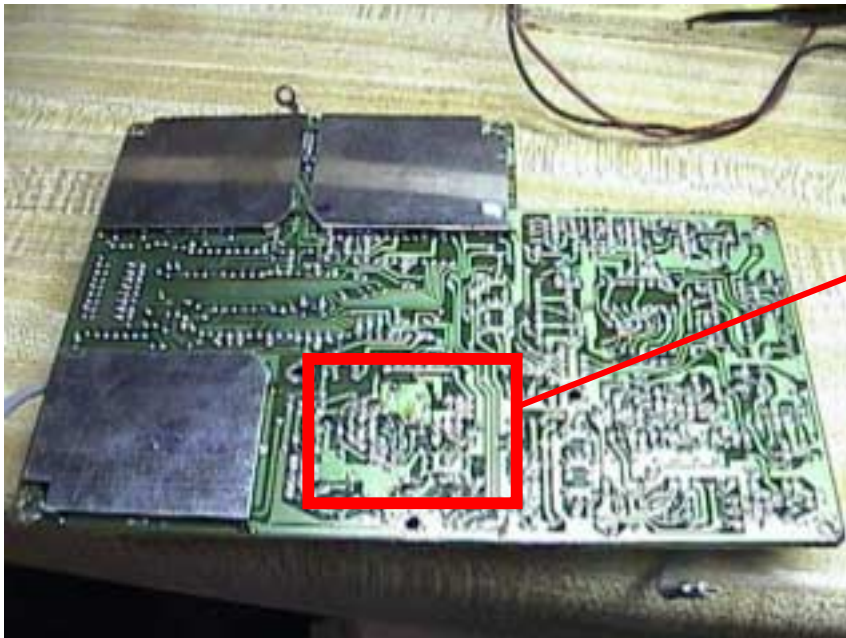
The top easily pops off with a small screwdriver.



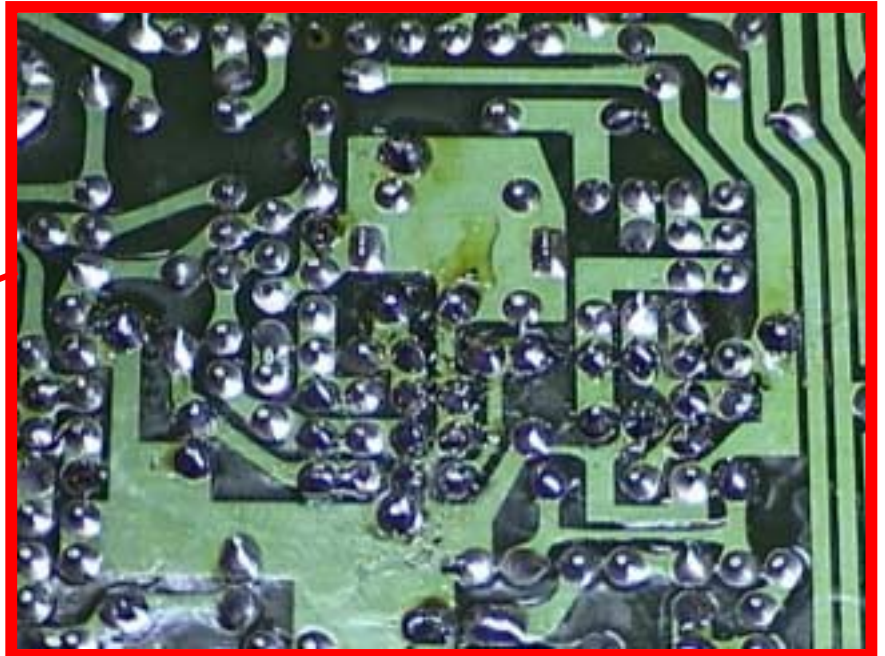
VCO5 on PLL board with top off.

The "glue" is located here. I am showing my VCO5 after I removed all the glue. (I forgot to take a pic of it before). I removed it with a pick and tweezers. I had to remove a few components to get the glue all out from the contacts. Make sure you remove it all. You may have to unsolder the metal shield around the VCO to get all the glue out.

