Badrestorer's Illustrated Guide to Restoring the Zenith Trans-Oceanic H500

Written and Photographed by
John Kopp

Edited by
Ed Morris

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The Antique Radio Forum, founded and maintained by Alan Voorhees, is the go-to online source for giving and receiving help on the collecting and restoration of antique radios, televisions, phonographs, and vintage high-fidelity audio equipment.

Forum members, who range from newbies looking to restore their first radio, to experts in every field of electronics, are friendly and helpful. Some members, not necessarily those most expert in electronics, stand out because of their willingness to take the time to present detailed, well-illustrated threads of their projects. Their willingness to share their knowledge gained and experiences, good or bad, is the strength of the Antique Radio Forum.

Chief among these is John Kopp, of Conway, Arkansas, or as he is affectionately known on the forum, "Badrestorer." His threads have become legendary, and in August of 2009, John began sharing with us his step-by-step efforts at restoring a Zenith Trans-Oceanic H500, a radio he had never worked on before. Encompassing 27 forum pages on, including almost 400 photographs, his *tour-de-force* presentation on ARF is probably one of the most viewed threads on the forum, with over 58,000 views as of this writing, and increasing every day.

More recently, John has been video recording his restorations and posting them on You Tube. You can find him on You Tube as Joernone. You can find his channel here: ***www.youtube.com/user/joernone***.

My motivation in producing this archive is to preserve John's exceptional work as recorded in his amazing thread, ***"Transoceanic H500 restoration…step by step…,"*** as well as make it readily available in simplified form.

In editing John's thread for this archive, I avoided changing his words or the order in which he proceeded in his restoration, except where necessary for clarity or re-locate certain sections to the relevant chapters of this archive. Editing consisted primarily of (regretfully) removing the posts of fellow ARF members who were eagerly following the thread, offering advice, support, parts, and encouragement. Secondly, it was necessary to crop most of John's superb photographs to fit them all in a reasonable number of pages.

I would like to express my appreciation to John for creating his thread (I used it to restore my own H500), his generosity in sharing it with us, and for entertaining us throughout the process with his wit and humor.

Ed Morris, September, 2012

INTRODUCTON

This article documents the restoration of a 1951 Zenith Trans-Oceanic portable shortwave radio, Model H500, but collectors will find it very applicable to most of the later tube Trans-Oceanics. In 1942, Zenith introduced a portable short-wave radio that began an unparalleled run of radios that represent the best of American manufacturing excellence. From 1942 to 1963, Zenith produced five series of Zenith Trans-Oceanic portable tube shortwave radios. The Trans-Oceanic lived on as an American-built solid-state radio until 1979. The last Trans-Oceanics were assembled from American made parts in Taiwan in 1980.

Collecting and restoring tube and solid-state Zenith Trans-Oceanic radios is a serious and growing hobby, as evidenced by the large number of radios, radio parts, service literature, advertising memorabilia, and accessories sold on eBay and other online venues. Additionally, there are a number of online sources for original parts, reproduction parts, power supplies, and batteries. It is possible to acquire and restore any model Zenith Trans-Oceanic radio to like new condition, including an original or reproduction owner's manual, and a battery power supply. An Internet search for Zenith Trans-Oceanic, or the item you need, will often return one or more sources.

Restoring a tube Zenith Trans-Oceanic is not particularly difficult for the most part, but the crowded chassis and the complex coil tower can be challenging. Newbies should try restoring at least one broadcast band (AM) AA5 chassis before tackling a Zenith Trans-Oceanic. And by all means, purchase a copy of the second edition of ***Zenith Trans-Oceanic, the Royalty of Radios***, by John H. Bryant and Harold N. Cones.

The first two models of the Zenith Trans-Oceanic, the 7G605, and the 8G005 series, are somewhat different than the 500 and 600 series radios. The 7G705 and 8G005 radios used loktal tubes and a rectifier tube to convert household AC to DC for the radio. The 8G005 radios had a push-pull audio amplifier, requiring one more tube than the 7G705 or later models. The 500 and 600 series radios used a selenium rectifier and miniature tubes.

All models of the Zenith Trans-Oceanic radio used the same power source, either household AC current or the Zenith Z-985 battery. When operated on the Z-985 battery, the AC plug is inserted into a battery changeover switch, located on the chassis inside the back cover, except on the 600 series, where the switch is on the outside cabinet on the line cord escutcheon.

The 8G005 series radios, which had the additional tube, required a 1.5-volt Z-1 battery in series with the Z-985 battery. The 600 series radios used the same Z-1 battery to power a dial light activated by a momentary contact slide switch on the front panel.

Battery power is recommended for full-time operation of any Zenith Trans-Oceanic radio for best performance. Original Z-985 battery boxes can be re-stuffed with AA and D cells to make a working battery, or you can buy a battery power supply from online sources.

This guide will be useful for restoring any model Zenith Trans-Oceanic; however, it will be most helpful for restoring the 500 and 600 series radios. Although there are minor differences among the various models in the two series, the G500, H500, and all the 600 models are very similar. Using the correct schematic will be helpful in determining the correct values of capacitors and resistors as well as proper voltages, which are particularly critical to ensure good performance and long life of the 1L6 tube.

Restoring the H500 series radios can be a little confusing as there are five variations, even though Zenith never gave any of these variations a distinct model identifier. Use the chart below to determine which model you have and then try to find the correct schematic if possible.

ZENITH TRANS-OCEANIC MODEL H500 CHASSIS 5H40 VARIATIONS

Introduction, baseline: Uses a 1S5 tube for the Det/AVC/AF. Has a dual-pin earphone jack.

Revision A: Uses a 1U5 tube for the Det/AVC/AF. Tube socket is wired differently from the 1S5. Also has a dual-pin earphone jack.

Revision B: Uses the 1U5 and earphone jack has been changed to a single 1/4-inch jack.

Revision C: Uses the 1U5 and has a single earphone jack. Low voltage switch was added for line voltages less than 110vac.

Revision D: Uses the 1U5, has single earphone jack and low voltage switch. A socket was added for an optional 50A1 ballast tube.

Chapter 1
Overview of the Radio

Welcome to my second attempt to garner your attention for the duration of yet another step-by-step vintage radio restoration thread…that of a Zenith Transoceanic H-500, supplied by our good forum buddy, Phil.

Phil contacted me a while back and said, "If you'll do a step-by-step restoration thread of a Transoceanic…I'll provide it at no cost." I thought it over for a couple weeks, then told him I'd give it a shot, but would not accept the radio for free. So we worked out a deal…and here we all are.

This is the first time I've ever laid eyes on a Transoceanic of any kind, but I'm not a bit worried. If I get into trouble I'm confident Curt* will bail me out. Norm** says Curt loves Zeniths…and Hallicrafters, too.

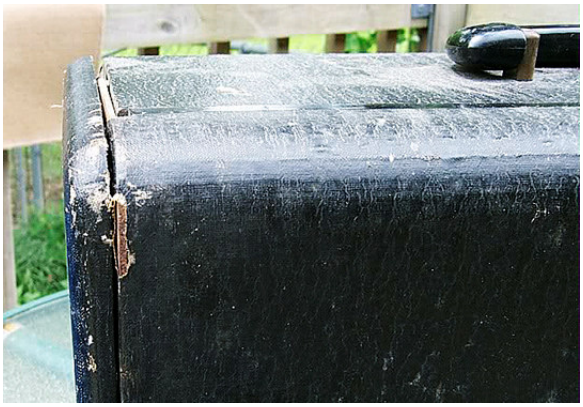
Here it is, folks. All in all (so far) I'd say this old radio is in pretty good shape---for the shape she's in:

Curt Reed, ARF member. Curt passed away September 28, 2010.

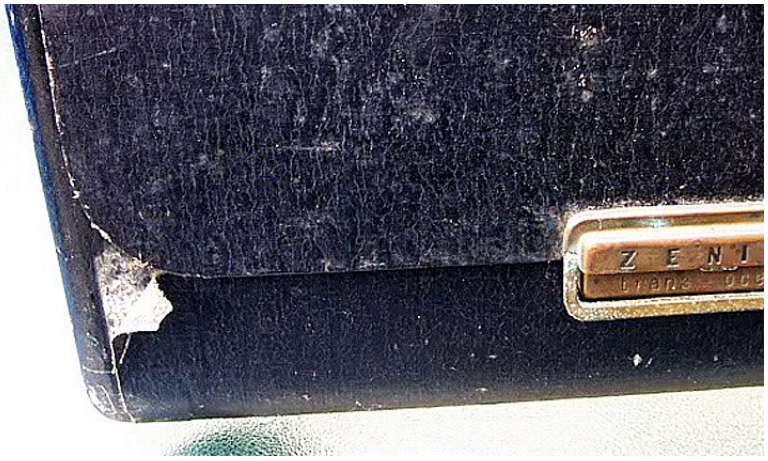
***Norm Leal, ARF moderator*

Before removing the chassis, let's do an outside close-up inspection. The cabinet is covered with a material that Zenith called "Stag". In my mind it's just plastic coated cloth. My grandmother called it "oil cloth" and covered her kitchen table with it.

The right and left front top corners have normal wear and tear:



There's a little peeling at the bottom of both front corners, but no big deal:



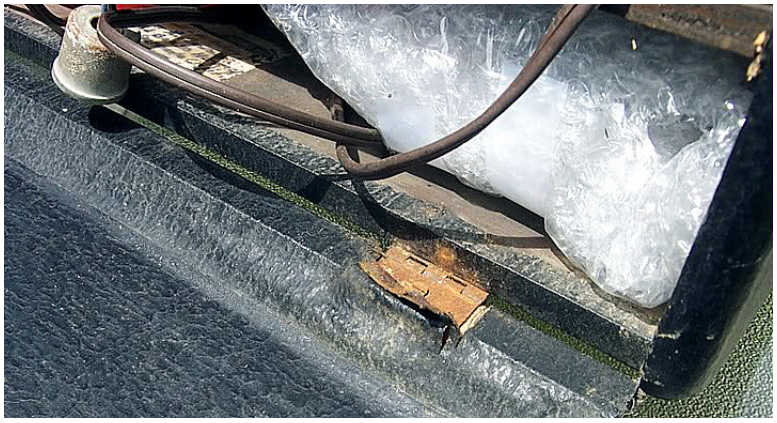
The brass front latch is very corroded. I'll have to get on that puppy right away:

The back has a couple of small nicks:

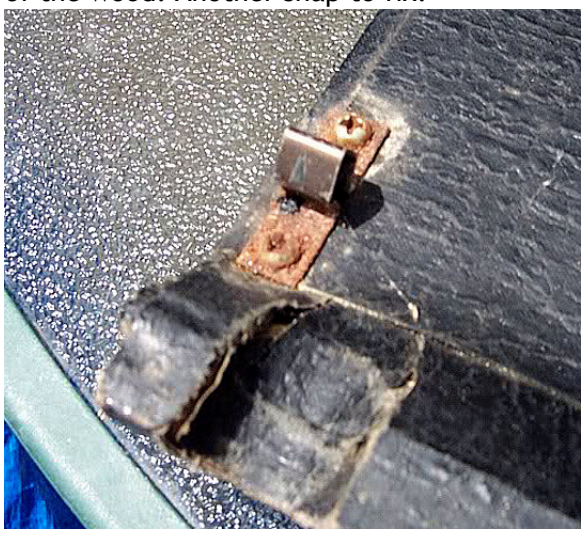
The left side has a larger gouge, but still no big thing:

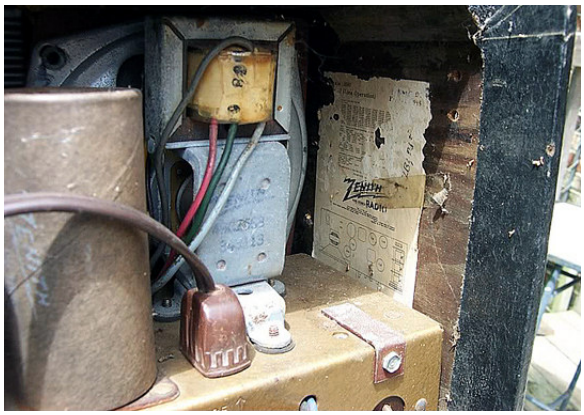
The bottom looks pretty good:

Inside of the back cover there’s more peeling and both hinges are very rusty. Easy to deal with:

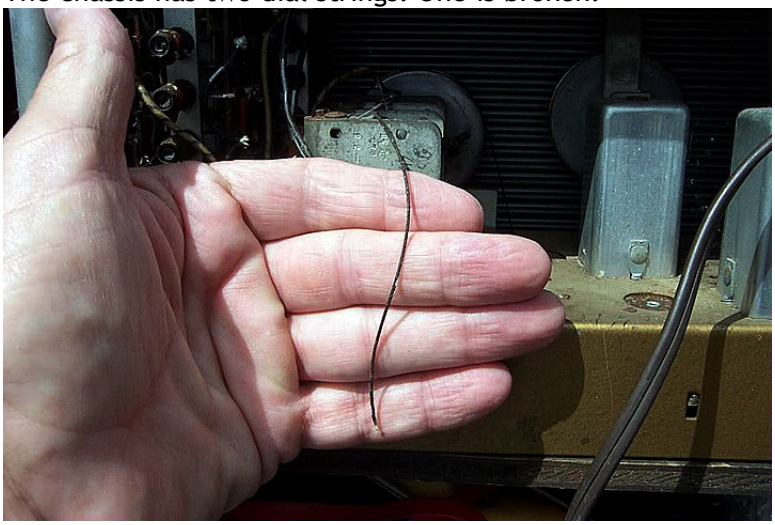


The left rear cover latch is ok, but the screws holding the right one have been pulled out of the wood. Another snap to fix:

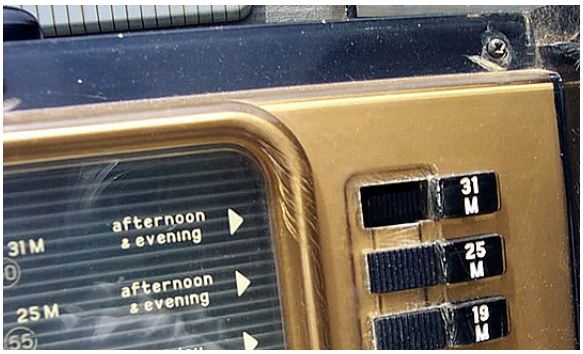




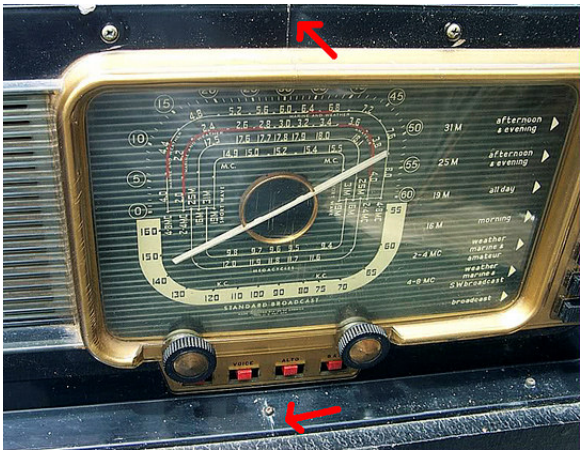
The chassis has two dial strings. One is broken:



The top band button has been pushed all the way through. Luckily, I can see it’s still in there:

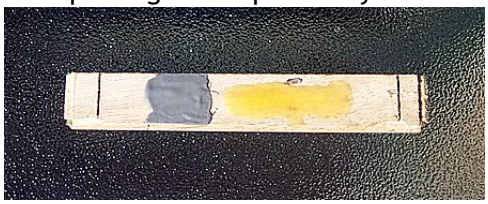


The plastic faceplate is cracked at the top and bottom. I understand it's fairly common with this model:



And it has a small chip at the top:

Lastly, I spread a gob of Elmer's Glue and J-B Weld on a strip of leftover tile wood. The next posting will explain why it was done:



So are we ready to go for it?

Chapter 2
Disassembly of the Radio

Disclaimer: Please understand that I am in no way an expert on any Zenith Transoceanic radio. I'm no expert on any radio. The sole purpose of this thread is to show how I do things. There are no doubt far better methods. And the thread is not aimed at the Trans-Oceanic experts out there. You folks already know this stuff. Rather, it's for the person who might pop into our little forum searching for information about restoring a Transoceanic they might have found, received as a gift, inherited or bought on a whim. Hopefully, what they read here will help them.

With that being said…enough with the inspection already…let's rip this critter apart.

