

## **A Practical and Simple Keypad Bounce Filter for the Kenwood R-5000**

This modification was reported in the Kenwood R-5000 Yahoo! Group by Ron Hankins (KK4PK). This documents my implementation of Ron's solution to this annoying and long lived problem with this otherwise good communications receiver.

Mike VE3JBT

Over the years many people had attempted to solve the bounce problem by taking the keypad apart and cleaning the contacts (a risky business) . I decided long ago to live with the problem rather than try to disassemble the keypad and rejuvenate it. It seemed to me that cleaning only mitigated the basic problem and did not provide a permanent solution. Ron's fix sounded easy to do, with very low risk of damage, and promised to be a permanent solution.

I have two R-5000's one with keypad bounce and one without . I decided to apply the mod to the radio with the bounce problem.

I was delighted with the result, it completely solved the problem, and the radio was now a pleasure to use. I was so pleased I decided to apply Ron's mod to my other R-5000 and document the process for others who might need step by step instructions.

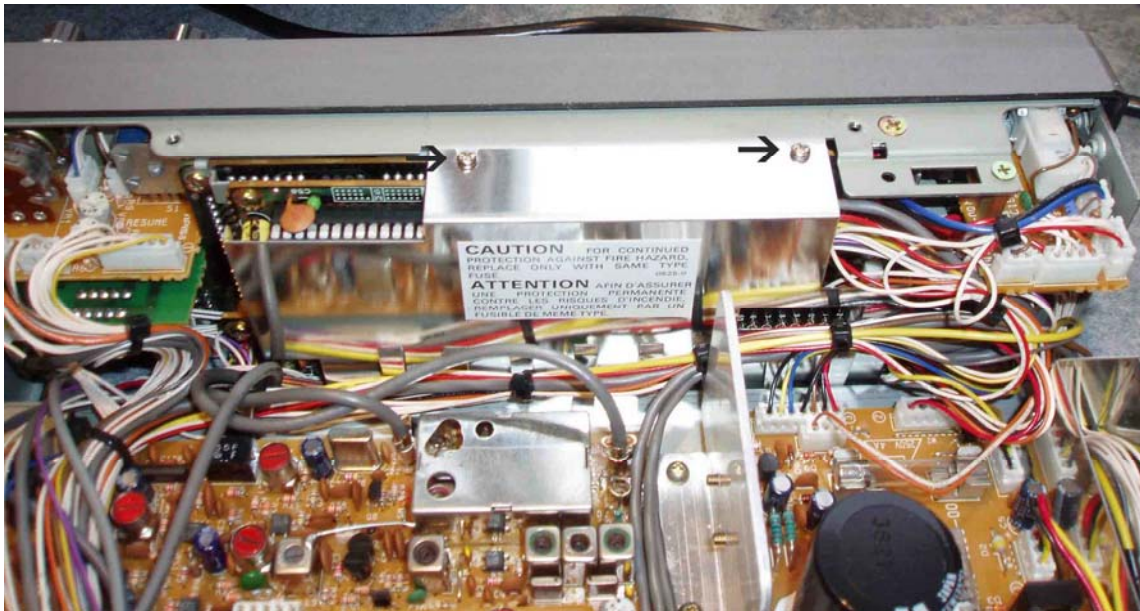
Ron's post in Yahoo! Groups indicated that you should place a .01 ufd cap between pins 2 and 7, and pins 3 and 7, on IC 53. The following describes an easy way to do that.

If you examine the R-5000 Service manual, you see that the anodes of diodes D65 and D66 connect to pins 2 and 3 on IC 53. Pin 7 of IC 53 simply goes to circuit ground.