Now, since you got the PLL out. Flip it over and check for cold solder joints. Check the VCO5 Area (see below). Use lots of light and a magnifier of some sort. A bad solder joint will have a slight ring around it, also it may have some whitish-grey oxide on it. To be safe I re-soldered all points in this area. Make sure you do not get sloppy and solder multiple contacts together.



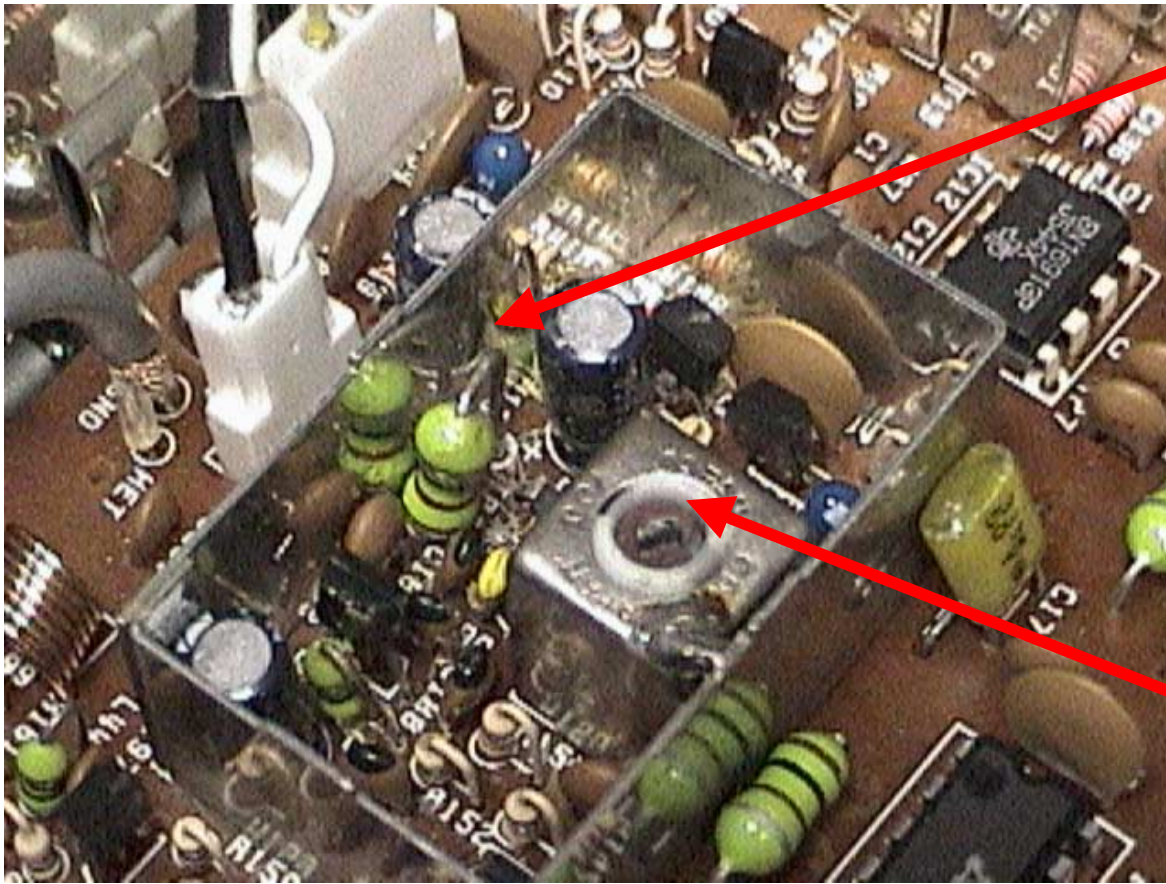
PLL board (solder side)



Close up of PLL (VCO5 Area)

Once you are satisfied, replace the PLL board.