Begin by removing the two front knobs. Each should slip off without much effort, so don't make like a gorilla. But do keep in mind that folks have been known to solve a loose knob problem with a blob of cement:

Now open the back cover and ease the telescopic (shortwave) antenna wire pin up and out of it's retainer clip. I used a small flat tip screwdriver to do it.
Note: Some retainer clips face you when the back cover is opened…others face front, situated behind the brown phenolic strip. Either way, just be careful when removing the pin. And take notice of that circled brown stuff. We'll be coming back to it:

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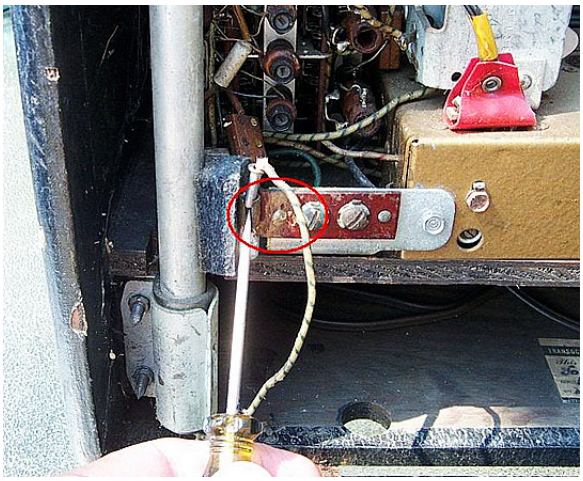
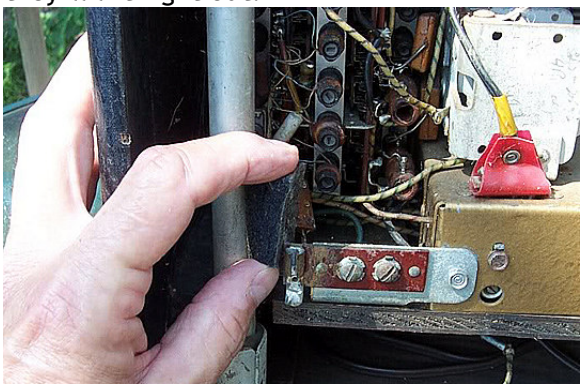
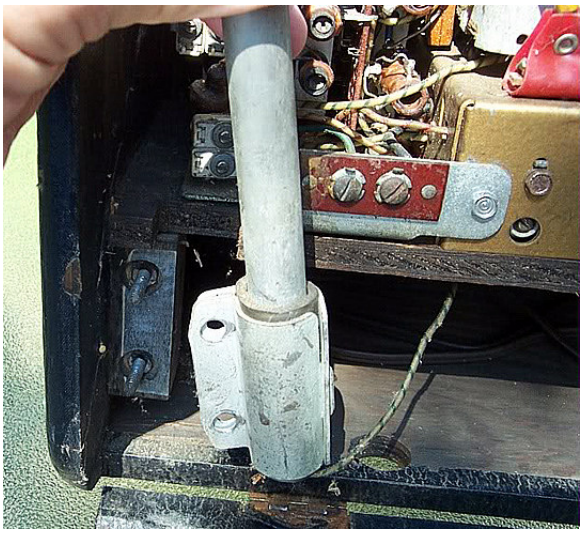


Remove the two thick felt pads…if they’re still there. Nothing holds them in place, so they’ll lift right out:

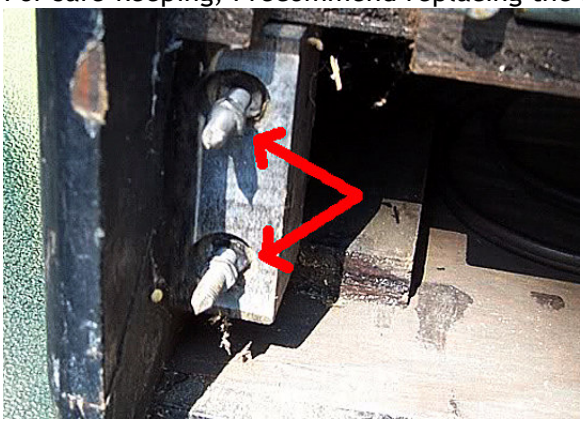


Remove the two nuts securing the base of the antenna to the cabinet:

Remove the antenna:

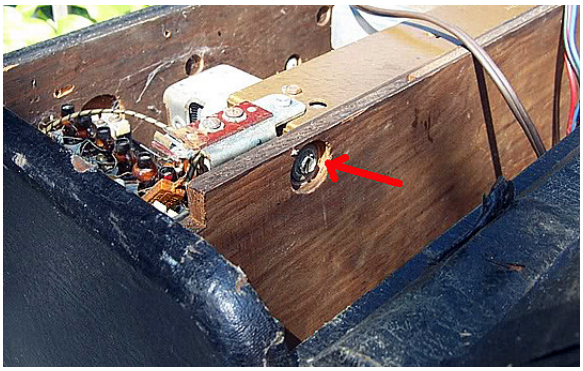


For safe-keeping, I recommend replacing the nuts back on the screws:

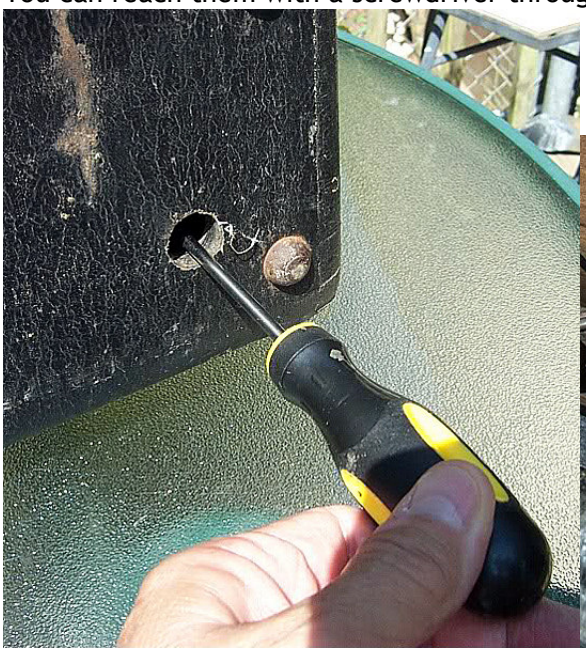


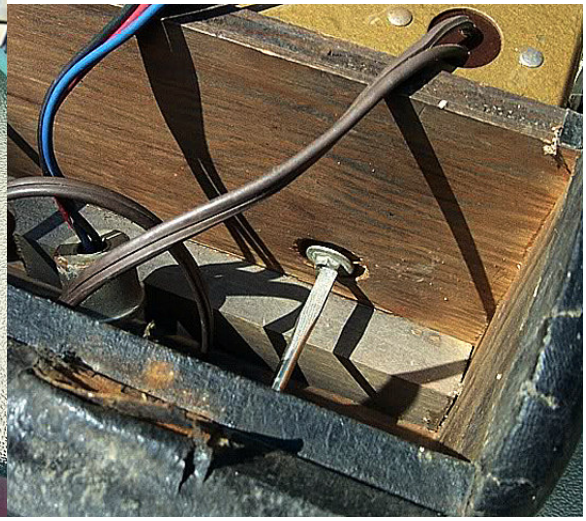
Very gently ease out the red, 3-prong Wavemagnet (broadcast) antenna wire plug. Be very careful here as the black wires could be wrapped around one or more of the thin wires soldered to that stack of coils. You don't want it to snag on anything during the chassis removal. Just be sure to give things a good eye-balling, then carefully move the black wires up, back and out of the way:

I found it odd (and cheap) that only two screws secure these chassis in their cabinets…one toward the front and one at the rear:

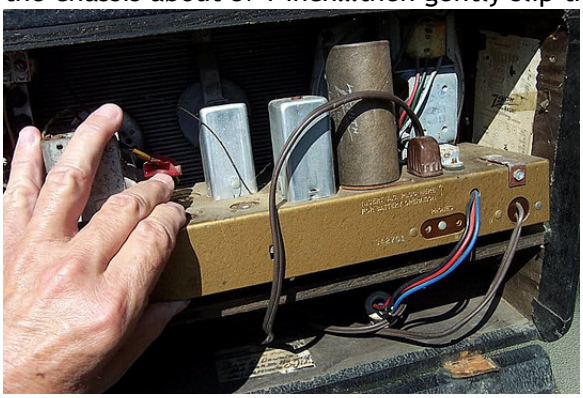


You can reach them with a screwdriver through the two large holes in the cabinet bottom:



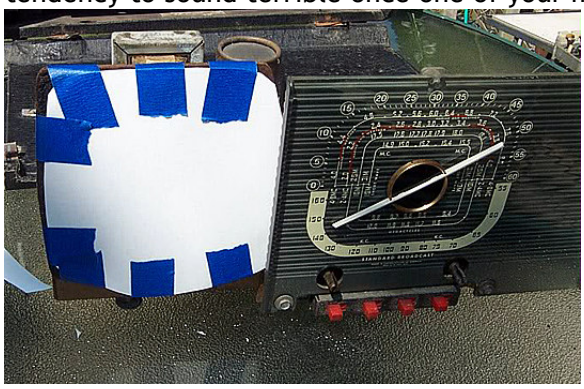


Once the screws are removed, create some clearance at the front by raising the rear of the chassis about 3/4-inch…then gently slip the whole thing out of the cabinet:

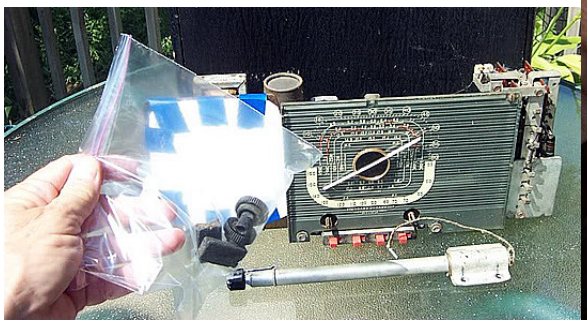


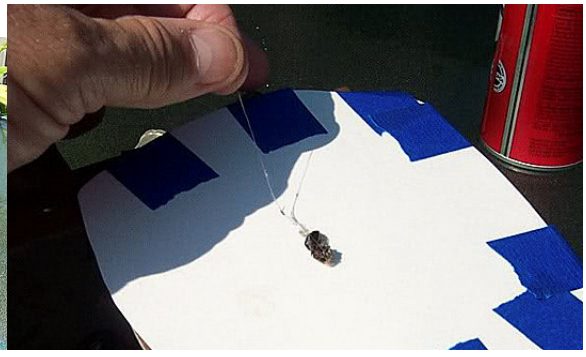
As with the telescopic antenna nuts, for safe-keeping I recommend installing the mounting screws back into the chassis:

Before you go any further, get a piece of cardboard or stiff paper plate and make a protective speaker cover. I recommend that you not delay doing this as radios have a tendency to sound terrible once one of your meat-hooks has punched through the cone:

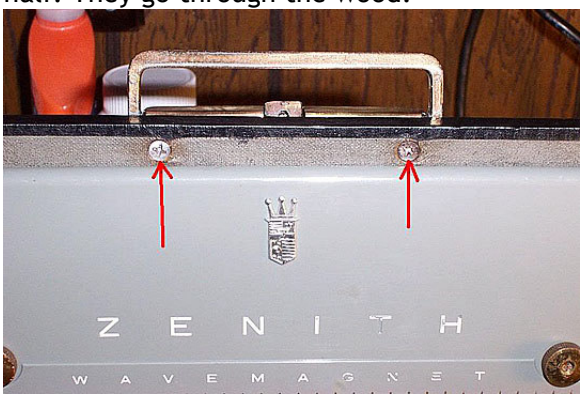


If all has gone well you should now have the telescopic antenna laying on the table plus two knobs and two pieces of felt in a plastic baggie, or whatever. You might also have a dead bug or two:

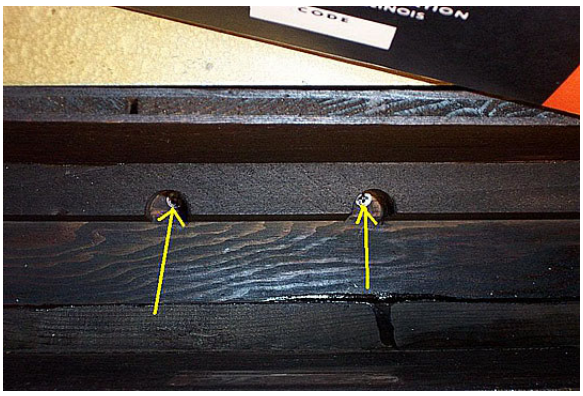




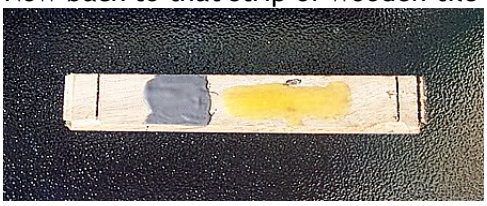
The (front cover) latches on this radio are held on by flathead screws in the back of each half. They go through the wood.



These two screws are accessed from inside the battery compartment:



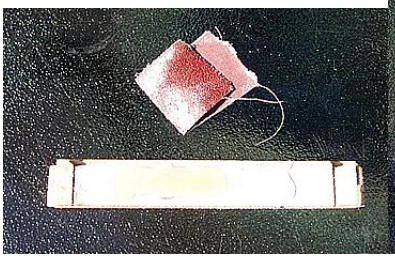
Now back to that strip of wooden tile with the dried Elmer's and J-B Weld on it:

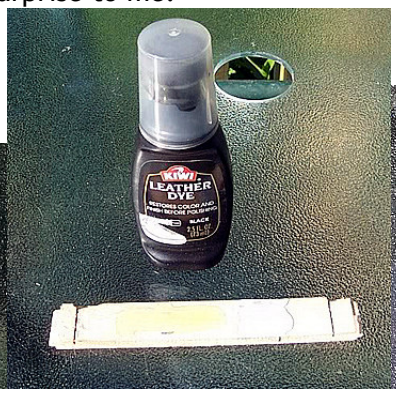


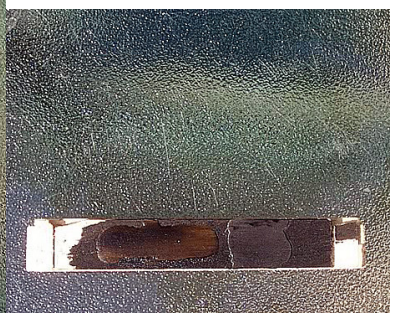
During my preparation for this thread I read about someone using Elmer's Wood Glue to patch/repair holes in the Stag. It supposedly sanded and feathered well and readily took black shoe dye, which was used to re-color the entire case. Sooooo…I started thinking (uh-oh). If Elmer's glue did the job…wouldn't J-B Weld also do it? I've used J-B Weld in the past and have always found it extremely easy to sand and shape, so I did a little comparative testing.

The Elmer's and J-B took about the same time to dry…and both dried really hard. But the Elmer's was much more difficult to sand. It sanded ok, but not as quickly and easily as the J-B. Leather dye was then liberally applied to both and allowed to dry. Both took the

dye fairly well, which was a surprise to me:







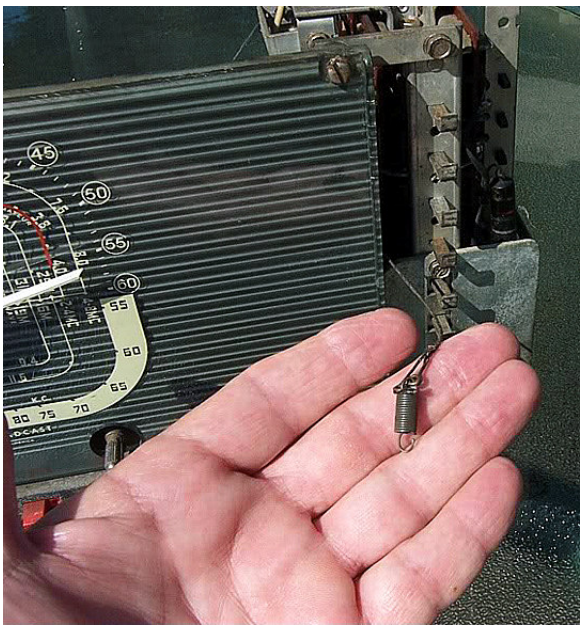
I then scrubbed the dye very hard with first a dry, then wet towel…in all directions, but it stayed put…which was another surprise:

Conclusion: Both Elmer's Wood Glue and J-B Weld will work equally well for repairing/patching Transoceanic Stag covering. But the Elmer's is a bit harder to work with. That's my story and I'm stickin' to it.

Chapter 3
Chassis Repair and Servicing

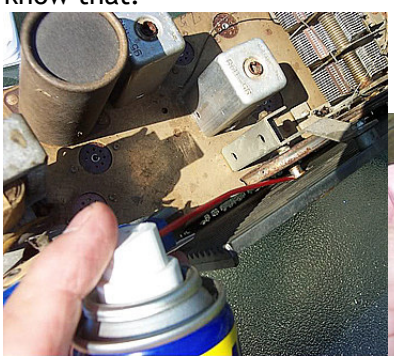
Dial String Repair

Let's take a look at our dial string problem. Translation: The gray plastic dial scale has to come off.

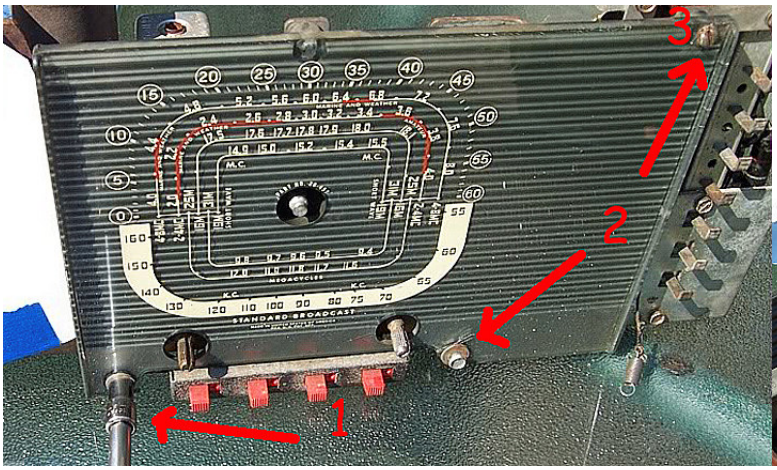


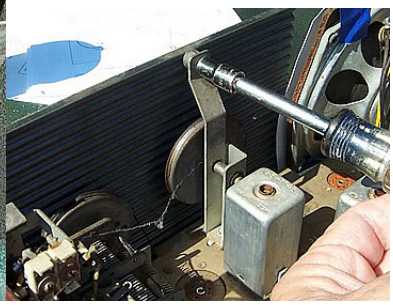
Fortunately, the broken string's tension spring was still present, but how it wound up hanging out there is a mystery. Guess I shouldn't look a gift horse in the mouth, huh?

As with many vintage radios, removing the dial scale means first removing the dial needle…but this needle wouldn't budge. I almost hauled out the trusty Bernz-O-Matic torch, but in the end a shower of good old WD-40 saved the day. By the way…be careful pulling the needle off the shaft. The round center gold part bends easily. Don't ask how I know that:

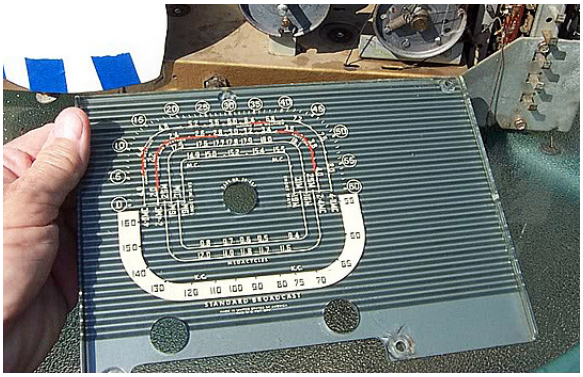


We’re home free. Take out three screws in the front (top & bottom) and one from the bracket in the rear:

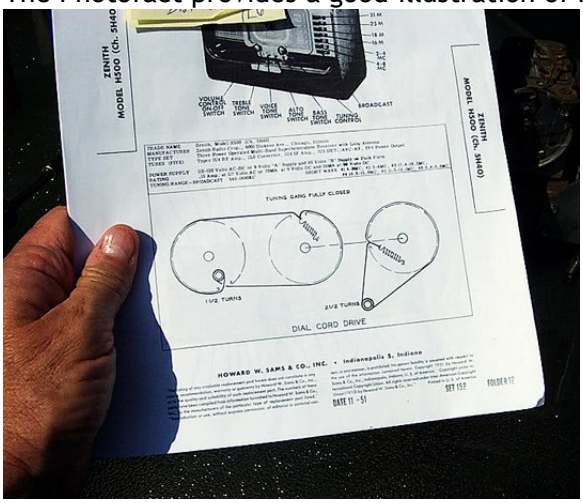




And the dial scale is off. A caveman could do it:

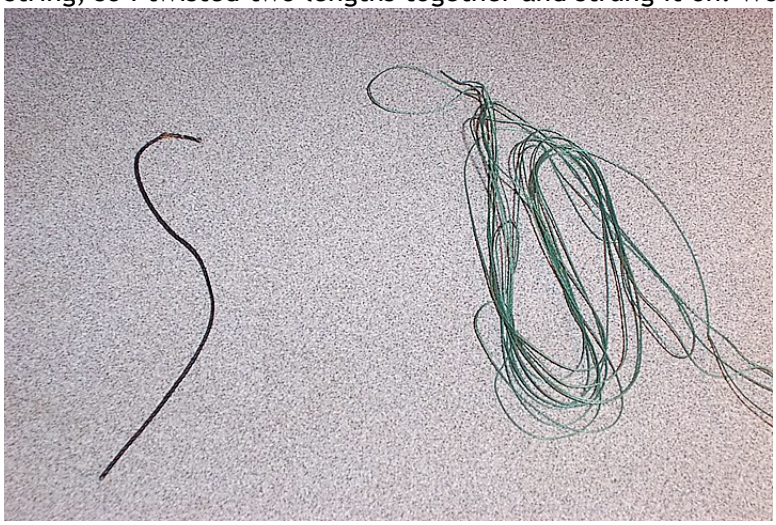


The Photofact provides a good illustration of how the two dial strings are strung.