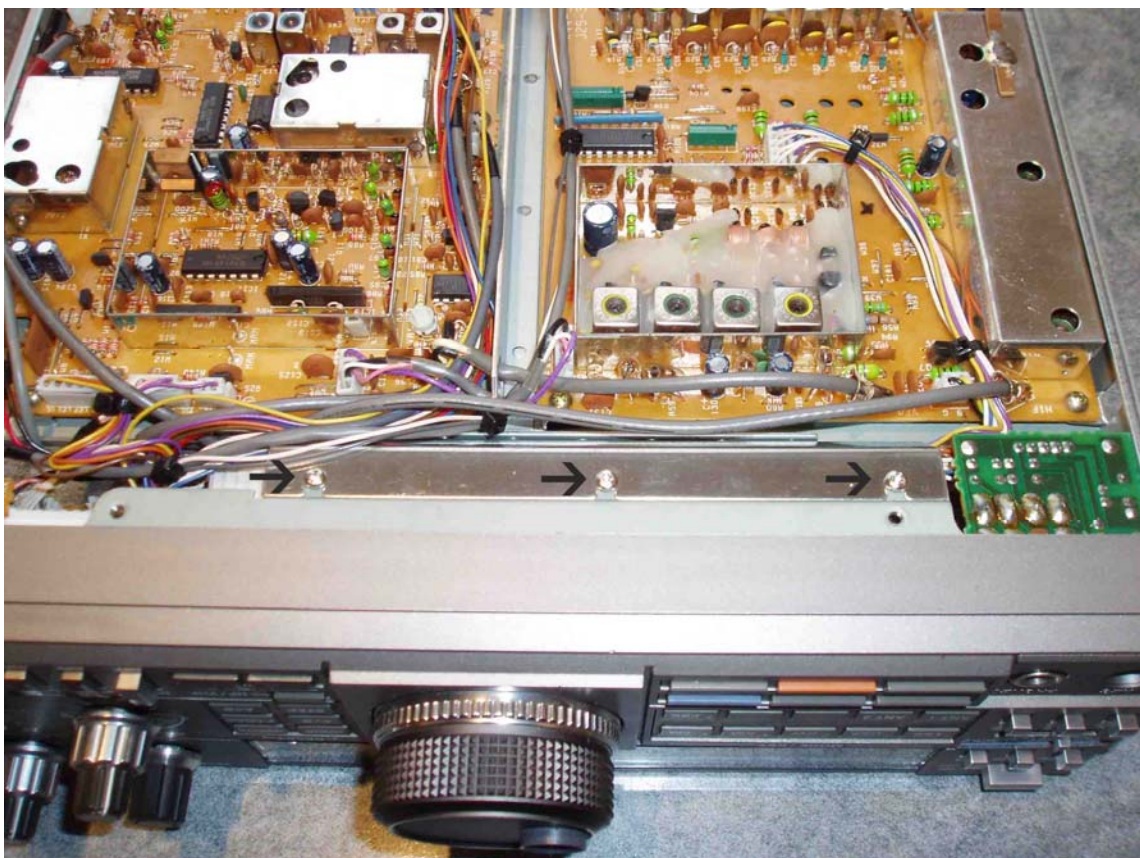
My implementation attaches the caps to D65 and D66.

### **Step 1: Open up the receiver**

Remove the top and bottom covers and set them aside after disconnecting the speaker wire, Loosen but do not remove the small screws indicated by the arrows as shown in the two pictures below.



