Rebuilding the bandswitch on a Kenwood Hybrid radio – TS-530S and TS-830S

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First of all, I am not an electronics expert by any means. I enjoy working on these older Kenwood radios as a hobby. Since I first started, I have gathered a fairly decent group of test equipment. What I present here is what I have learned from repairing and restoring in excess of 50 of these radios. If you notice any glaring errors in this presentation, please let me know.

Overview

Many of the ills with these radios can be attributed to a very dirty and poorly operating bandswitch. Many cases of poor drive and even no drive can be corrected by properly cleaning this switch assembly. Removing the board will give you access to the soldered switch wafers and other components on the board. Board removal can appear as a daunting task, but in reality, it is not that difficult.

You should have a good idea as to the symptoms occurring in your radio before removing the RF board.
- Necessary to "rock" the bandswitch knob to get bands to "lock in". Bandswitch needs cleaning.
- Unable to properly adjust L41, the 160 meter antenna coil. Very poor reception of on-air signals as well as the calibrator signal.
- Unable to get any drive on 15 and 18 meter bands when other bands are good. Can be a bad RFC L36.
- Other coil issues such as broken cores, bottomed out cores, etc.

I have only attempted this procedure using a Hakko 808 de-soldering tool. I have not tried to remove the solder with wicking. You are on your own with this method.

Removal of the RF board is not a difficult task. The main thing to keep in mind is the alignment of the bandswitch sections on the RF board and the final amplifier tank circuit switch located in the final compartment. These must remain in sync else you will have larger problems when the radio is reassembled.

Warning: You need to make sure the High Voltage has been discharged completely prior to working around this board and its associated components. If you are not sure how to accomplish this, get some help before proceding.

RF Board Removal

Begin the board removal by removing the final amplifier cage top cover. Remove the front final amplifier tube (6146B) in order to gain access to the shaft coupling located inside the final cage. Place the bandswitch in the 160 meter position and loosen the front Allen screw (1.5mm). Rotate the bandswitch to the 30 meter position and loosen the second coupling screw. You can now remove the bandswitch knob and shaft through the front of the radio. Watch where the three shaft grounding springs are located as you remove the shaft. There are three of them – one on the front panel, one about midway along the shaft, and one on the front of the final cage. These will need to be replaced when reassembling. Now is a good time to inspect the shaft coupling for any cracks. They generally crack through the set screw holes. If yours is cracked, replace it with a brass coupling available from Ken Kemski, K4EAA. I usually replace this coupler as a matter of course whether it is cracked or not.

Carefully remove all of the Molex connectors attached to the board. Also, there is one coaxial cable with a press-in connector that must be removed. Be gentle in removing these connectors and watch for any movement of the Molex connectors in the board indicating a poorly soldered connector. You may want to mark each connector as you remove it so that they can be put back in the proper locations. Some are obvious and some are not. Remove the 12BY7A driver tube and shield.

Loosen the four set screws on the DRIVE control shaft coupler located near the front of the radio. You can then slide the coupler forward enough so that it is off of the board shaft.

Remove all of the board mounting screws. On the TS-530S, there are two wires that will need to be unsoldered. The TS-830S has three wires. One of these wires is located underneath the board edge just in front of the final amplifier compartment. By lifting the board some, you will see the blue wire attached to the DRV terminal. You should now be able to slide the board out of the radio.

Bandswitch Disassembly

Before beginning the switch disassembly, carefully inspect the solder joints at the base of the 12BY7A driver tube socket for cracks. These are notorious for cracking through the solder connections. If there are any cracks, I remove the old solder using the Hakko 808. I then thoroughly clean the connections using 190 proof Everclear available at your local liquor store. Do not drink this stuff or you will never get your switch back together correctly. I then replace the solder with new making sure to fill the complete joint. Other places to inspect are the joints where the ganged variable capacitors (drive tuning) are mounted to the board. Similar cracks can occur in these areas. Use the same procedure as with the socket. Remove the old solder, clean the area, and replace the solder.

You can also visually inspect the board components for any discoloration, cracking, etc. Also, inspect all of the solder connections to each of the Molex connectors. By plugging a plug back on the connector body (this insures any loose pin is seated down) and then, under light and magnification, wiggle the plug and connector body back and forth gently you can check for a circumferential crack all around the solder filet or cone and sometimes see the pin floating around. The old solder needs to be removed and clean the oxide off the pin and re-solder.
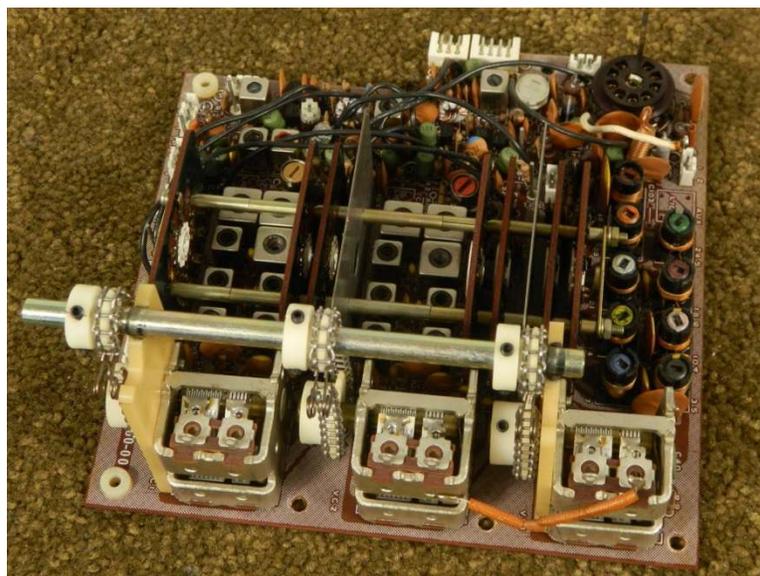
This is the RF board assembly as removed from the radio. It has only been cleaned by the use of compressed air to remove the loose dirt and dust.