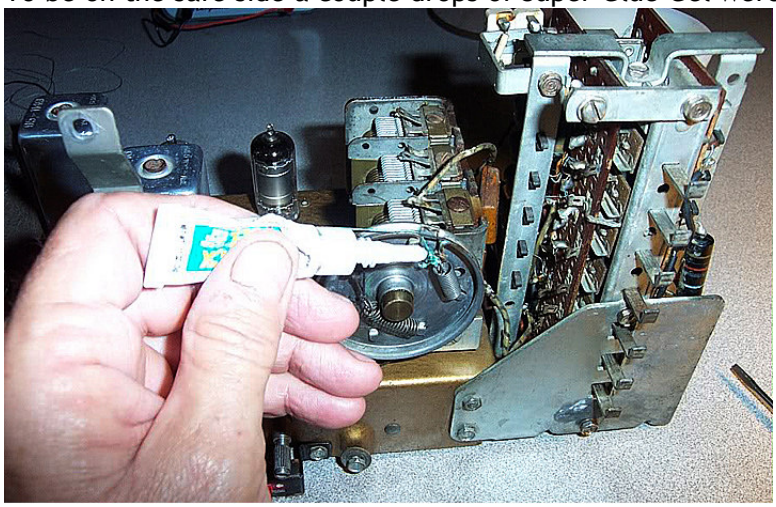


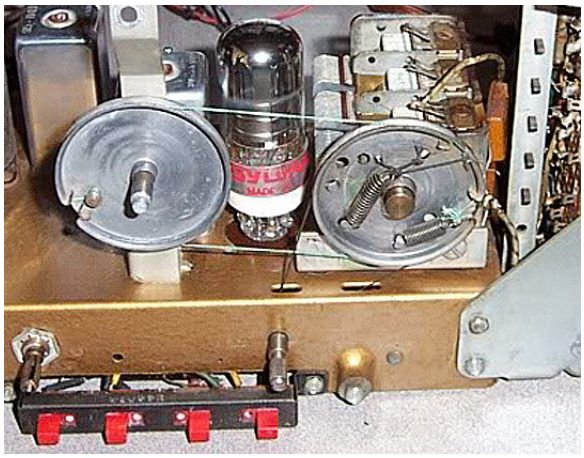
My brother-in-law, whom I suddenly remembered was an avid fisherman, (had) “Spiderwire” and handed me a few feet of it. It was a little thinner than the original dial

string, so I twisted two lengths together and strung it on. Works very well:



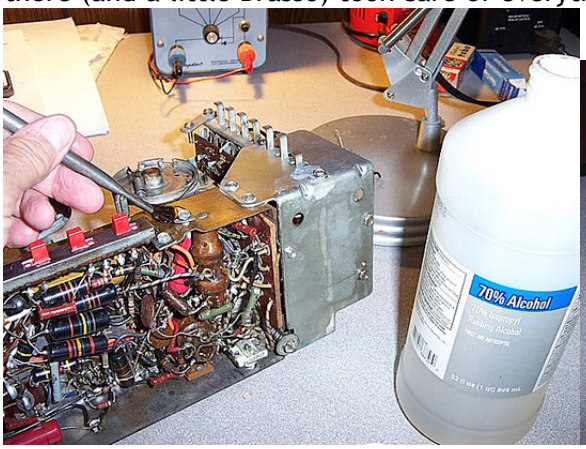
To be on the safe side a couple drops of Super Glue Gel were applied to the tied ends:



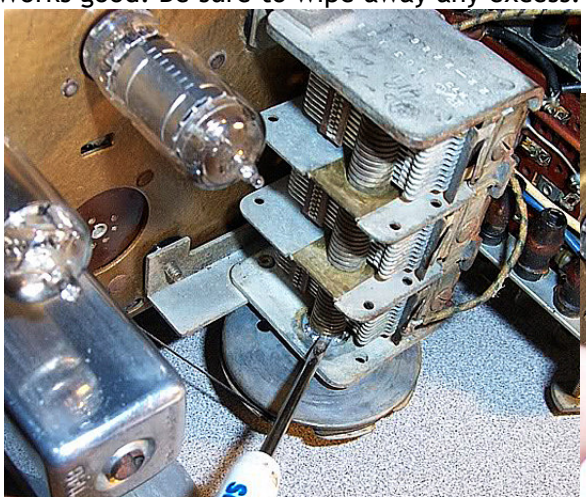


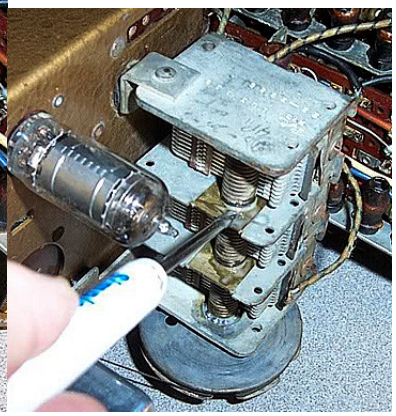
Restoration and Repair of the Chassis

This chassis is in excellent shape…having only light dust and a couple of very small rust spots. I'm really thankful for that. Some alcohol, a couple drops of Navel Jelly here and there (and a little Brasso) took care of everything:



I decided not to mess with the tuner too much, except to give it a good spraying with contact cleaner. I also oiled the bearings and shaft using my usual mixture of White Lithium Grease and 3 In 1 Oil…more oil than grease. It drips in right where you want it. Works good. Be sure to wipe away any excess:

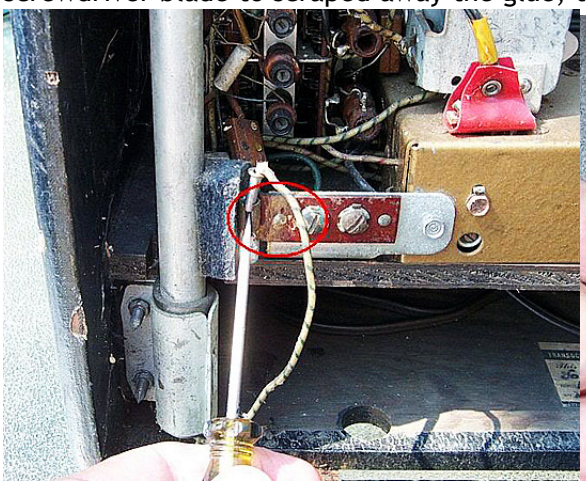
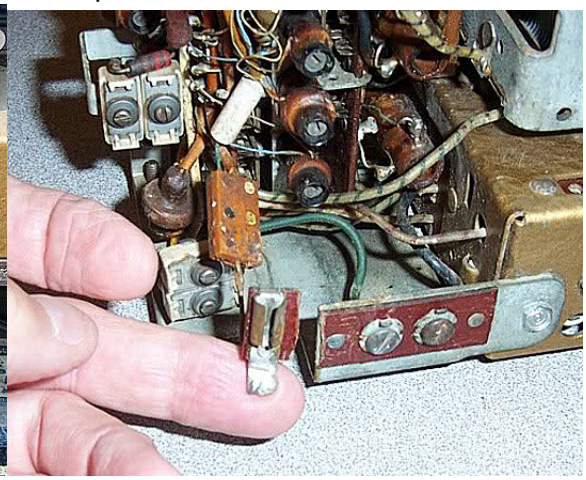




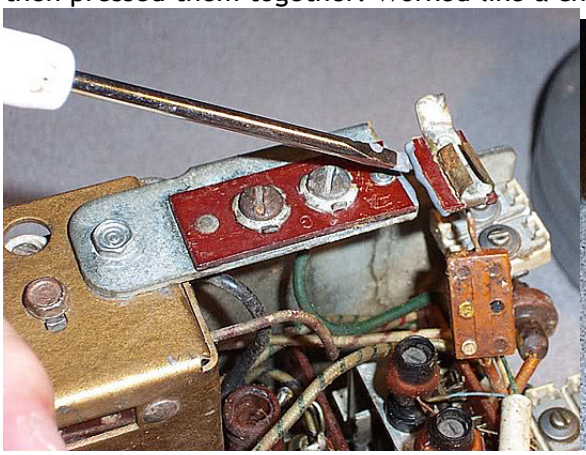
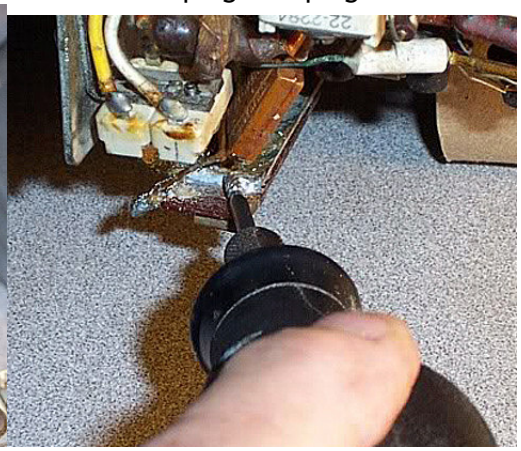
Before continuing to dazzle you with my profound Trans-Oceanic H-500 knowledge, I want everyone to know how cool it is to have you here…especially the new and/or previously lurking types. In my mind it's what our forum needs…less lurking - more participation. Your positive comments and suggestions (and presence) are very much appreciated.

Glory-time over….back to bidniz.

Remember that circled brown stuff? It's a lot like soft Liquid Nail. Somewhere along the line the phenolic antenna connection strip got broken and a tacky repair job was done. Get it?...tacky? I kill me. Moving right along…the glue and a mica capacitor lead were barely holding the broken section in place. It needed to be made righteous. I used a small screwdriver blade to scraped away the glue, then separated the two sections.

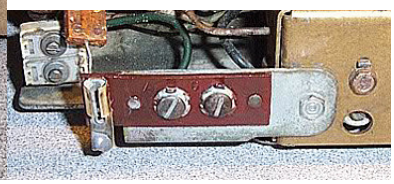



The edges were cleaned and a bead of J-B Weld applied to each, but they weren't fitted together right away. I instead waited until things got very, very gummy, almost semi-hard, then pressed them together. Worked like a charm…no clamping or taping needed.

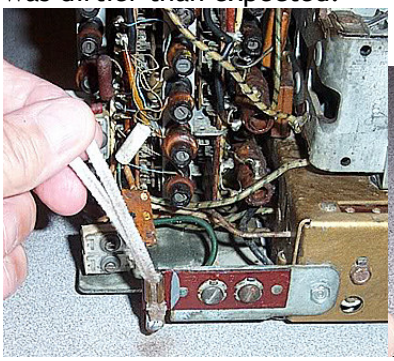
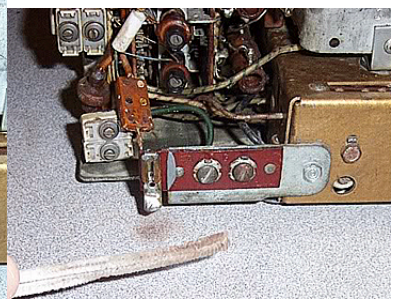



The next day I whipped out the Dremel Tool and roughened up the back with a course bit. More J-B Weld was added, and the thing is now stronger than when new. I did a little sanding, and some touch-up work with a Q-Tip and brown paint. I have to admit…it does

look better:

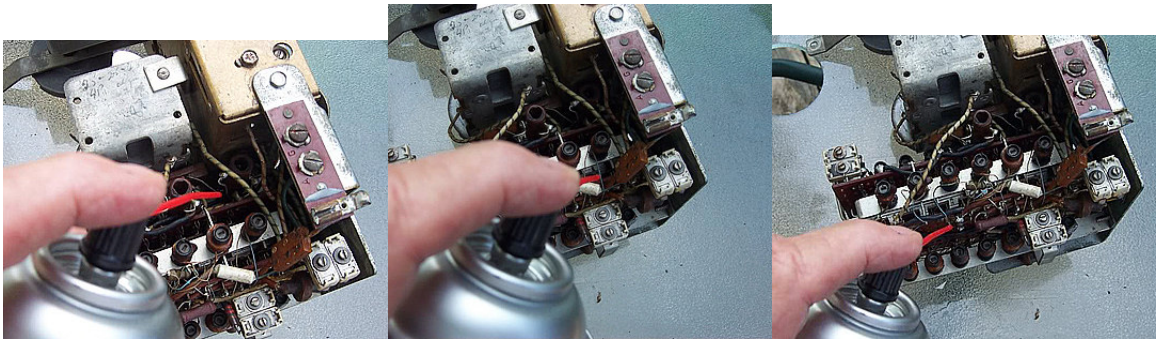



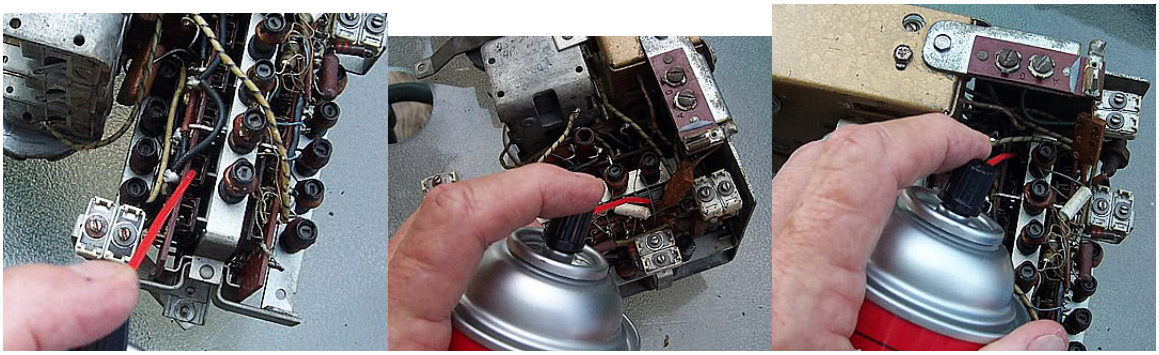
A pipe cleaner and alcohol scrubbed the inside of the shortwave antenna connector clip. It was dirtier than expected:

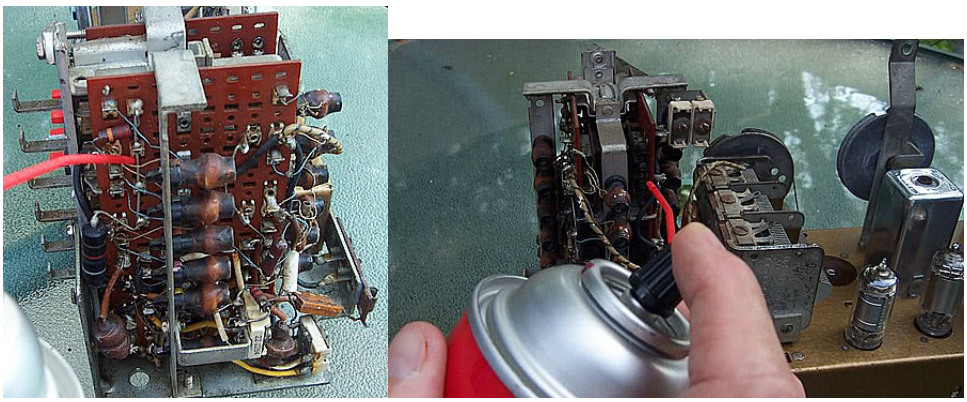



Coil Tower Cleaning

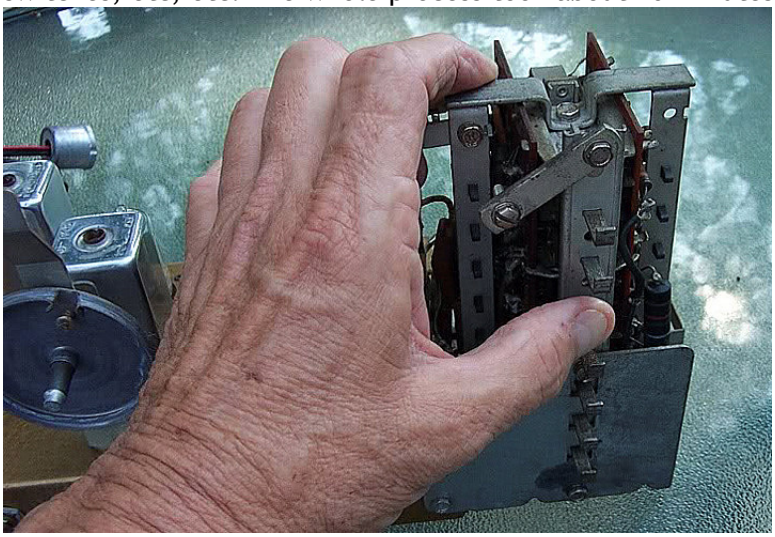
The coil tower consists of twin circuit boards standing on edge and held in place by small metal brackets. Pairs of thin coil wires are soldered to brass contacts mounted on the opposite side of each board. They're the band switch contacts and are unfortunately pretty much located out of sight. Still, they need to be free of dirt and corrosion…so I dug out a fresh can of contact cleaner and went hog wild:



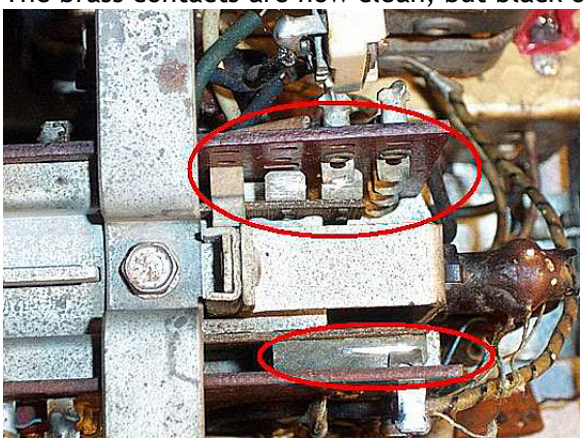




I think you get the idea. After spraying for 5-10 seconds or so, I worked each of the band switches in and out about 10 times each. Then it was back to spraying…then working the switches, etc, etc. The whole process took about 10 minutes:



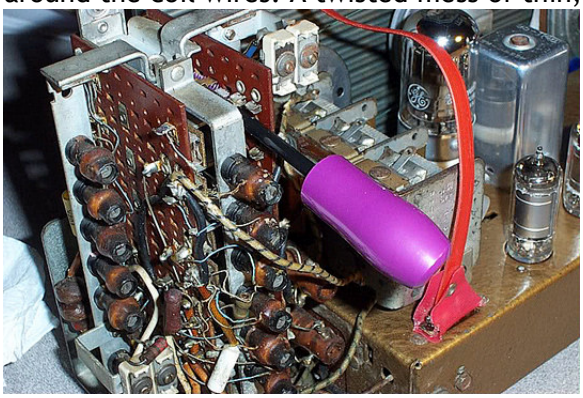
The brass contacts are now clean, but black oxidation remains. That's not good.