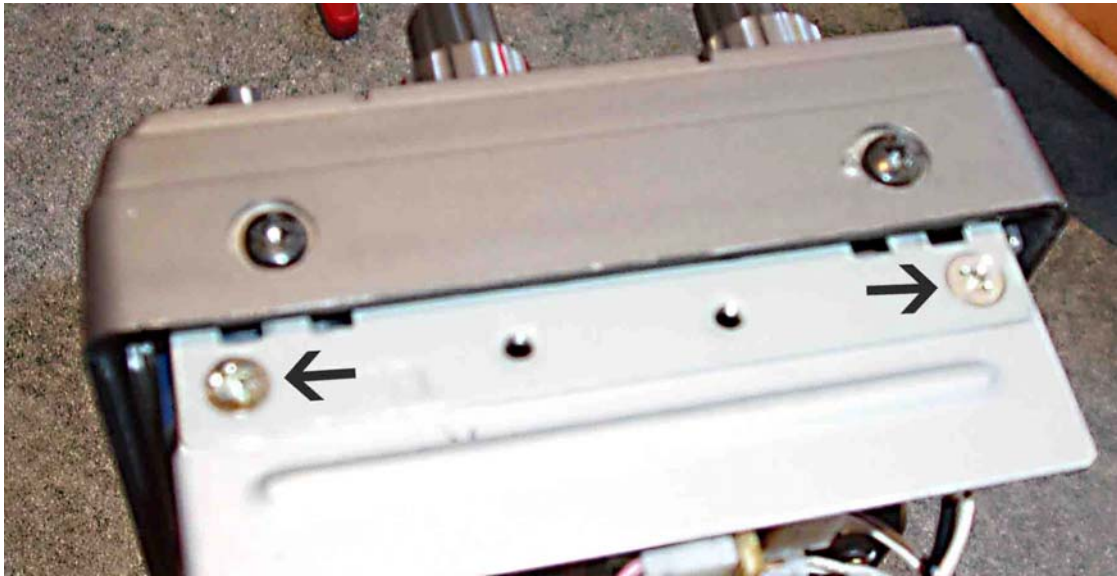
Top view



Bottom view

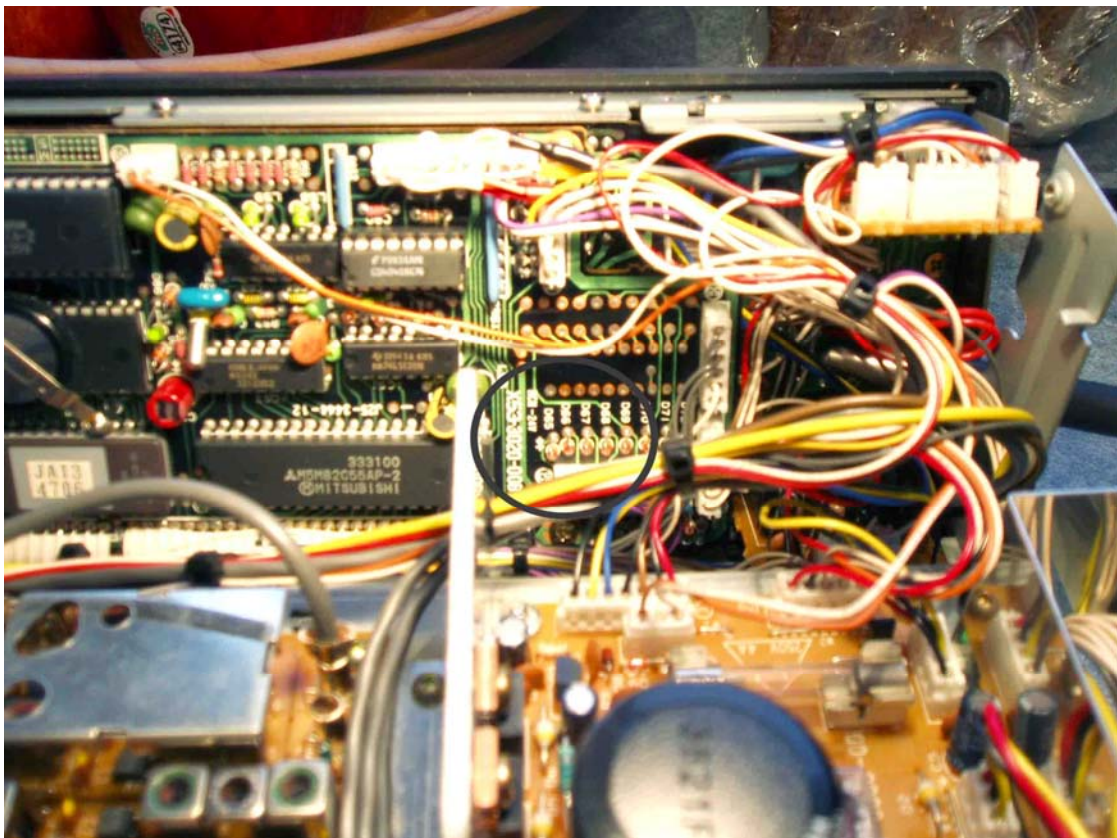
Remove the two countersunk screws holding the front panel in place as shown below.

Remove the screws from both sides and gently separate the front panel from the chassis. The shield can now be removed by sliding it towards the back and carefully removing it.



**Front panel attachment screws**

With the shield removed, you should be able to locate the circled area shown in the image below.