Actual disassembly of the switch begins by removing the long through screws that go all the way through all seven wafers. I use a folded piece of paper to keep the switch spacers and other components in order. I use a pair of long tweezers to grab the spacers as the through screws are withdrawn.
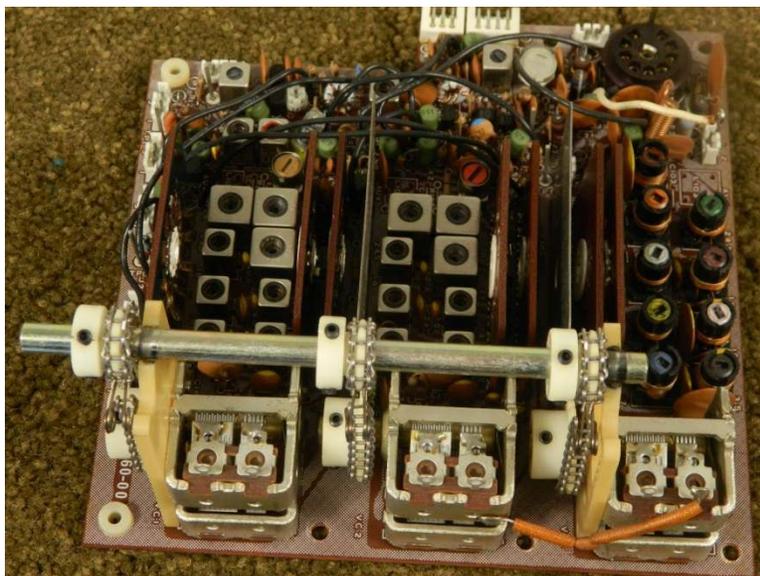
This is the same switch with the through screws and spacers removed. They are kept in order so that they may be replaced correctly.

These are the through screws and spacers as removed from the switch assembly.

This is the Hakko 808 de-soldering tool. I have owned this one for over ten years and could not function without it. Many will think it is expensive, but it is well worth the money if you do much work on PC boards.


Using the Hakko 808, it is a simple matter to remove the solder around each wafer pin completely. When you have removed the solder from each pin, the wafer will fall out of the board.

You will find some of the pins have been bent down toward the board before being soldered at the factory. I use the Hakko 808 to remove as much solder from these pins as possible. Then, using the soldering iron, I heat the joint and move the wafer back and forth while the solder is cooling to prevent it from adhering to the pin. I have had good success and have lifted only a couple of traces. There is no need to re-bend these pins during the reassembly process. I wish there was a better way to do this job, but I have not found one. Kenwood did us no favors when they decided to bend these pins over.
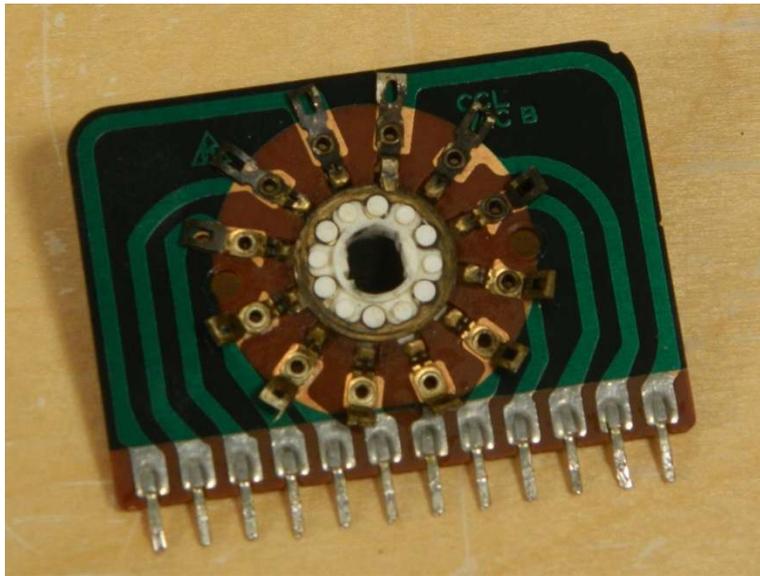
This is the first bandswitch wafer as removed from the RF board. You can see the buildup on the switch contacts and rotary contacts. This is not the worst I have seen by any means.
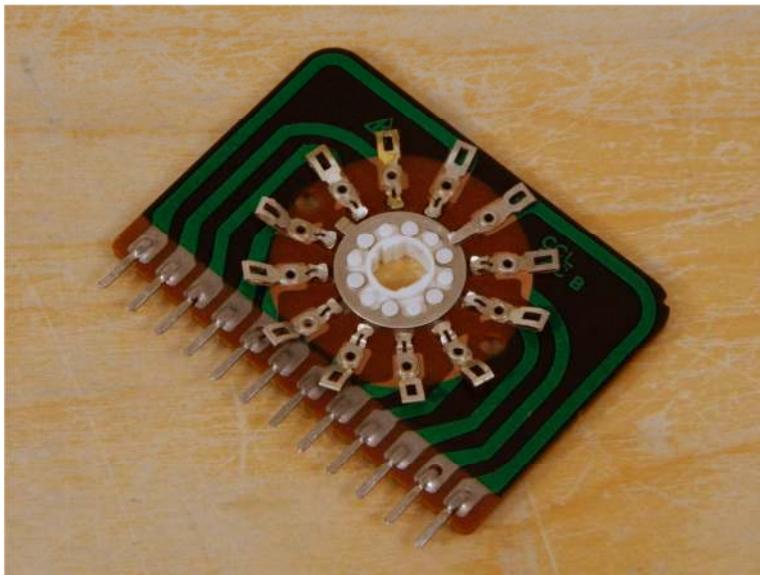
This is the same wafer after polishing to remove the tarnish on the contacts. I am now using a product made for polishing silver. It is called Wright's Silver Cream and works quite well. I use a discarded *soft* toothbrush to accomplish the cleaning/polishing and then rinse with tap water. The final rinse of the wafer is done with distilled water. The wafer is then carefully dried and blown out with canned air.