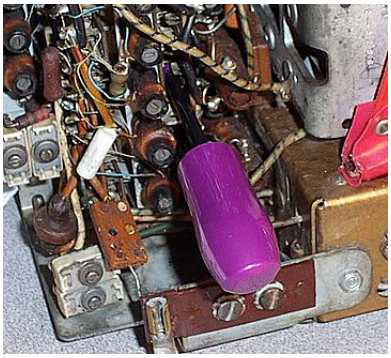


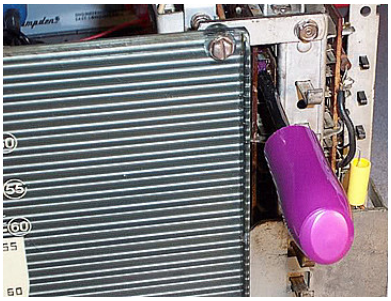
Here's a little food for thought. Yesterday my wife said she was heading to Wal-Mart, so I asked her to pick up a mascara brush…a long one. This is what she brought home:

That morning I had spotted a bottle of CLR beneath the kitchen sink and got the brilliant idea that it and a mascara brush might be just what was needed to clean the numerous band switch contacts hidden in the coil tower. Even though I had previously sprayed the tower with contact cleaner, they were still pretty messed up.

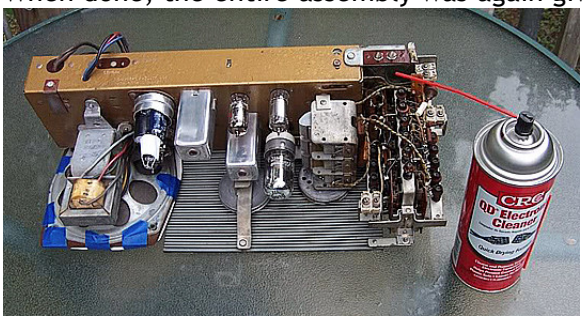
So I dipped the brush in the CLR and proceeded to do the wild thing…being very careful around the coil wires. A twisted mess of thin, broken wires was the last thing I needed:



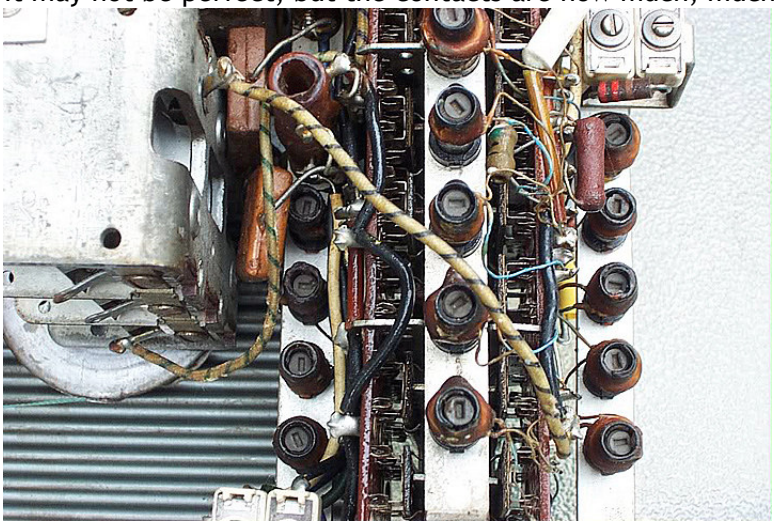




When done, the entire assembly was again given a good shower of contact cleaner:

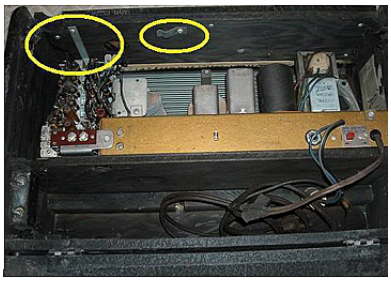


It may not be perfect, but the contacts are now much, much cleaner.



Band Switch Repair

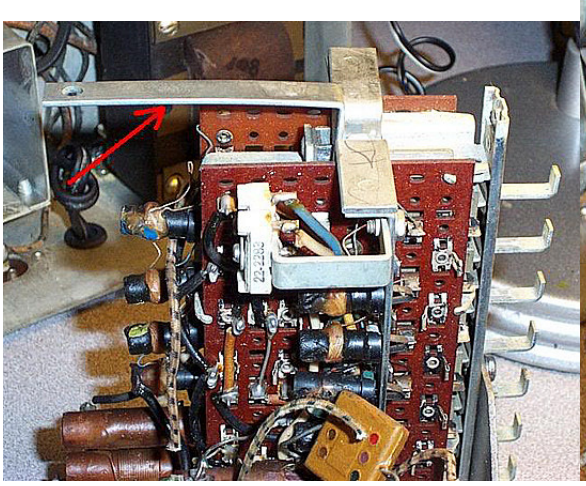
You'll recall that during our initial inspection of this radio we found the top band switch button pushed all the way through and into the cabinet, and the second button nearly the same way. I remember asking myself what self-respecting engineer would design a radio so the buttons could do that. It turns out that an engineer would not. The problem was caused by a missing coil tower support bracket:

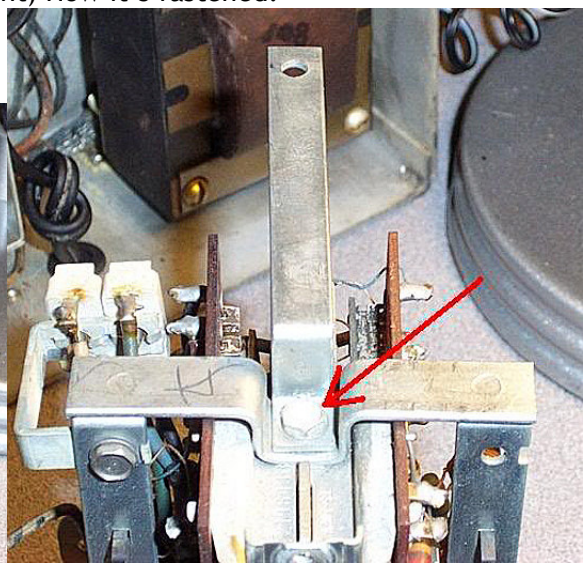


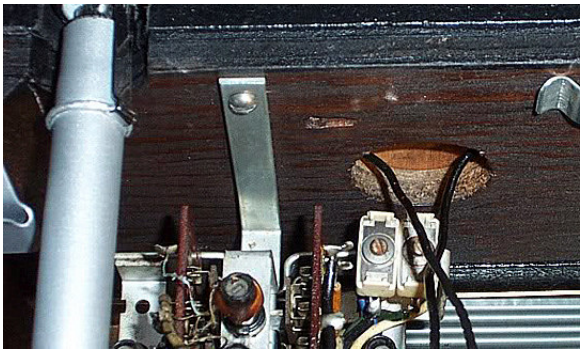
The bracket's purpose is to prevent the tower from bending/leaning backward as the bandswitch buttons are pressed, and it's lack thereof has been causing part of my bandswitch difficulties. The tower was moving backward, slightly jamming the bottom of the flat shaft that runs down its center. It was pure luck that I found out about the bracket. An ebay seller's photo told the tale…to include showing me there was also a missing Wavemagnet antenna wire clip:

Back in August, at the very beginning of this thread, I received a PM from forum member, R-520/URR (ShawnK), of British Columbia, Canada, kindly offering to send me any needed H-500 parts. I really appreciated his offer. Good to his word, he provided the missing bracket, two red suction cups, the small silver clip in the above photo…and a junk coil tower. It continually astonishes me how willing our members are to pitch in and help out each other.

Shawn's tower and the missing bracket. (Right) How it's fastened:

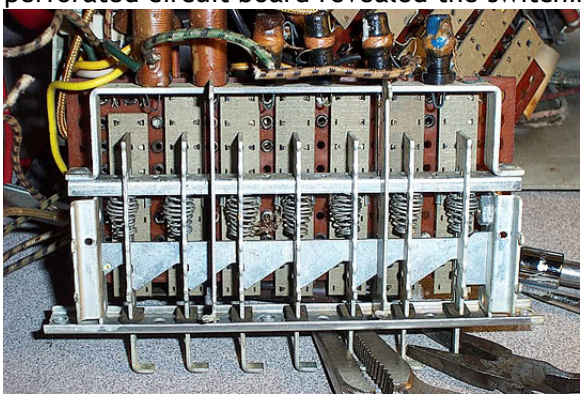






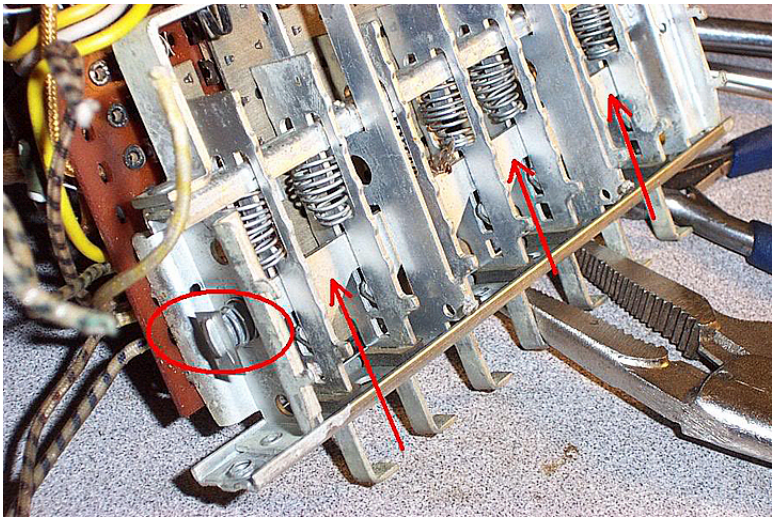
The bracket and clip are now installed, but I'm again having band switch problems. They all just won't lock into place.

I asked for, and Shawn provided, the junk coil tower so I could take it apart to see what makes it tick. I suspect more than a few of you will find this interesting. Removal of the perforated circuit board revealed the switching mechanism:



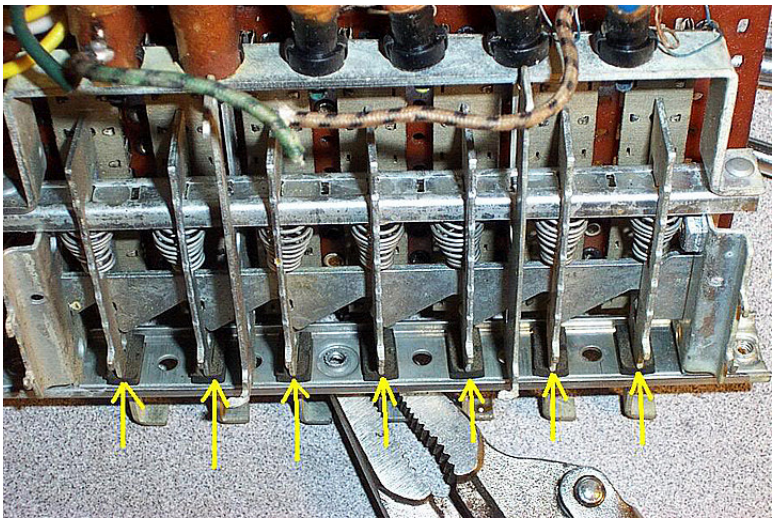
This shows the backside of the circuit board. Notice that the brass slide-switches aren't overly exposed. I've been hesitant about squirting even a little WD-40 down into the switching mechanism for fear it would drip on the slide-switches and cause arcing. I can now rest a little easier:

This is the pain-in-the-butt shaft that's been jamming. But I just might have found the solution.

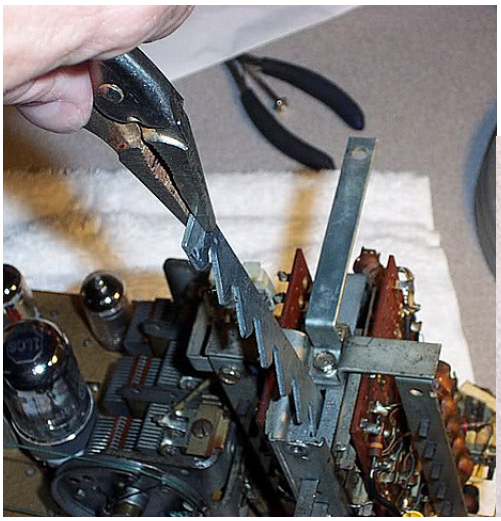


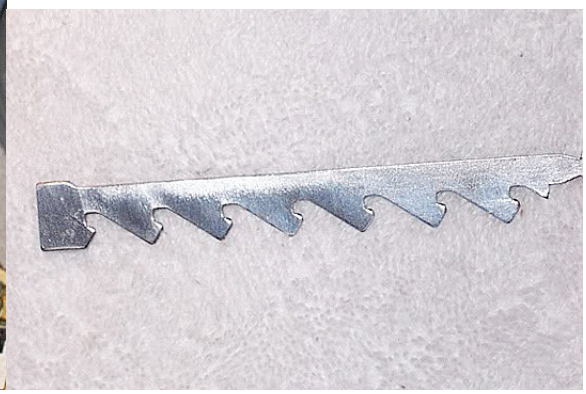
(The photo below shows) the small rubber bumpers that had fallen out of the tower. At the time I couldn't figure out how to get them back in. Guess what?...it still ain't gonna happen:

Here's why (photo below). Maybe someone else can come up with the answer. Meanwhile, (for the third time) it's back to tearing apart the tower to mess a little more with that darn shaft:



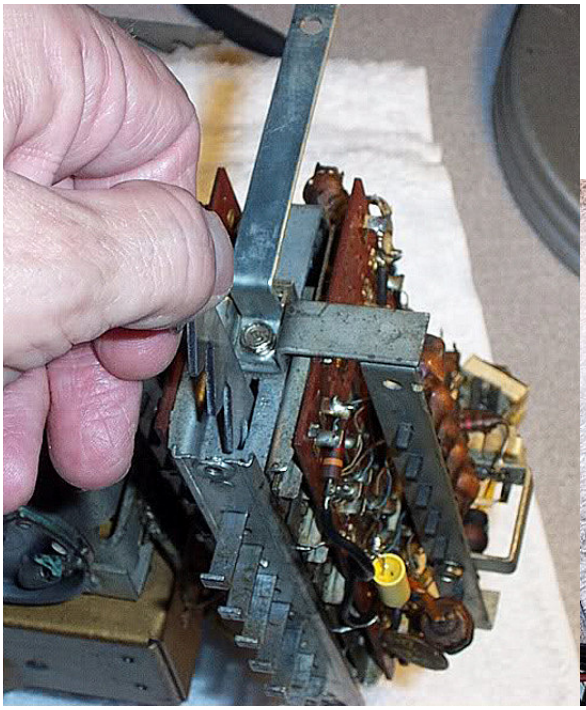
Having a junk parts tower in hand sure made things easier. I could see that the flat center shaft was removable, and once the bottom spring and keeper were released, it did slide out from the top. I had previously tried to remove the radio tower's shaft the same way, but was unsucccessful…and I didn't want to force the issue. But now I understood that it must have been dragging/snagging on something, so this time I put the ole Vice Grips to it. A little of this…a little of that…and she finally pulled free.
I should have been a dentist:





(I cleaned) up the parts tower shaft on the big grinder and wire wheel. The results were good, but it would still probably catch on something inside the tower:

Dry-fitting proved the theory correct. It wasn't dragging quite so badly as the original shaft, but it was enough to keep the band switches from working properly. So what to do?