**The area where the caps will be attached**

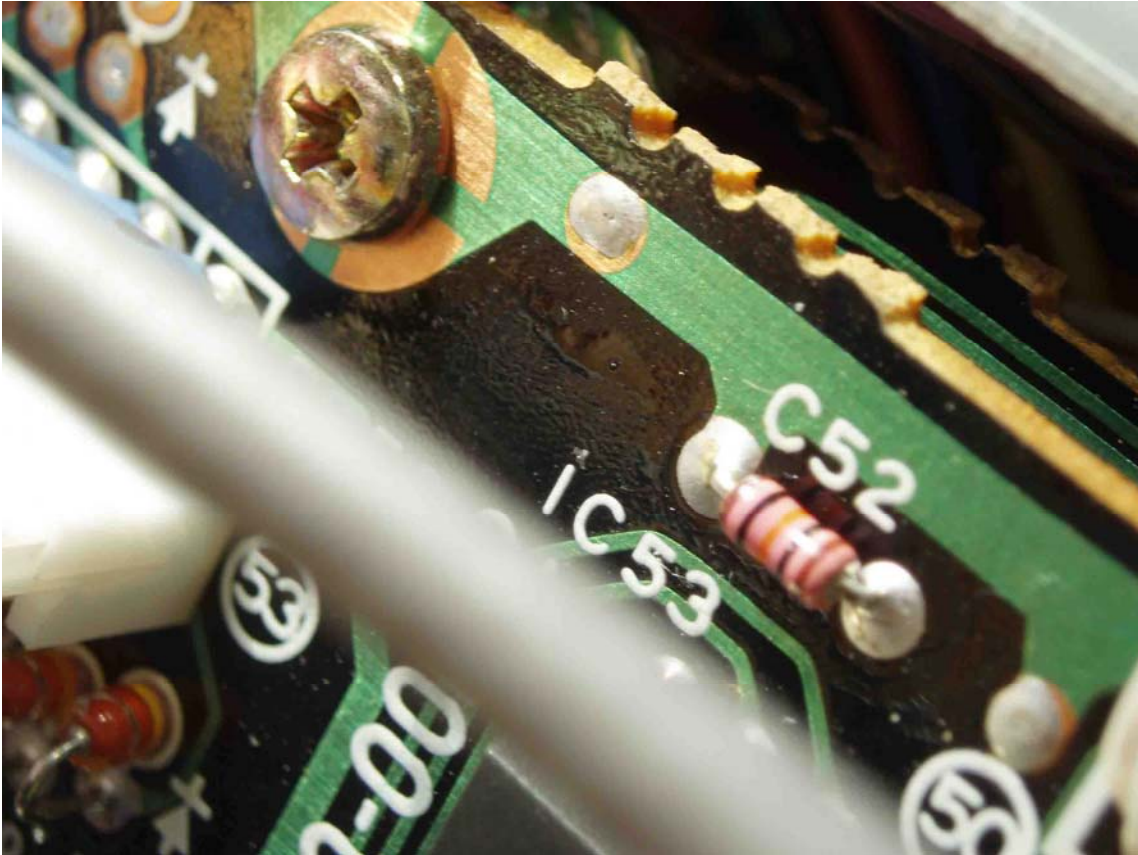
## Step 2 Install the caps

Preassemble two .01 ufd disc ceramic caps as shown in the picture below.