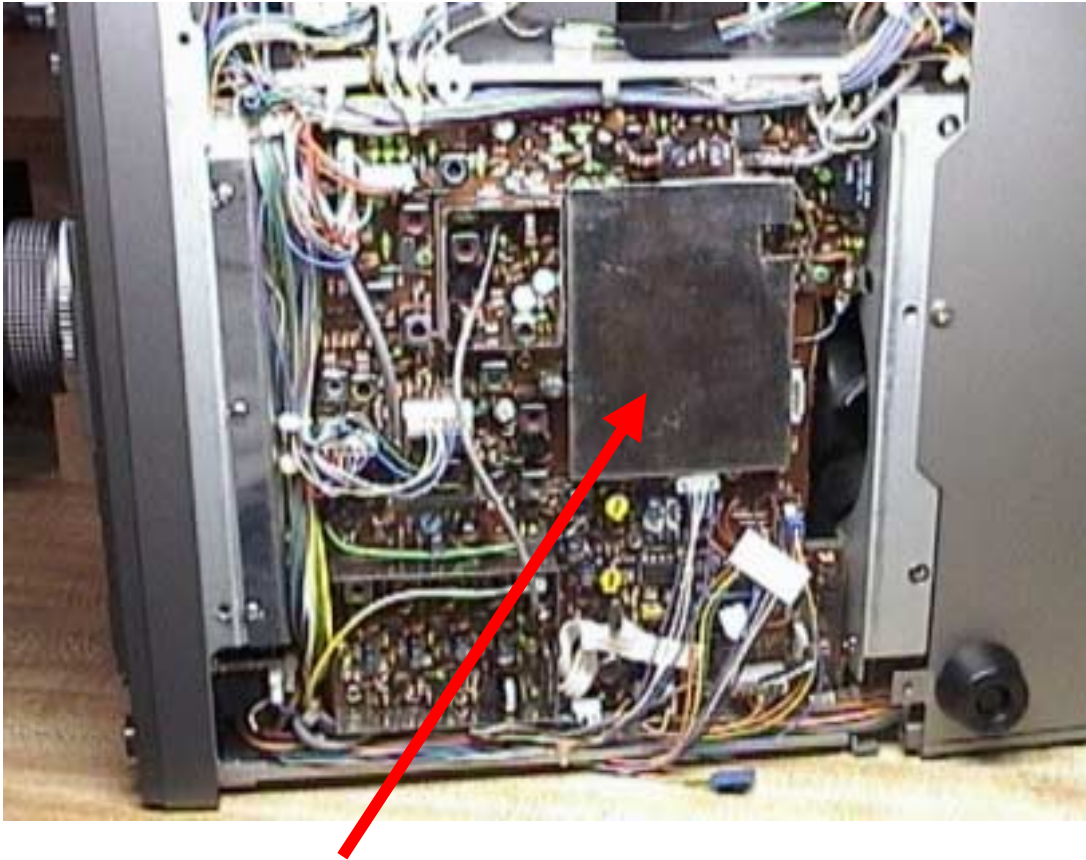


TP11. Exposed end of Inductor. This is where you want to take a voltage reading from. Connect the red lead here, and the black lead to any point on the chassis (ground).

Adjust with a small screw driver until you get a reading of 5.00 Volts from TP11.

VCO5 on PLL board with glue removed.