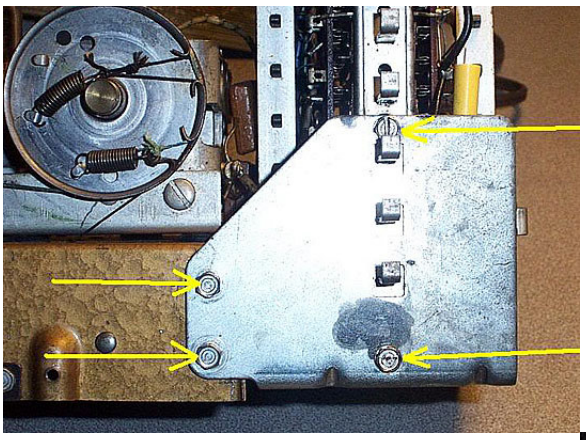


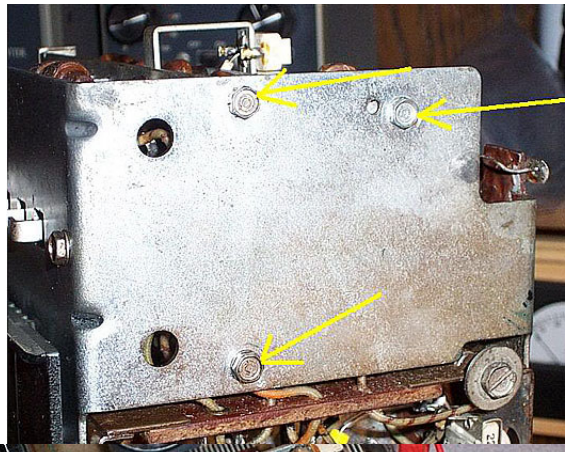
The only thing I could think of was to haul out my diamond impregnated sharpening stone and started stropping away, first on one side, then the other…then do another dry-fit. This went on for 40-minutes, but when it was over the shaft, with the help of a light coat of

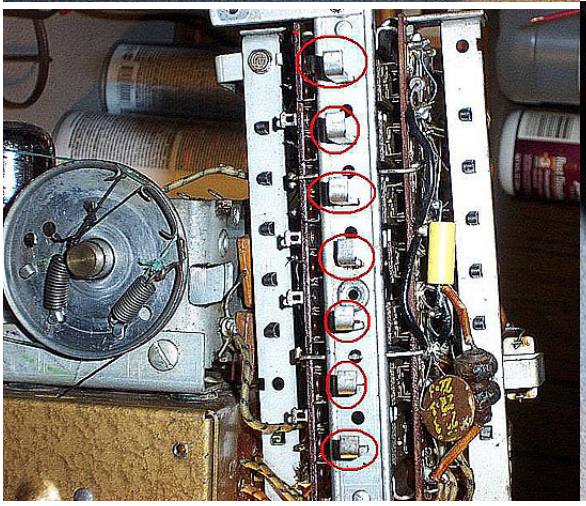
white lithium grease, slipped in and out with total ease. (But) for some reason the band switches stopped locking into place. I lifted while pressing…pushed down while pressing…moved them left and right while pressing. Nothing worked. They just kept popping back out. I was not a happy camper.

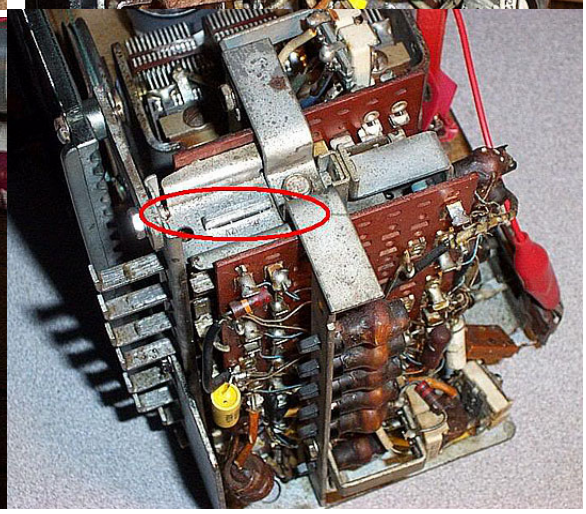
I noticed that when I pushed in on the switches a little metal bar at the top of the coil tower would rise and fall just a tiny bit…sort of pop up and drop down real quick-like. So I brought the desk lamp in tight for a close-up inspection.

It turned out that the little bar was actually the top of a flat shaft that ran clear to the bottom of the tower. Along it were cams that were supposed to drop through a hole and hold the switches in place after they were pushed in. Apparently, something was not providing enough downward pull on the bar, preventing the cams from firmly engaging the holes. Was there a broken spring beneath the tower?:

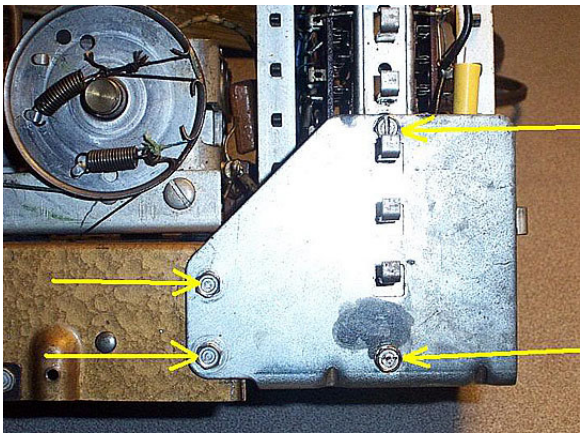


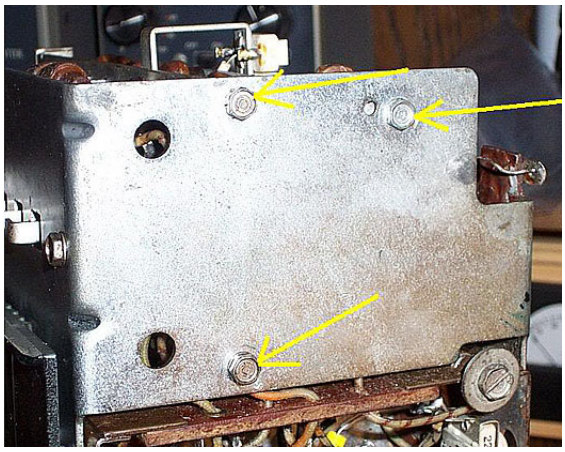




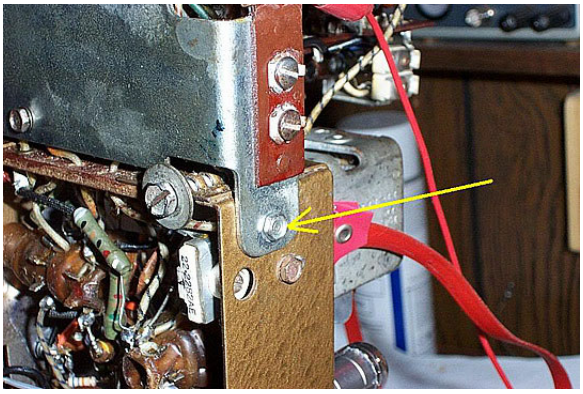


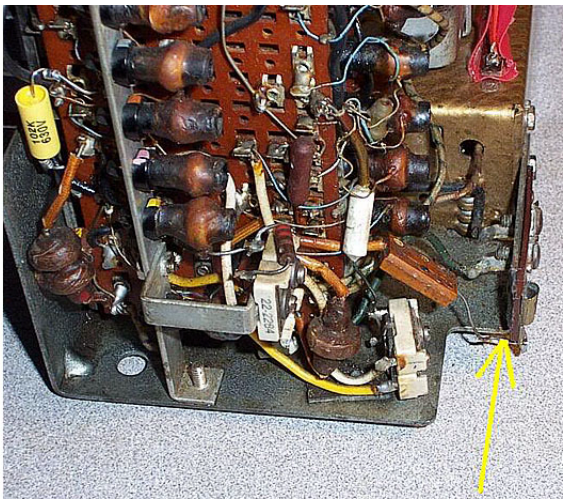
Finding the answer meant that the whole mess needed to be seperated from the chassis. Just what I wanted to do at that time of night. Anyway…off came the knobs and dial scale, and out came the four front screws, (then) the three on the bottom were removed:



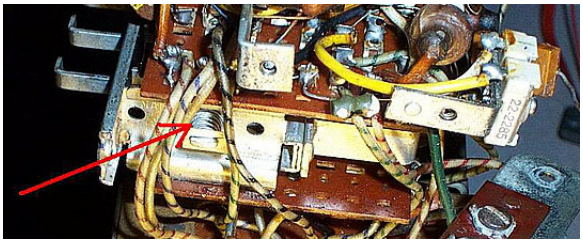


The single screw on the rear was taken out. And the Waverod input capacitor lead was unsoldered:

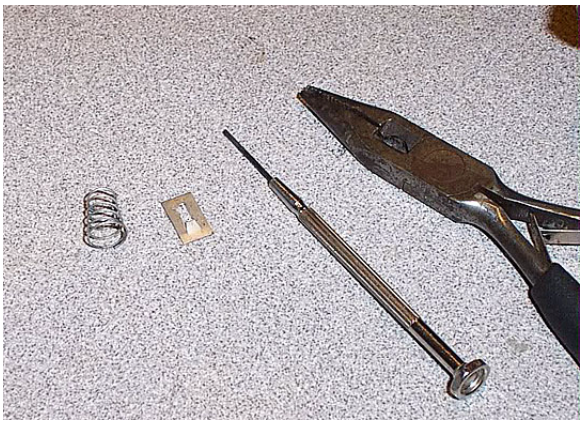




The metal plate was then unhooked from the band switch arms and gently eased out of the way, exposing the bottom of the tower. As expected, a spring and keeper was attached to the bottom of the flat shaft:

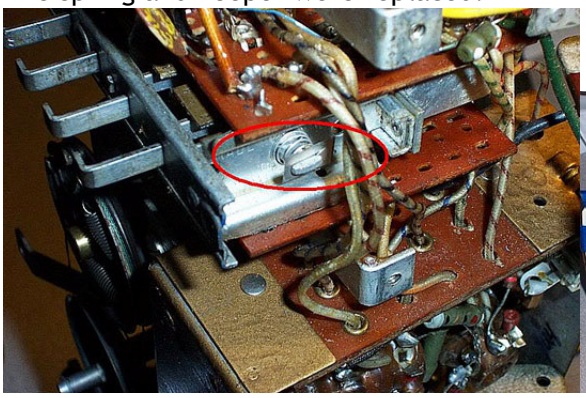


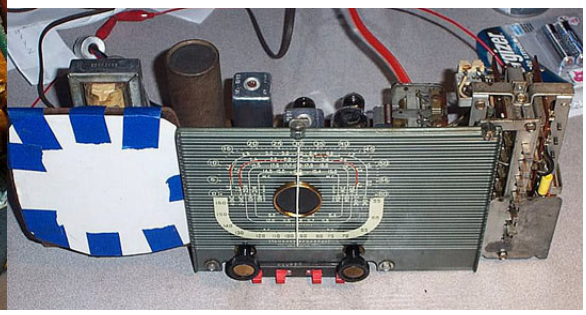
A small pair of needle-nose pliers and a very small jewelers screwdriver made it easy to remove both:



The spring had apparently collapsed from age, so I stretched it to almost twice its length. (Note: The amount of stretch was precisely calculated by a series of highly sophisticated mathematical formulas).

The spring and keeper were replaced:

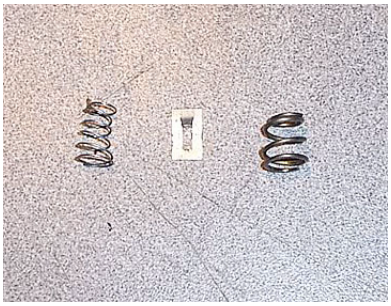


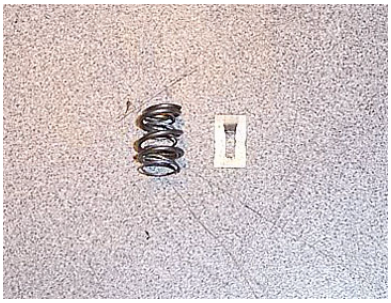


The tower plate and screws were reinstalled, the Waverod capacitor lead was soldered back in place, and the dial scale and knobs were put back on. Works fine – last a long time.

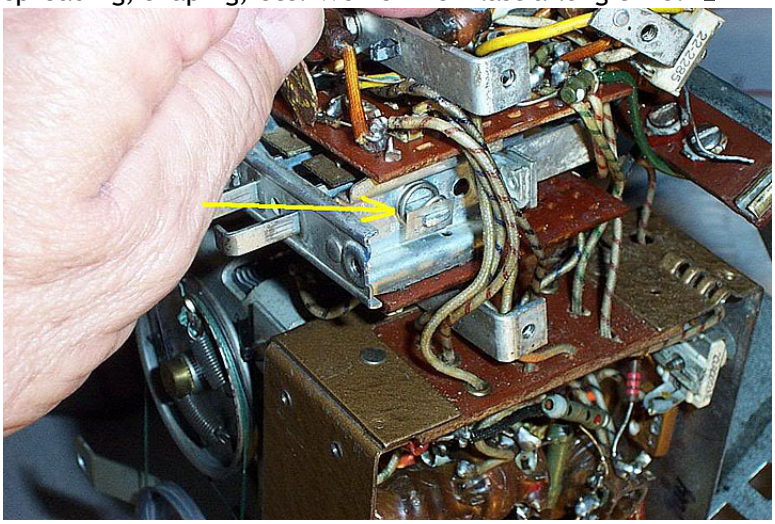
(Unfortunately, the switches) again stopped locking in place when pressed. Stretching the spring at the bottom of the flat, vertical shaft was supposed to have solved the problem…"works fine – last a long time". Wrong. Apparently, the spring's tension is completely gone…never to return. So once again the coil tower was disconnected from the chassis. As a reminder, (the spring in the red circle above) is the spring we're talking about.

I dug around in my junk bins and came up with a thicker, stronger spring…surprisingly, its length and diameter being pretty darn close to the original. Even a blind hog finds an acorn once in a while:





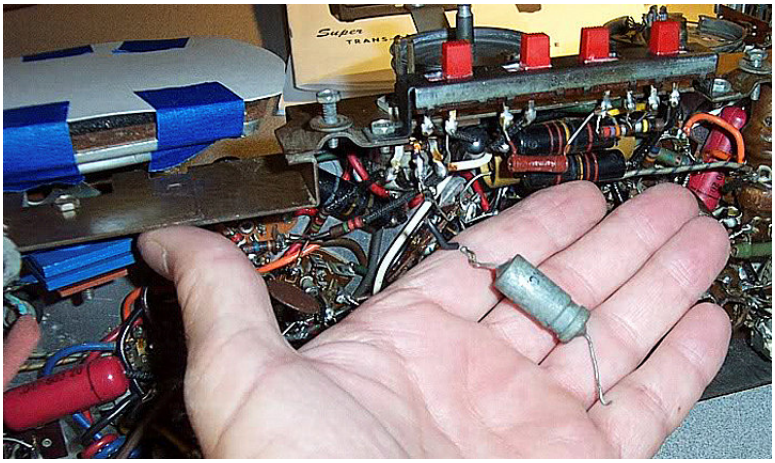
So I stuck the old spring inside the new one and installed the combination on the shaft. No dice. Far too much tension. The band switches barely budged. In the end I was able to use the new spring by cutting off the top loop. Then came a little bending, twisting, spreading, shaping, etc. Works fine – last a long time: 😃



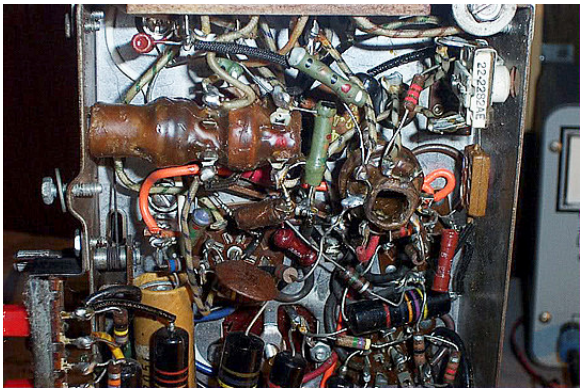
Chapter 4
Electrical Restoration

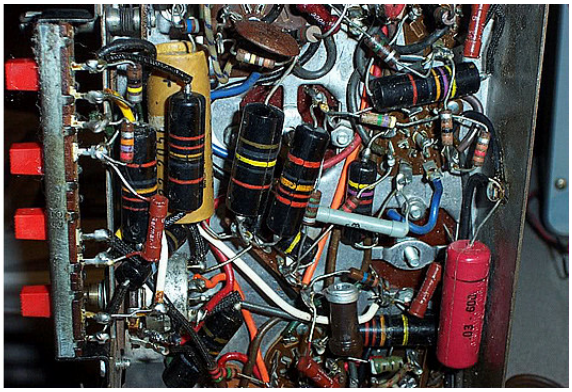
H500 Chassis Variations

Now for a peek under the hood. Other than a hanging audio coupling cap connected to the volume control center tap, all else looked great. I have no idea if the cap is original. Off hand I'd say no, but it makes no difference, as it'll be replaced. I temporarily removed it:

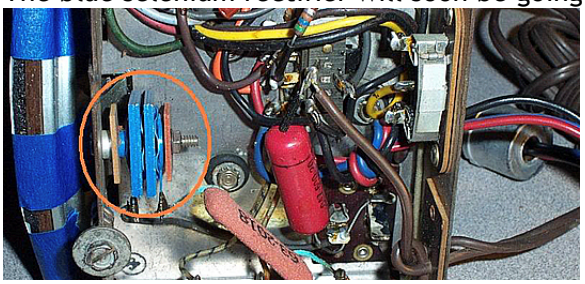


And a couple more shots. Not too shabby:





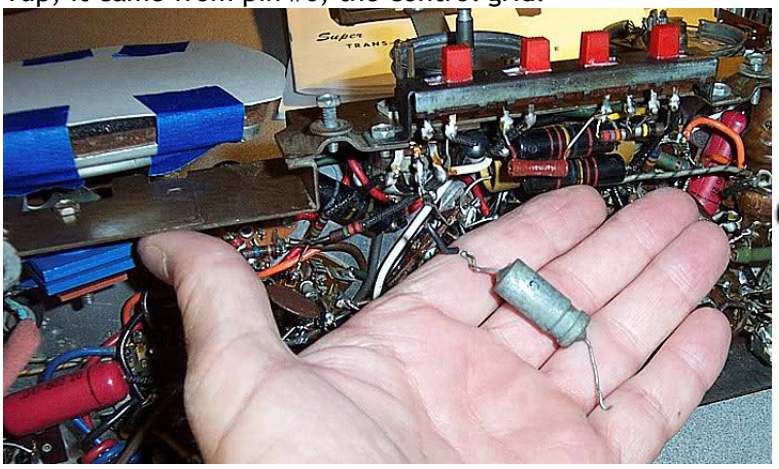
The blue selenium rectifier will soon be going the way of the Do-Do bird:

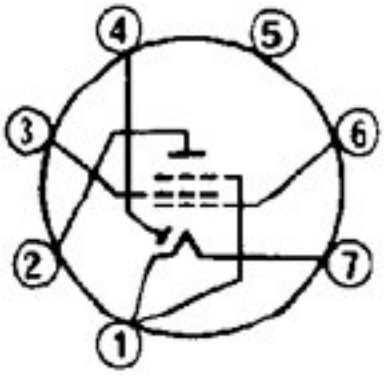


Determining which chassis is in your Transoceanic H-500 is important. (I said this would be boring. Skip it if you wish):

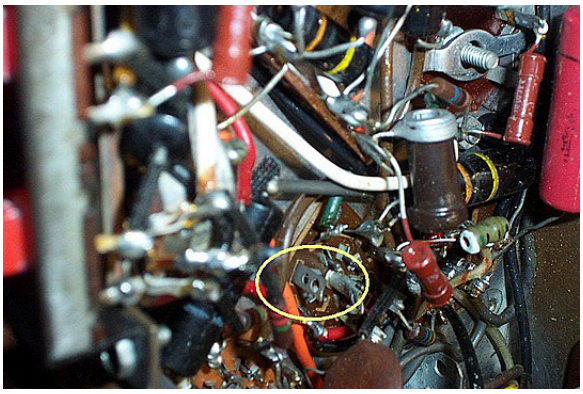
Believe it or not, Zenith made five different chassis for this radio…and gave all of them the same chassis number: 5H40. Not too bright in my book, but such is vintage radio life. The chassis in this thread is the original baseline version, supposedly introduced in May of 1951.