Each contact is checked for high resistance after cleaning. I am using here the Blue ESR meter which will measure quite low resistances. The reading here is .1 ohm. As you get closer to the other probe, the resistances will decrease as it is reading the resistance of the traces on the board. I also check physically for any looseness of the contact on the board. These contacts are originally held in place with rivets and they sometimes loosen.

One of the contacts on this board showed a rather high resistance and the contact was found to be loose against the board. A simple way to repair this situation is to solder the contact to the board. There is usually enough of the board trace material showing to allow for soldering. I scrape the material clean with a Xacto knife prior to soldering. I then use solder that is .015 inch in diameter making it easier to control the amount of solder used and to keep heat to a minimum. I have not tried the silver solder pens for this repair.

The other six wafers will be treated in the same manner. I remove one wafer at a time so as not to mix them up. I feel I could do this very easily.

Before installing the newly cleaned switch wafer into the board, I coat the switch contacts with DeoxIT and rotate the switch contacts thoroughly. Then, dry with canned air.
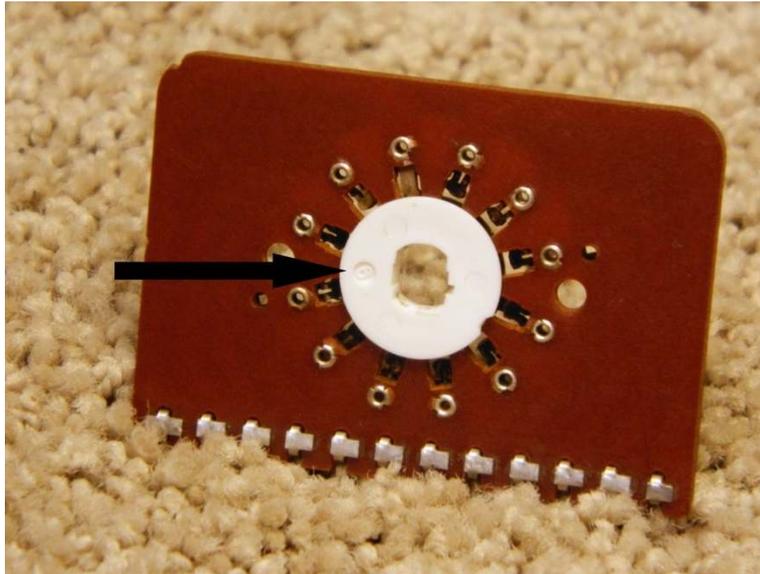
The rotary section of the switch must be properly aligned prior to installation so that each section will align properly with the switch shaft during reassembly. On the backside of the wafer are some marks that will be used for alignment. VERY IMPORTANT! Rotate the white collar of the switch so that the small recessed dot is at the nine o'clock position. When reassembling the switch, these will represent the 30 meter position on the bandswitch dial.

Reassembly is simply a reversal of the disassembly procedure. When inserting the bandswitch shaft, point the knob to the 30 meter position and gently push it through the aligned wafers. Tighten the set screw in the 30 meter position, then rotate the switch to the 160 meter position and tighten that set screw.

I have found that even though I had performed a coil pack and driver coil alignment prior to rebuilding the switch, it was necessary to again do the alignment. You will be amazed at how well the coils come into alignment after this switch job.

That should do it.