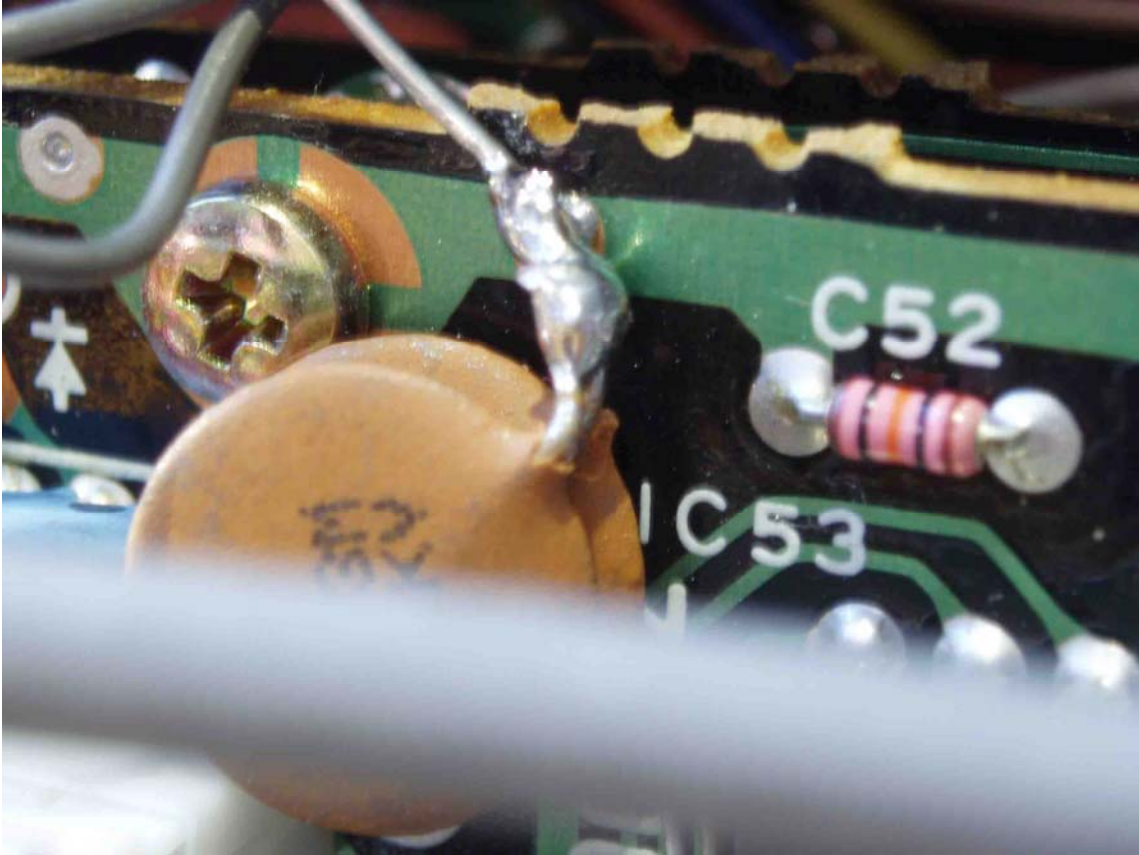
### Capacitor assembly

My caps happened to be 1Kv types and were 10mm (3/8") in diameter.  
Now turn the radio so the bottom side is up and locate the solder pad located between the pc board mounting screw and C52 as shown in the picture below