In preparation for this thread I downloaded the Photofact from BAMA and poured over the schematic. When done, I knew little more than when I started. Then I looked under the chassis and saw that hanging audio coupling cap…one end still soldered to the center lug of the volume control and the other just flopping around. I hate hanging components. Anyway, I did some eye-balling and eventually determined that the loose end had probably come from pin #6 of the Det/AVC/AF tube, the 1U5. To be sure, I checked the schematic. Yup, it came from pin #6, the control grid:



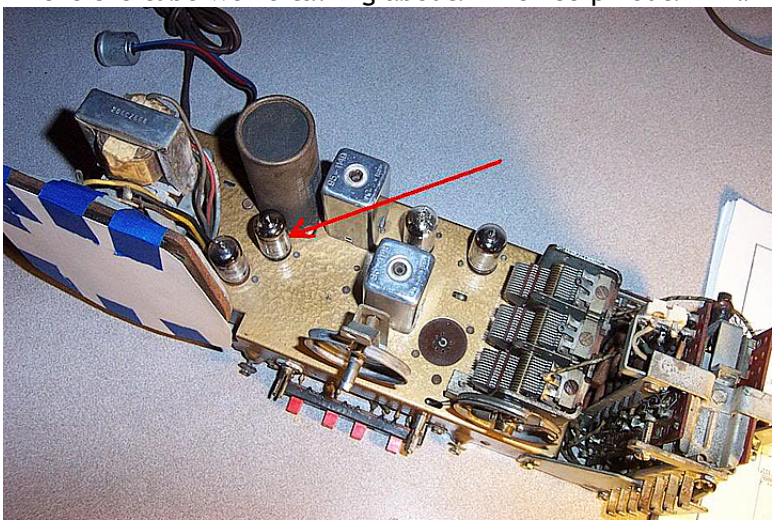


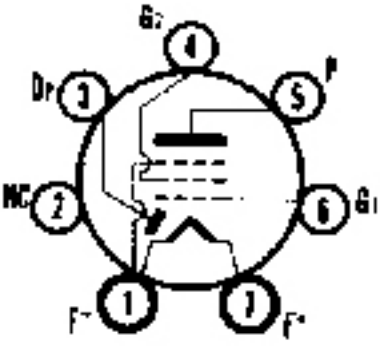
What happened next made me glad I had studied the photofact schematic. I noticed that pin #2 of the 1U5 was empty. In fact, nothing had ever been soldered to it. Pin #2 is the plate…how could the plate pin be empty? Something was wrong in River City:



To make a longer story shorter, it turned out that I was using the wrong schematic. Can't tell you how many times that's happened to me. When Brother Uffda (Phil) sent me the radio he included both 1U5 and 1S5 tubes. Smart thinking on his part. At the time I thought they were direct substitutes, plug and play types, so I just stuck the 1U5 in the socket and headed for the Miller Lite. Wrong. The socket in this chassis is wired for the 1S5. I had a 50-50 shot at putting the right tube in the hole, and blew it. Story of my life. I'm now using the correct schematic. Got it off Nostalgia Air.

This is the tube we're talking about. The 1S5 pinout. Pin #2 is empty:





We're finally back to the five H-500 chassis versions. Here's the breakdown. The below information is credited to Padgett's Trans-Oceanic Page web site, a great resource:

Introduction, baseline: Uses a 1S5 tube for the Det/AVC/AF. Has a dual-pin earphone jack.

Revision A: Uses a 1U5 tube for the Det/AVC/AF. Tube socket is wired differently from the 1S5. Also has a dual-pin earphone jack.

Revision B: Uses the 1U5 and earphone jack has been changed to a single 1/4-inch jack.

Revision C: Uses the 1U5 and has a single earphone jack. Low voltage switch was added for line voltages less than 110vac.

Revision D: Uses the 1U5, has single earphone jack and low voltage switch. A socket was added for an optional 50A1 ballast tube.

1L6 Tube Substitutes

Which brings up the 1L6 tube in these radios. We need to talk about those jewels, but prepare to be bored once more.

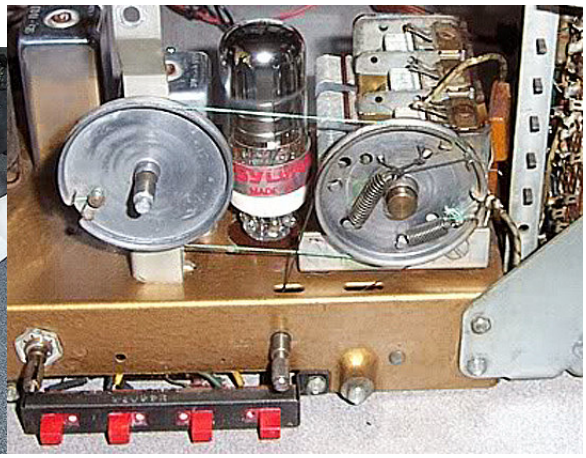
As previously stated, I did loads of preparation for this thread. It was amazing how much Trans-Oceanic info is available on the internet. It went on forever. And one of the much discussed topics was the infamous 1L6 tube, a miniature pentagrid converter having a 1.4 volt dc, 50 milliamp filament. It was designed for use in low-drain battery operated radios…like our Trans-Oceanics.

I read that the 1L6 tube is now quite rare, thus costly to buy. Conversely, I read that there's plenty of them around (being hoarded by thugs like us), but since folks think they're rare, the price remains artificially high. You know...I don't care either way, because for we novices there are other ways to solve a missing or busted 1L6 tube problem:

1. Use a 1R5 tube. There's supposed to be plenty of them around, making them fairly cheap, and they work fine up to about 10mc. Beyond that frequency it's a crap shoot. I read that the 1L6 is also fragile, so experienced repairman will use the 1R5 during troubleshooting, repair and alignment. Should the tube get wiped out nothing much will be lost. I have no idea if that's true (*Ed. Note: I used a 1R5 tube in place of the 1L6 when I restored my variant A model H500, so I guess it's true, at least some of the time.*)

2. Use a 1LA6 loctal tube….or a 1LC6 which is a direct substitute. You'll of course need a socket adapter. And you might need a shield, as the loctal is larger and a lot closer to the IF can (and the tuner) than the miniature 1L6 would have been. The 1LC6 and adapter is

what I received from Bill Turner*, the replacement for my missing 1L6 converter. Though big, it looks pretty spiffy sitting in there:



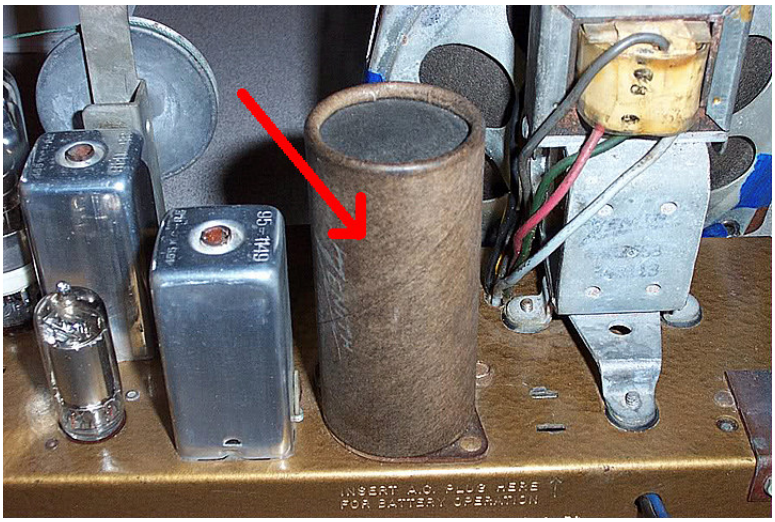
3. Use a solid state tube…that's right, solid state. It's a tiny circuit board with solid state components mounted inside a glass tube. I think it looks really cool, and wanted one for this H-500. The seller claims that the tube can be installed in a Transoceanic without any realignment required. Unfortunately, the cost is $43.00 plus $2.00 shipping.

Bill Turner's tube and adapter was $18.00, which included shipping. It was a no-brainer. Those are the three easiest ways to overcome a missing or busted 1L6 tube. There are three more ways, two of which involve tubes supposedly just as rare as the 1L6. The last way requires the installation of a separate oscillator. If interested, you can look those up on the net.

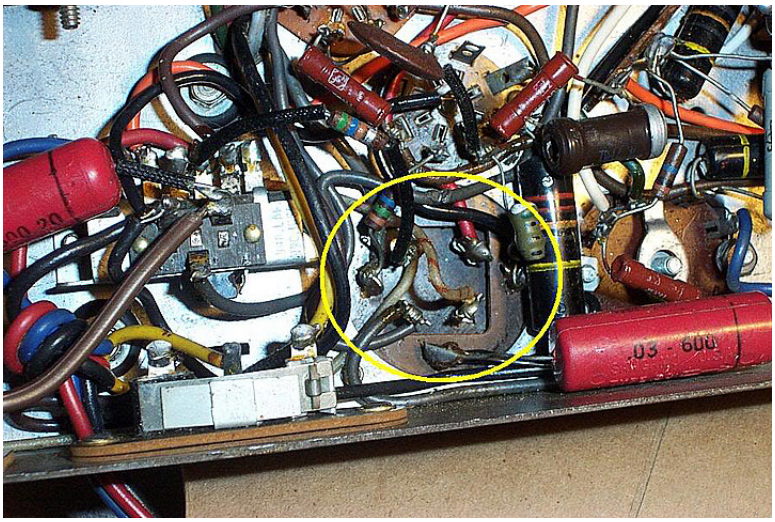
**Contact Bill Turner at www.dialcover.com*

Restuffing the Filter Can

I've decided to begin the chassis restoration with the filter can. This radio has a floating ground. The negative plates (the can itself) of the four electrolytic filter caps are connected to B- rather than the chassis. Note the cardboard insulating sleeve covering the can. It's purpose is to keep characters like me from getting zapped:



Here's the seven soldering tabs under the chassis, four of which connect to the can innards:



Removing the filter can from the chassis would require unsoldering the wires from those four tabs. It's pretty tight under there, but I've worked in smaller spaces and didn't consider the job to be all that difficult. But one of the reasons I do these threads is to

hopefully present at least one or two new ways of doing things. This filter can, which is riveted to the chassis, presented just such an opportunity.

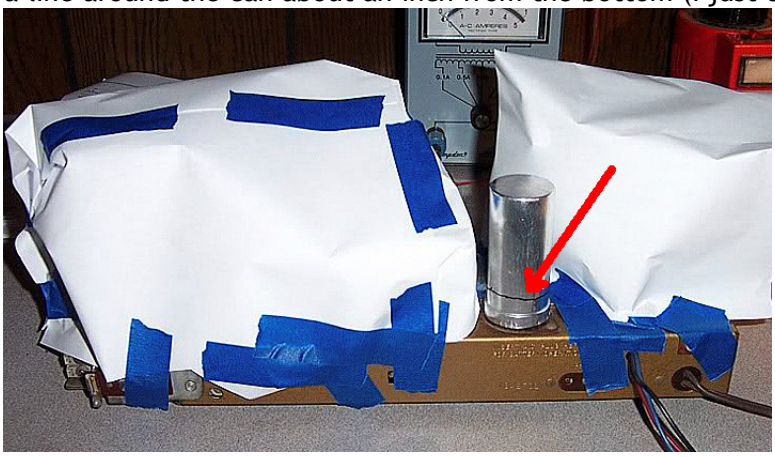
I decided to re-stuff the can without removing any of the existing wires or drilling out the rivets. The can would stay put. Therefore, it became time for a nice cup of coffee and a bit of skull-braining. The first problem was to figure out what to do about the cardboard sleeve. It had to come off and not sustain any damage in the process. I thought the answer might be the ole heat gun.

I didn't know what type of glue was holding the sleeve in place, but hoped it would soften under heat. So I poured the heat to the outside, keeping the gun constantly moving and being very careful not to set the thing on fire. It got pretty hot, but no smoke appeared. After about 45 seconds I wrapped my hand around the sleeve, but not for very long…know whadda mean, Vern? I let it cool for a few seconds longer, then tried again. Son-of-a-gun…the sleeve twisted off just as easy as you please…without so much as a wrinkle.

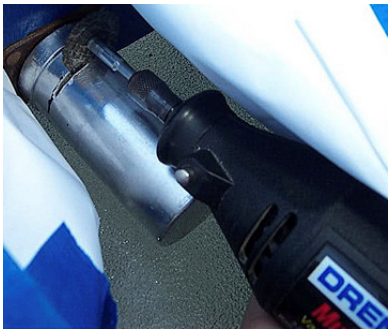
The round disk remained stuck to the top, but my pocketknife helped with that:


The sleeve was glued on by a tar-like substance, but not exactly tar. It's almost like tar and wax mixed together. My knife blade removed the excess. Mineral Spirits made the rest go away. It peeled right off the round cap…no effort at all.

Everything except the filter can was then covered and taped. With a magic marker, I drew a line around the can about an inch from the bottom (I just eye-balled it):

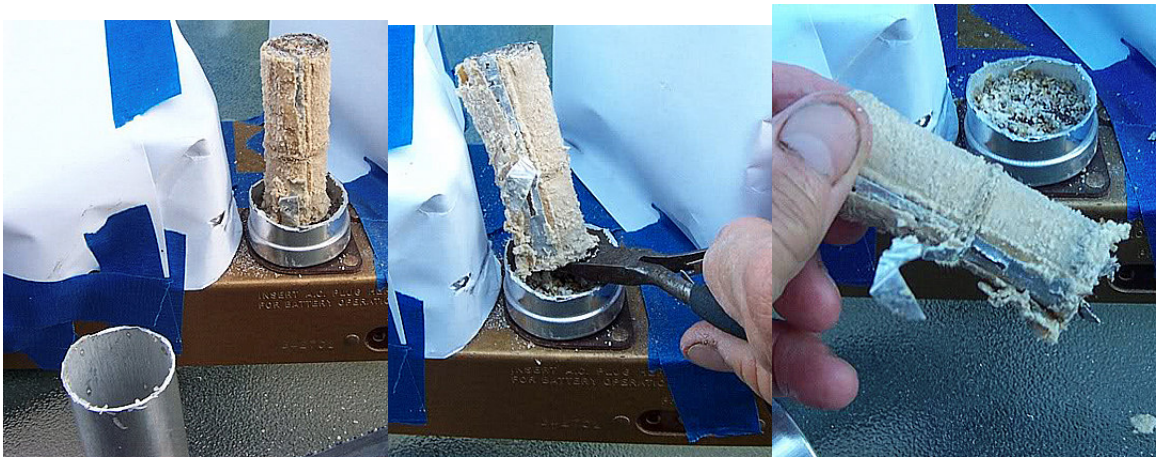


It was now make or break time. Out came the Dremel Tool, the chassis was laid on its side, and the cutting began:

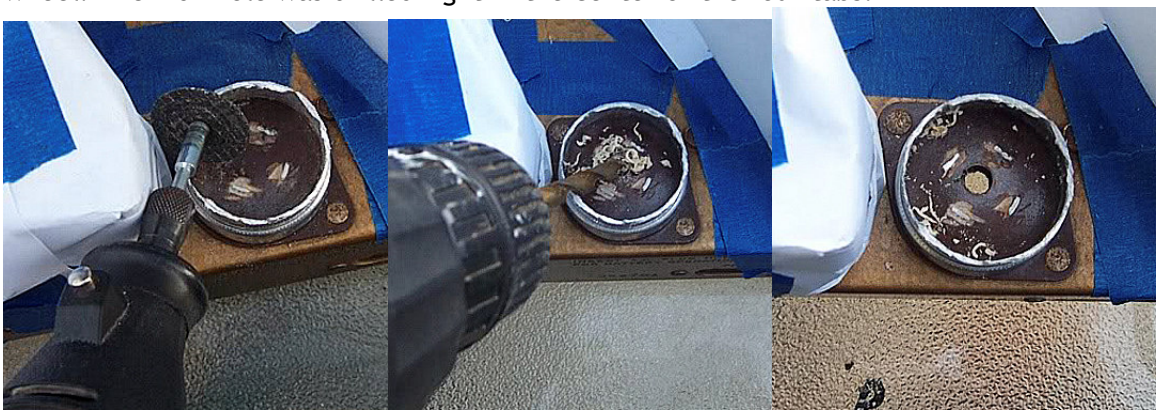


There’s not much room between the IF and filter cans, so the last 1/4 inch or so was done by hand with a hack saw blade cutting at a slight angle.

The guts were wet. Removal was done by snipping the four soldering tabs at the bottom:

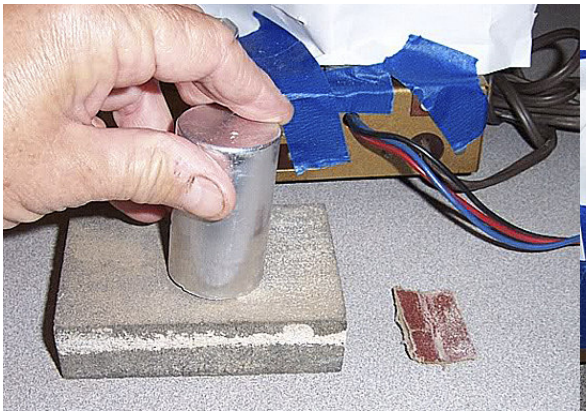


The loose stuff was vacuumed up, then the stubs were ground flush with the cutting wheel. A 5/16” hole was drilled right in the center of the four tabs.



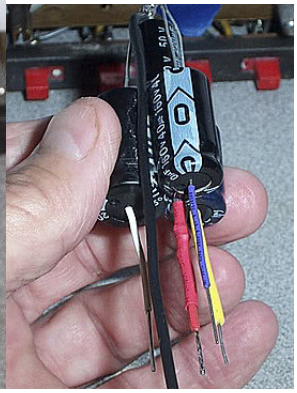
The wires (negative and positive) from the new caps will thread through it and be soldered to the tabs under the chassis.