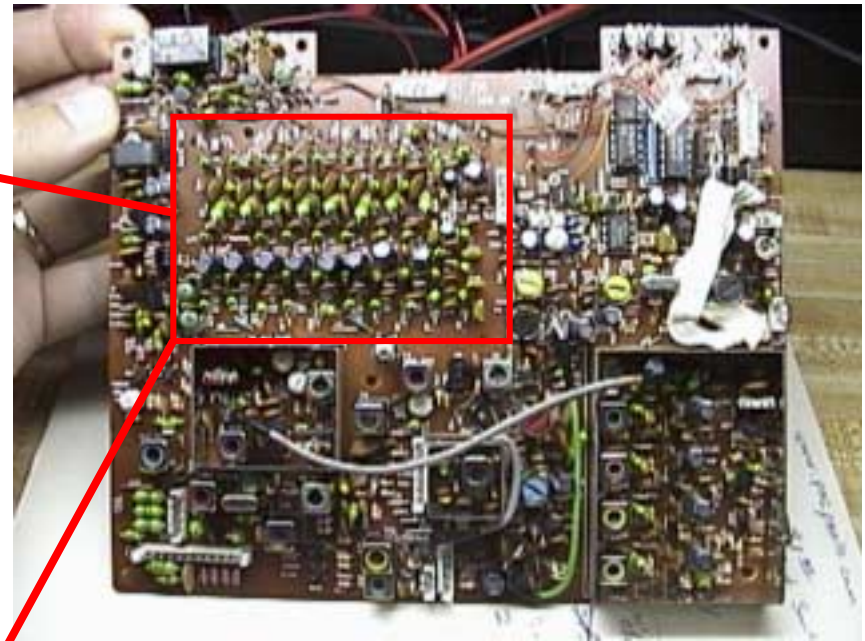
In order to check VCO5, you need to have all your cables plugged in and the PLL board replaced. Turn on the radio for about 30 minutes to warm up, set it for 14.200Mhz USB. You should get 5.00 Volts on a good DMM. If not, adjust (very slightly) the metal can. Replace VCO cover when done.



If you still are having problems, flip the rig over and take the bottom cover off. You now are looking at the RF board.

This is the area on the RF board that contains the Band select circuitry. Carefully remove this metal shield to expose the components.

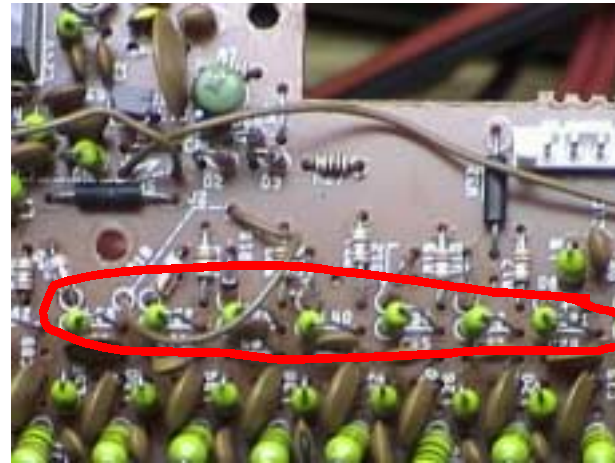
If you are still getting Garbled sound or dots on your display, it may be in this area. (as it was for me). So we are going to check to see if there are any leaky diodes in here. Do not remove the RF board from the TS-440S yet. Leave it in because we are going to check for leaky diodes first. I removed it for reasons explained later on.



RF board removed with shield off of the Band select filters.



RF Board - Close up of band select filters (metal shield removed).



These yellow inductors are your test points.  
Follow directions below.

The most common symptom is the PLL unlock. Reset the transceiver by holding in the A=B button as power is turned on. Even if the display only shows decimals, only the (band pass filter) BPF for 14 MHz should be turned on. Using a DC voltmeter, measure the voltage at coils L11, L15, L21, L28, L34, L40, L46, L52, L58, and L62. Only coil L52 should measure 8 Vdc. The other coils should read 0 Vdc. If one reads 0.5 - 8 Vdc, replace the two diodes in that BPF circuit.

Coil/Diode/frequency range relationship:

L11 D4 D5 **0 - 0.5 MHz**

L15 D6 D7 **0.5 - 1.6 MHz**

L21 D8 D9 **1.6 - 2.5 MHz**

L28 D10 D11 **2.5 - 4 MHz**

L34 D12 D13 **4 - 6 MHz**

L40 D14 D15 **6 - 7.5 MHz**

L46 D16 D17 **7.5 - 10.5 MHz**

L52 D18 D19 **10.5 - 14.5 MHz**

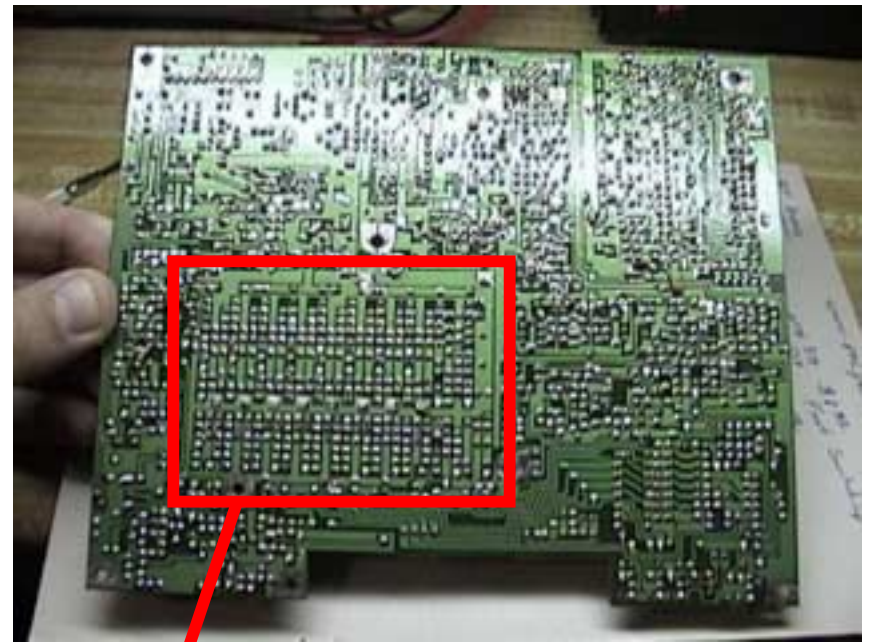
L58 D20 D21 **14.5 - 22 MHz** L62 D22 D23 **22 - 30 MHz**

Replace diodes with 1S2588 ,1SS91S or 1S1587 (I used these)



RF board removed (solder side) with shield.

If you find a bad diode remove the RF board carefully (like you did with the PLL board). Notice the metal shield? Well you guessed it, you must carefully remove it by unsoldering it from the RF board.



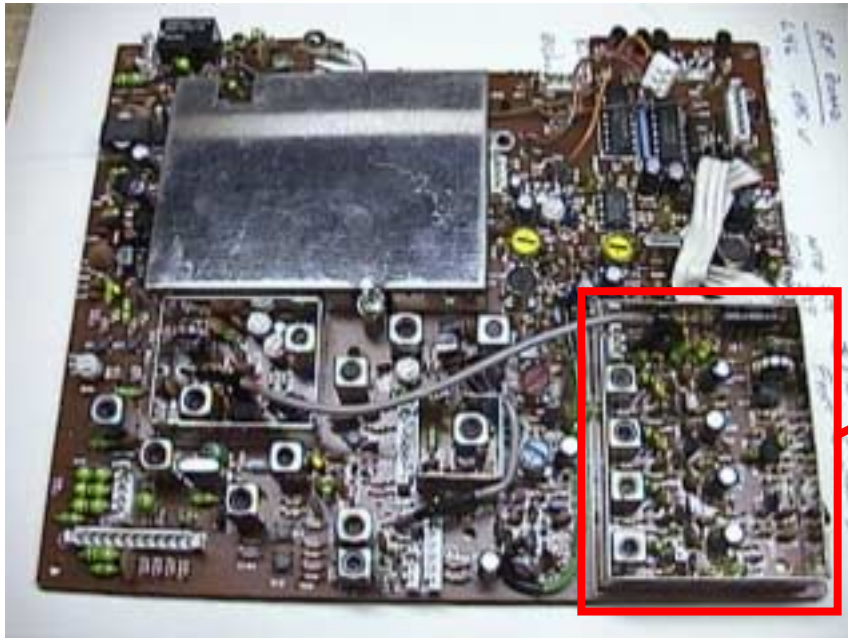
RF board removed (solder side) no shield.

After the shield is removed, replace your diodes. Also, very important. Check for bad solder joints here. I found several and repair as necessary in the entire area. This is a very likely area if you have dots on your display only on one frequency. Its because of broken solder joints.