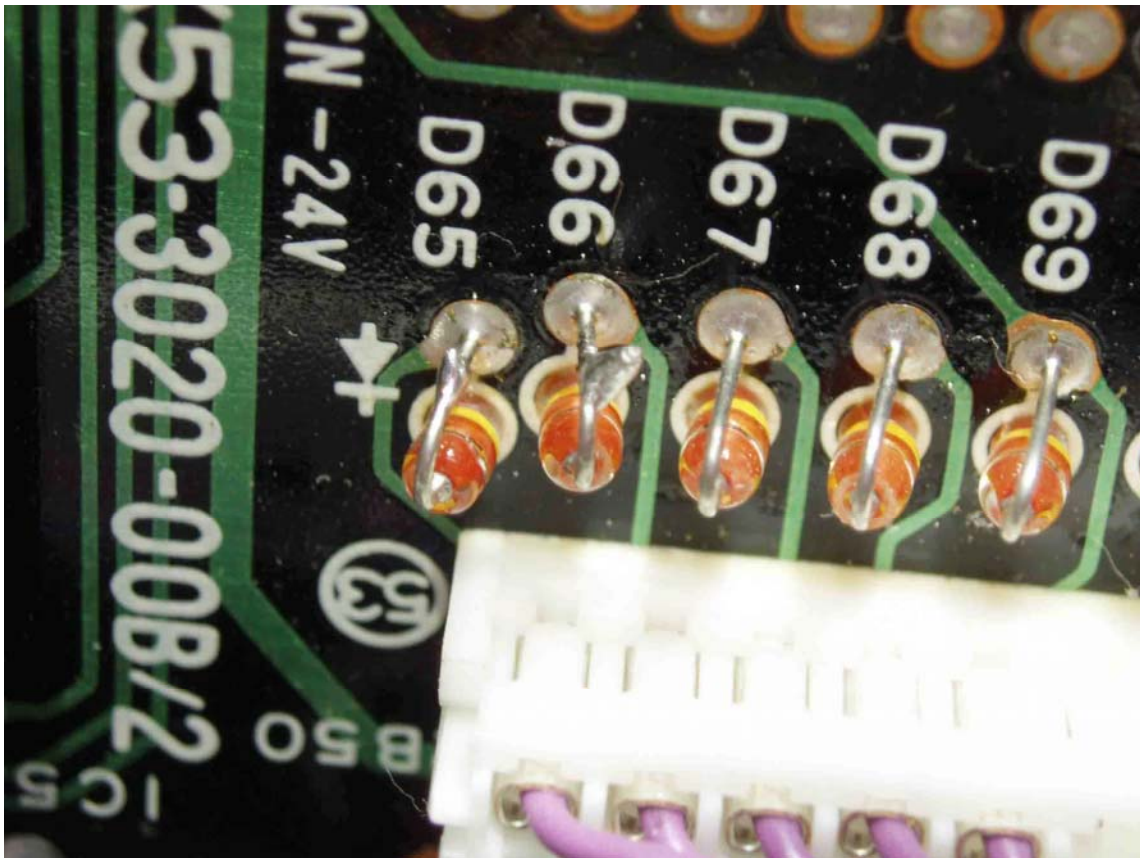
**Ground solder pad**

Using a small pencil soldering iron, tack a small blob of solder to this pad and attach the cap assembly as show below. Cut the wire tail off after you have made a good solder connection.



**Capacitor assembly ground side attachment**

Now turn the radio right side up. and locate the anodes for diodes D65 and D66.  
Using a low wattage pencil iron, Tin the wire loops on these two diodes as shown below.



#### **D65 and D66 Anode connections**

The final step is to solder the two remaining capacitor leads to the diodes. Carefully dress the capacitor leads so that they do not touch anything other than D65 and D66 anode leads.

Pre-tin the capacitor leads and tack them into place as shown below



**D65 and D66 Attached to the caps**

**Addendum** March 5 2009

### **De-bouncing other switch groups**

If your radio exhibits key bounce on other switches, you can add extra capacitors to three other diodes in similar manner to the procedure described above.

Add a cap to **D67** for **M/V, M to V, Scan, M-IN, CLR, and ENT** (bottom left button group)

Add a cap to **D68** for **Hour, A/B, Step, H/V and Down** (Right hand button group)

Add a cap to **D69** for **Minute, Lock, A=B, and Up** (Right hand button group)

### **Step 3 Reassembly**

After checking your work, reinstall the metal shield onto the front panel; be careful to tuck in any wiring that has to go behind it. Do not tighten the small screws that hold the shield, you do this a little later. Just let the shield sit loose for a minute. Move the front panel back towards the chassis and reinstall the four countersunk screws that secure it to the chassis. Now check that no wiring is being pinched by the shield, and slide the shield slots under the five small screws. Tighten the screws so the shield is held firmly in place.

Several grey coax cables connect the front panel to the chassis mounted boards. Make sure that none of these have pulled loose.

Replace the top and bottom covers and reconnect the speaker wires and you have finished the job.



One thing I did notice was that I did get a switch bounce one time after the mod. I vigorously worked the switches for a few minutes and the problem cleared up.

It is possible that this filter will let a bounce through occasionally depending upon how bad the switch is. Switch 1 is the worst on my radio. I have found that the problem seems to return after the radio has been turned off for a day or so. A few repeated button pushes seems to clear the problem every time though, and for the rest of the session the switches function properly.

It may not be a perfect solution, but for me it's a 99.9% solution, and much easier and safer than switch disassembly.

Do not be tempted to use caps larger than .01 uF ( 10 nF). Larger caps will cause strange problems.

My thanks to Ron Hankins for solving this problem once and for all.

Mike Parry VE3JBT  
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