Caution: Don’t drill through any wires underneath. Be sure to first check things out…and do drill slowly



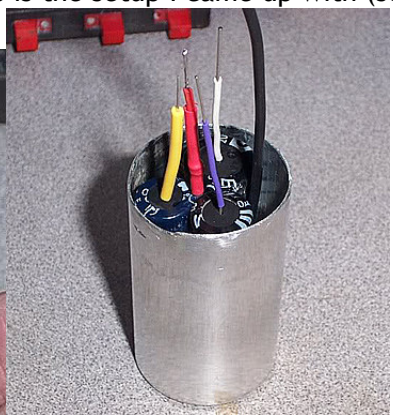

The cut edges were sanded smooth, mineral spirits removed the remaining cement from inside the top, and both sections were cleaned with alcohol. The can is now ready for restuff.


How to configure the four new filter caps (220uf, 60uf, 40uf and 20uf) for a good solid installation inside the filter can became the next headache. So I set the caps on the

workbench and maneuvered them this way, that way and a hundred other ways looking for the best arrangement. I’m sure many of you could have done better, but with the help

of a little Super Glue Gel, this is the setup I came up with (see photos, above and below).



I liked the idea of the negative leads off the three lower caps forming a cage around the upper cap (220uf). The leads were cut to length and soldered together, but one was left a bit longer than the others. About 5-inches of 22ga. black insulated wire was then soldered to it. It doesn't matter which lead is left longest. Just pick one.

I also liked being able to thread the upper cap's positive lead down through the center hole formed by the lower caps. Different colored insulation was then installed on each of the positive leads. Turned out the whole mess fit nicely inside the can

But I did encounter one small difficulty: I had drilled too small of a hole through the bottom of the filter can. The now insulated positive leads would need to be excessively bent to fit through it. Not good. So the hole was enlarged to 3/8-inch:

I didn't want the caps to sit on the bottom of the can without at least some sort of insulation/padding. So I dug through my goodie box and came up with a set of rubber washers I had bought at Lowe's last year and for some reason glued together… probably for use as a chassis mounting washer, but guess it didn't work out. Anyway, it came in pretty handy for this little deal. Scissors initially enlarged the hole, followed by the ole Dremel tool and sanding drum. A nearly perfect fit. (T)he e-caps are officially back in the can.

The black rubber washers were super glued to the bottom of the can and a few globs of hot glue hold the caps in place:

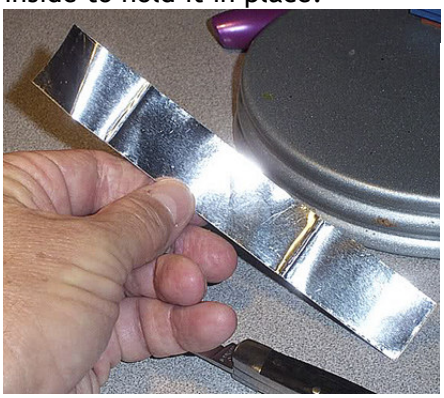
Let's close the filter can and create a mini-time capsule. I just love this stuff.

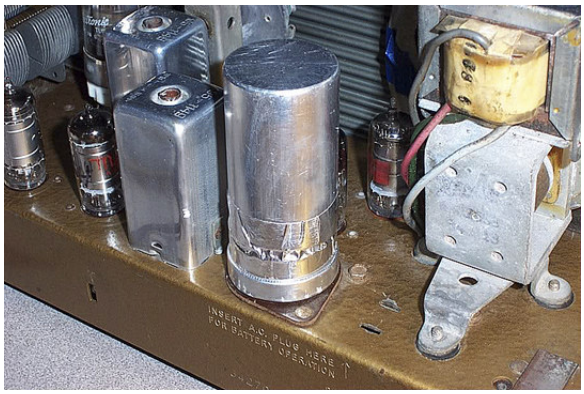
The note is wrapped inside the buck. It says Brother Uffda (Phil) was the generous supplier of this project radio. I and all members of the ARF received credit for the restoration itself. It's unknown if the can will ever be opened again, but if 200 years go by and someone does reopen it and read the note…the dollar bill will also be there so they can call someone who gives a flip:

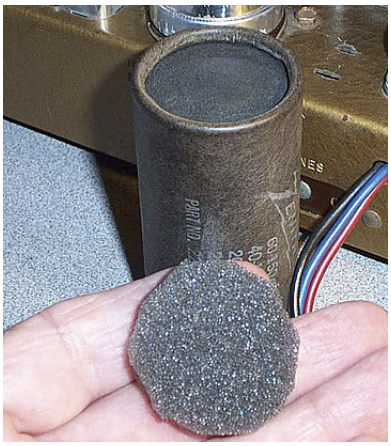
The two halves were joined with aluminum exhaust header tape. A while back another forum member recommended using it. I liked the idea, so decided to give it a try. Trust me, it works great. It's neat, clean and provides continuity, if needed.

(A disk) was cut out of a thin sheet of foam rubber. The round disk at the top of the cardboard sleeve is just pressure-fitted in there, but I decided not to glue it in place. Too

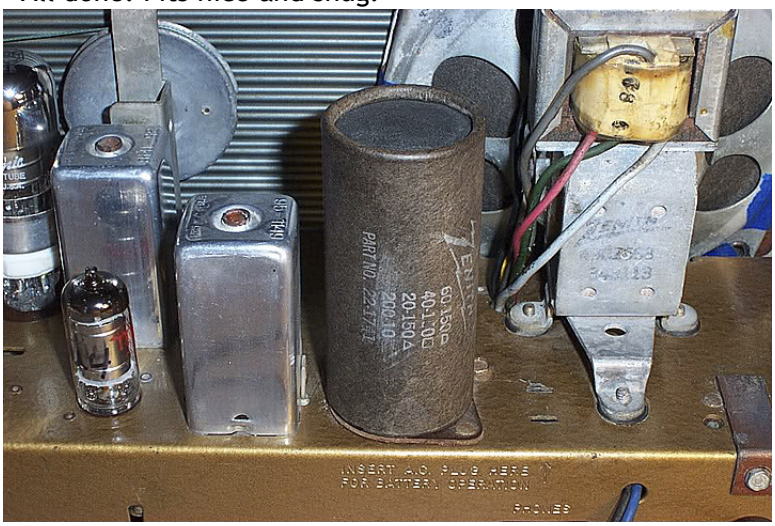
messy. Instead, the foam will sit on top of the can and apply enough pressure from the inside to hold it in place.





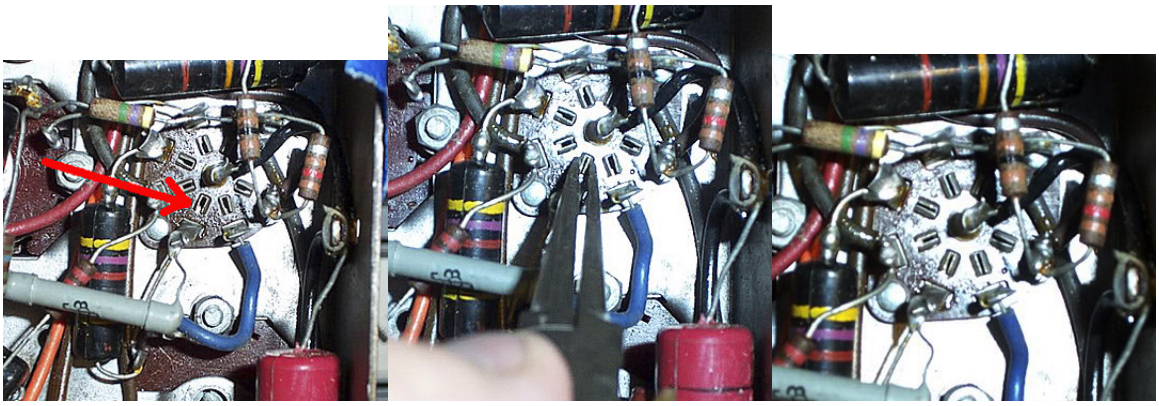


All done. Fits nice and snug:



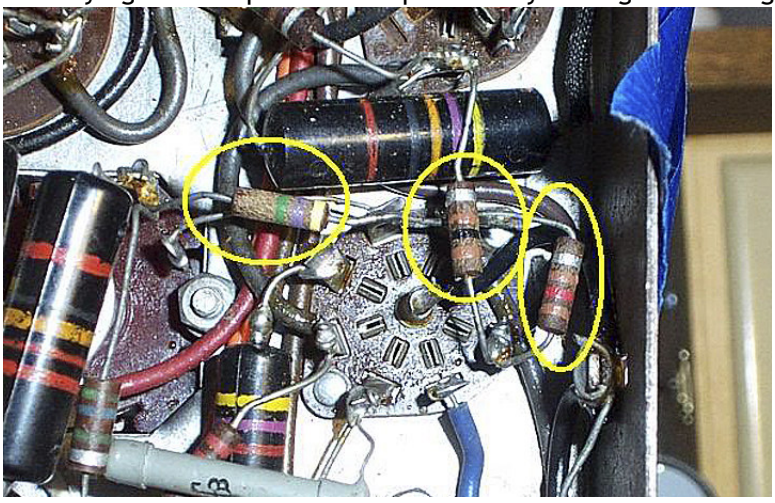
Tube Socket Repair

More than a few folks have asked about cleaning miniature tube socket connectors and how to make them have better contact with the tube pins. Here's a bottom view of one of the miniature sockets in this radio. You can see how spread apart each connector has become:



But there is a plus side to this…it makes them easier to clean. Hit them with some spray, brush them with alcohol etc., then use long needle-nose pliers to very carefully pinch each one back together. Easy, easy does it…don't mash them, just sorta sqooze em. When done they should look a little like this (see photos above)

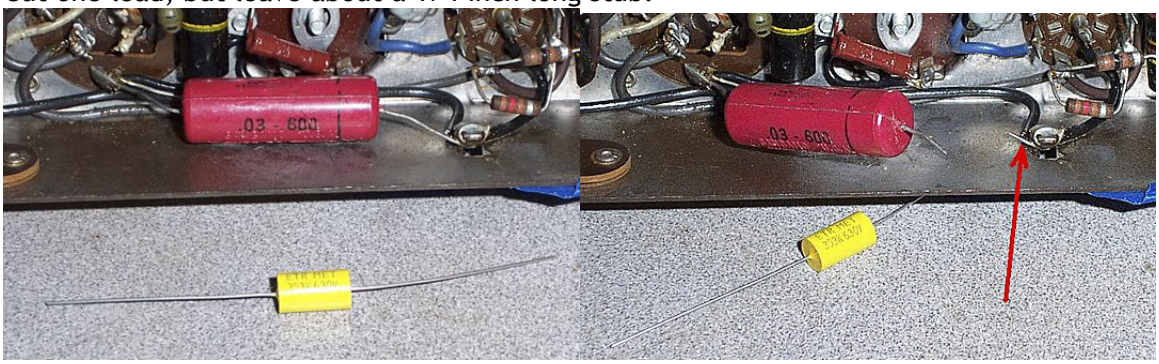
The circled resistors (in the photo below) look like dry drift wood. I don't trust them, so they'll soon be leaving this chassis. I recommend that you always eliminate resistors that look this way, even if they ohm out ok. They only cost a few cents each, so why risk destroying more expensive components by letting them hang around and go poof.



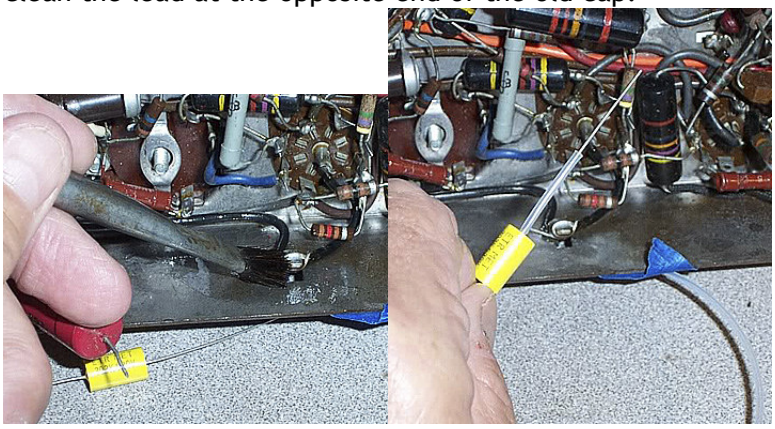
Replacing and Soldering New Components

Since joining this forum I've noted more than a little discussion concerning the correct method of soldering in new components.
Suggestion: If a highly-skilled NASA soldering tech ever tells you what he thinks is the correct way…be sure to listen to him. Otherwise, simply use whatever method works best for you. Your own good judgment is what brought you to this forum in search of vintage radio know-how, so let your good judgment also determine if you're making acceptable solder connections. Trust me, you'll know if your soldering is below par.

That being said, here's how I solder in new components. It's often referred to as the "coil method". Some say it works good, some say not. I say it works fine for me…and it's how the new caps will be soldered into this chassis. We'll begin with a red .03uf 600volt cap. Cut one lead, but leave about a 1/4 inch long stub:



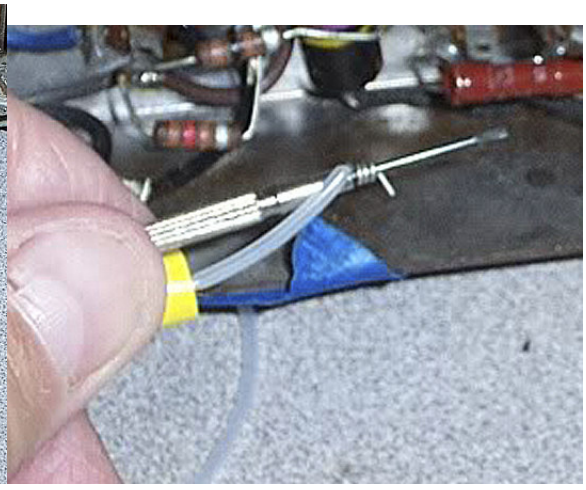
Thoroughly clean the stub and surrounding solder with a brush and alcohol. Don't skip this step. Things must be clean to establish a good, new joint. In the same manner, clip and clean the lead at the opposite end of the old cap:

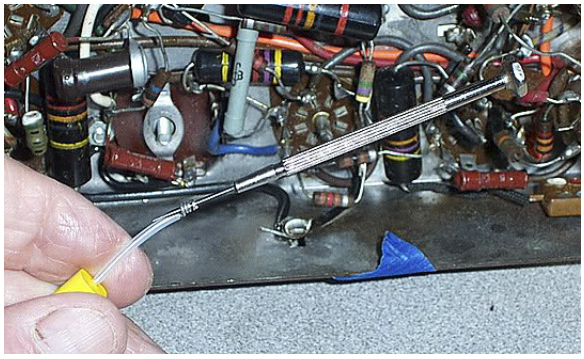


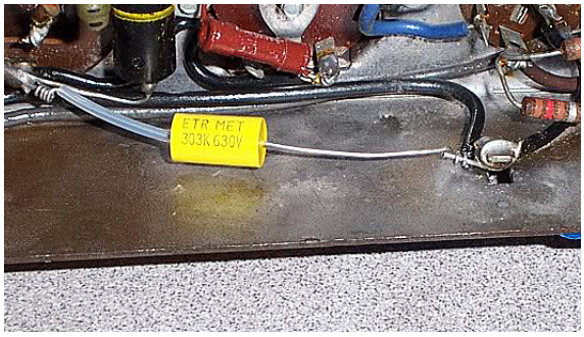
Dry fit the new capacitor (center it between the stubs) and determine how much insulator will be needed on the leads. In this case only one lead requires insulation, as the other

lead will be connected to chassis ground. An insulator can be heat shrink tubing or a liquid type painted on the leads after the component has been soldered in place. I use a clear Teflon insulator commonly called “spaghetti tubing.”

The coil method of soldering starts out with a thin jewelers screwdriver, about a 1/32” type. The pics explain the rest:







There's three things I like about the coil method of soldering:

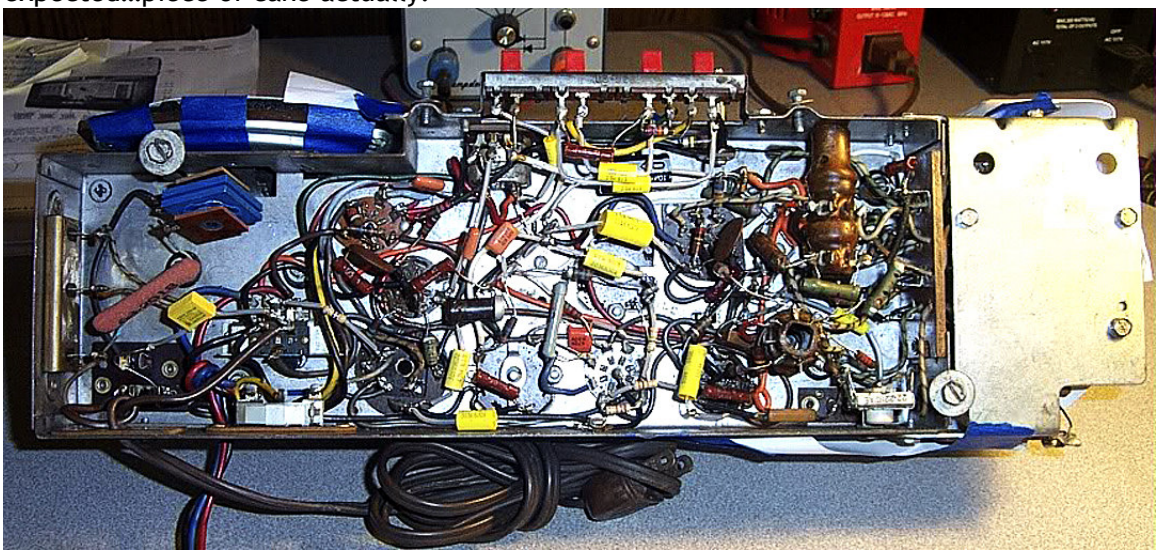
1. Done correctly, it eliminates, or at least minimizes, damage to tube socket pins and other old, fragile connection points.

2. There's no need for a third hand. Once the insulation is on the leads and the coils are formed at each end, the component will hold itself in place on the old stubs. All you'll have to do is apply the solder. Caution: Be sure to heat both the coil and the stub. Heating only one will most likely result in a "cold solder joint". That's bad.

3. If the component ever has to be removed, it's simply a matter of heating and slipping it off the stubs. No fuss – no muss.