Again, do not get sloppy with the solder in here! Very Bad!

Once you are done, put the RF board back into the TS-440. Make sure you check all cables. Plug everything in, leave the top and bottom covers off for now. Turn the rig on. Does it work? Is it fixed? Hopefully so, but if not, go back and check for more broken solder joints. Particularly in the VCO5 area and the BPF area on the RF board. Go back and make sure you removed all the “glue” from VCO5. I had to completely re-solder both the RF boards and the PLL boards to make mine work. This was an extreme case and I had lots of time today. Do not continue on until you get the display working.

If you got your frequency display, continue on. Even if your rig works well, you may want to continue anyway.



RF board.

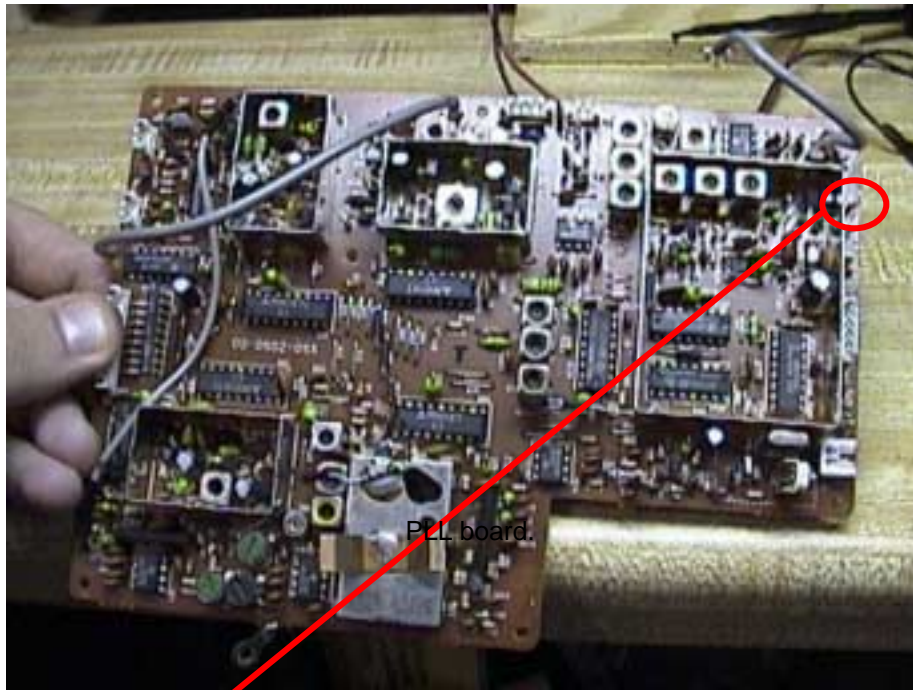
Remember the RF board (bottom of the Rig? Don't remove yours, leave it in. But look at it. See the 4 cans to the right?



VCO cans.

We are now interested in this area. These are the cans that adjust your VCO1's (I believe the adjust the PLL locking for VCO1). From left to right they are:

T24, T23, T22, T21



**R138**

**With the Rig on:**

**Measure at R138, TP10 on the PLL unit, with DC VOM**

**29.9999 Mhz, adj T21 for 2.5 volts on TP10**

**21.9999 Mhz, adj T22 for 2.5 volts on TP10**

**14.4999 Mhz (this is where the svc manual was in error, it says 14.9999), adj T23 for 2.5 volts**

**7.4999 Mhz, adj T24 for 2.5v**

**Check at 22.0000, 14.5000, 7.5000 and 30.0 kHz, for TP10 to read around 5.3-5.5 volts, not critical as long as it isn't above 6.2 volts.**

Also, remember the PLL board? Again, leave yours in. Do not remove it. You want to find R138. Your voltage test point is the exposed lead of this resistor. You should be able to see it with the IF board secured down. Just place your rig on its side and look for this resistor on the edge.



That's it. These procedures restored my TS-440S to working condition except I still have dots on 12m. When I figure this out I will gladly post the solution in this file.