Lastly, please know that coils, used either separately as splices or formed on the end of components leads, goes back a long way. It's nothing new. Here's a little more about them:
http://www.antiqueradios.com/forums/viewtopic.php?p=698906&highlight=&sid=878dcf4a1eeddbf8c3fd3bb41a84092d

With the exception of one or two small caps located on the coil tower (the tower is still covered with paper), all the old black bumblebee and red molded caps have been replaced. A(ll out of tolerance) resistors also went bye-bye. The job was much easier than expected…piece of cake actually:



Restoring the Power Supply Circuit

Sorry to bore you again, but please allow me to perch on my newbie-speak soapbox one more time:

This Transoceanic is simply an AA5 with a pile of adjustable coils on one end. True, the coils and associated wiring seem like a ball of spaghetti, but the rest of the radio is pretty darn simple…nothing most of you haven't seen before.

The five miniature tube filaments each operate on 1.4 vdc. Zenith engineers designed it that way so the batteries wouldn't be quickly sucked dry. Believe it or not, the company claimed that a fresh set of batteries would play this radio 3 - 4 hours a day for 5 weeks…which brings us to the replacement of the proverbial selenium rectifier.

It's very important for the tube filaments to operate at 1.4 vdc, or slightly lower. Too much voltage and the filaments go kaput. Too little and the tubes quit working.

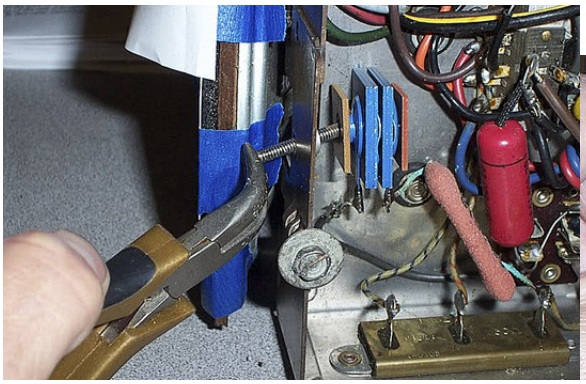
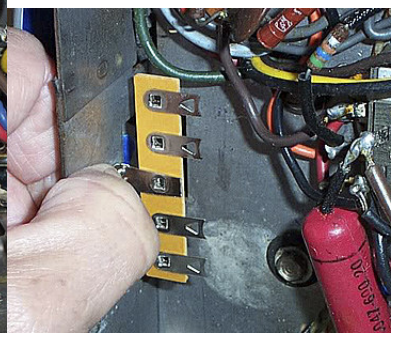
It's what (ARF member) Tack meant when he said, "I like to get that 1L6 voltage set as low as possible, but still have normal operation on the upper bands. A good 1L6 will still oscillate at around 1.25 volts."

Translation: He's too cheap to keep buying 1L6 tubes at $99.00 a pop. Better to lower the filament voltage so the tubes (especially the 1L6) will last longer. I fully concur. But just keep in mind that you can lower the voltage only so much.

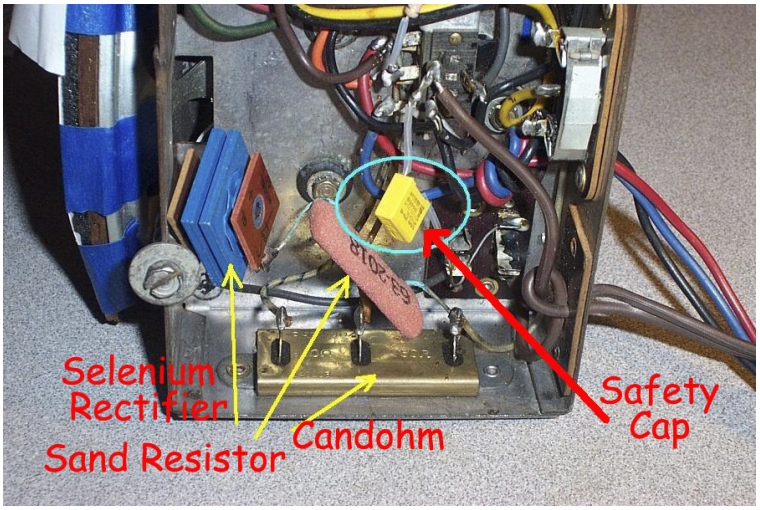
The selenium rectifier's built-in resistance is vital to properly maintaining the filament voltage, so you just can't replace it with a diode and hit the Bud Lite. You must also put back some of that resistance by adding a resistor after the diode.

I've read more than once that it's best to simply disconnect the wires from the rectifier, leave it in place and attach a terminal strip to the end of the long screw running through its center. The replacement solid-state diode, and added resistor, would then be soldered to the strip.

I don't like that idea. A terminal strip will be used, but it'll be attached to the chassis via the screw hole that held the rectifier. The rectifier will go bye-bye.

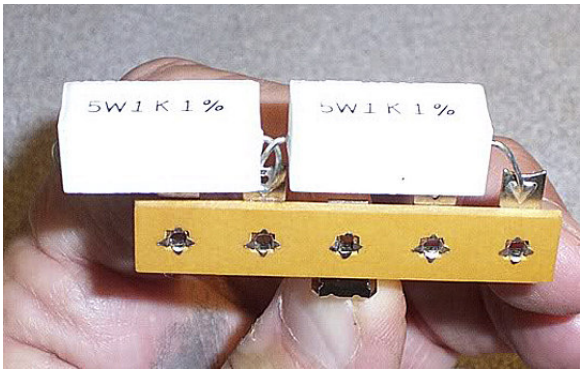



The head of the long screw is very close to the edge of the speaker basket. Removing it requires things to be somewhat tilted. The terminal strip will be mounted about like this (I'm holding it in place with my thumb, photo above.)

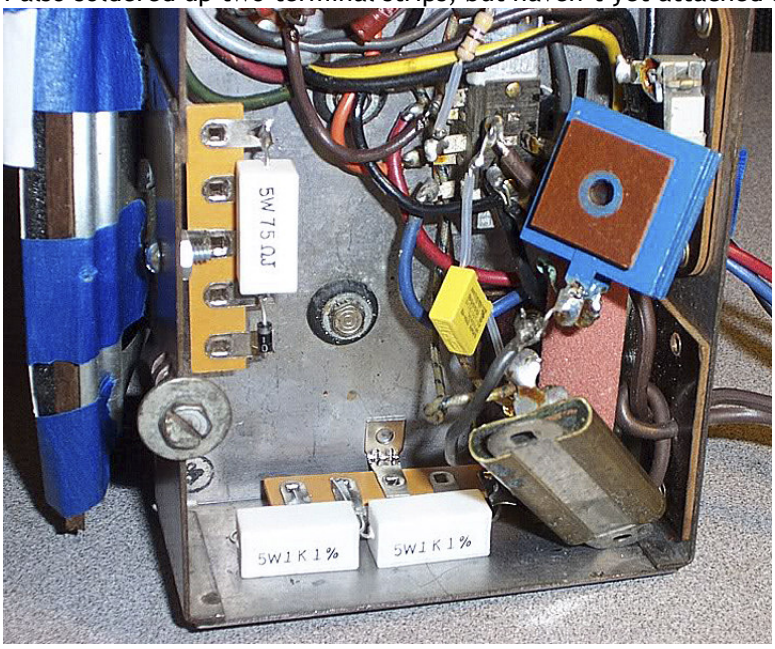


In the photo above, note the safety capacitor (green circle) installed across the AC line.

This morning the Dremel Tool and a pointed medium grit stone were used to remove the rivets holding the Candohm resistor to the chassis. That Candohm consists of two 950-ohm, 3-watt resistors. They'll be replaced by two 1k-ohm, 5-watters.



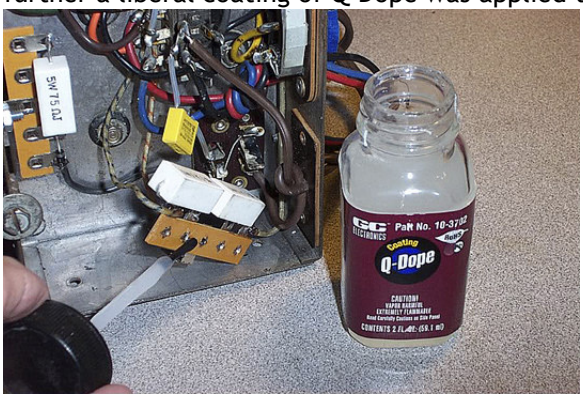
I also soldered up two terminal strips, but haven't yet attached any wires



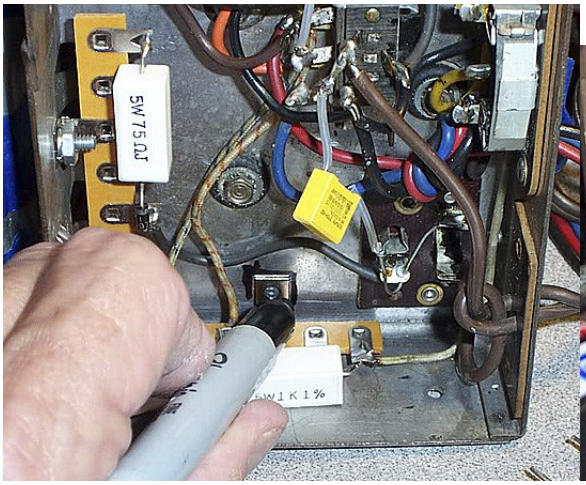
The strip on the left (screwed to the chassis) has the 1N4007 diode and 75-ohm, five watt resistor. I read that a 75-ohm resistor after the diode will provide the correct filament and plate voltages for this radio, so I decided not to reinvent the wheel. If in the end it proves to be bogus, then I'll pull down the multimeter, fire up the variac and correctly determine the needed resistance. The lower terminal strip holds the resistors which replace the Candohm. It'll be cemented into the chassis, with the resistors against the chassis wall to dissipate heat.

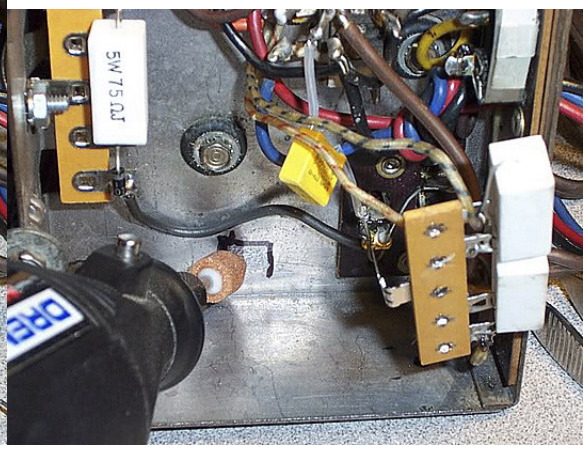
High filament voltage, low filament voltage…all I want is enough voltage in the right places so this thing will start playing again. With that in mind, what say we get back to the bidnez of restoration? The wires from the Candohm and selenium rectifier were removed and reconnected to the terminal strips. I then became concerned about accidentally touching and

grounding one of the double resistor connection points to the chassis, so before going any further a liberal coating of Q-Dope was applied to the backside:

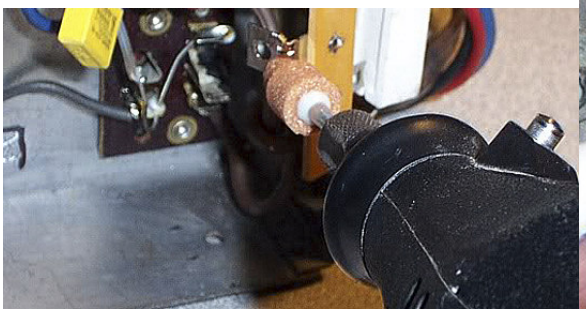


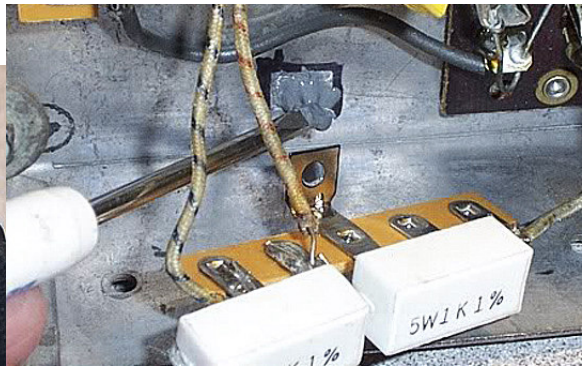
The mounting tab position was marked. To maximize adhesion the area was roughed up with a medium grit stone:



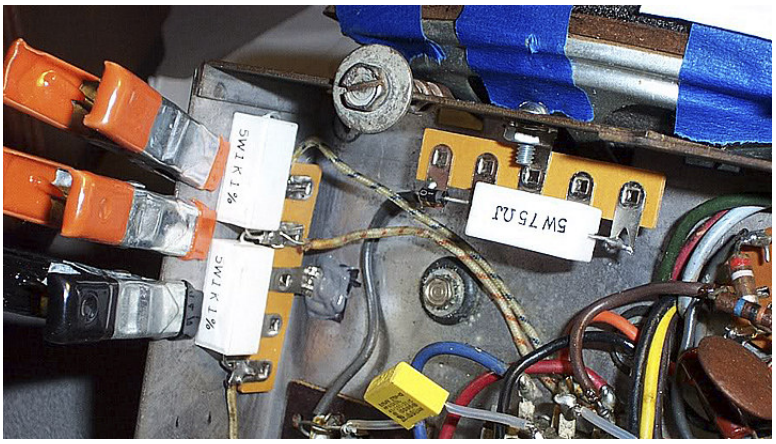


The side of the mounting tab that faces the chassis was also roughed up. Don't overdo this part. Those tabs are pretty thin. The J-B Weld was applied:

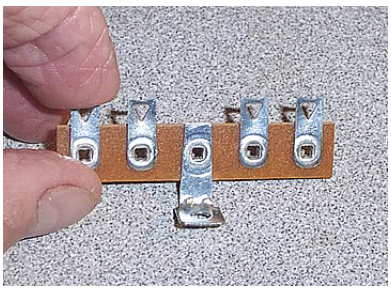




And the terminal strip was positioned in the chassis. I used the clips to provide pressure until the cement dried. Worked pretty good:



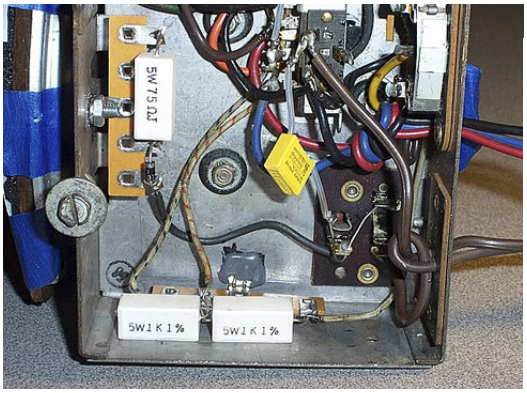
I don't always use J-B Weld to attach a terminal strip to a chassis, (so) to make things a little clearer for my newbie brothers, here's a pic of one of my usual strips...showing the center soldering tab cut off. I do this to keep from making a big mistake.

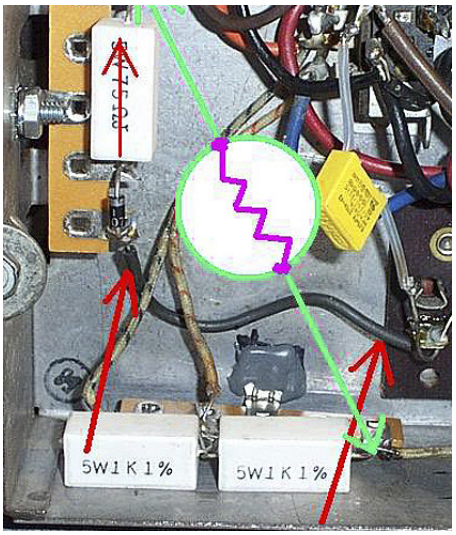


If the terminal strip is attached by a screw and nut, it will ground that center tab to the chassis. To keep from wrongly soldering a wire to that point it's best for the tab to be removed. If the tab isn't there the mistake can not happen.

There are of course times when you want the center tab to be grounded to the chassis...and not cut off. Just make sure you know when. If you're not sure...ask the sharp gents on this forum.

Everything is now hooked back up:



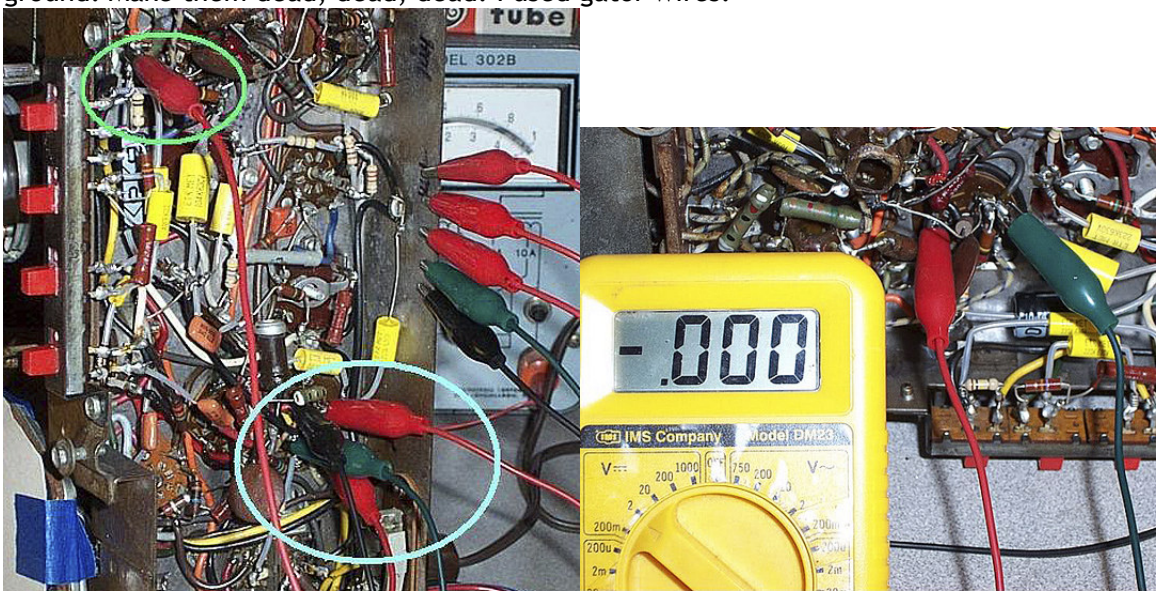


Here's the voltage flow. It enters on the black wire shown by the red arrows…then goes through the diode rectifier where the negative half of the cycle is removed (blocked actually)…then it continues through the 75 ohm resistor and out into the rest of the radio's circuitry. The green lines and white circle depict the location of the sand resistor (Zipohm).

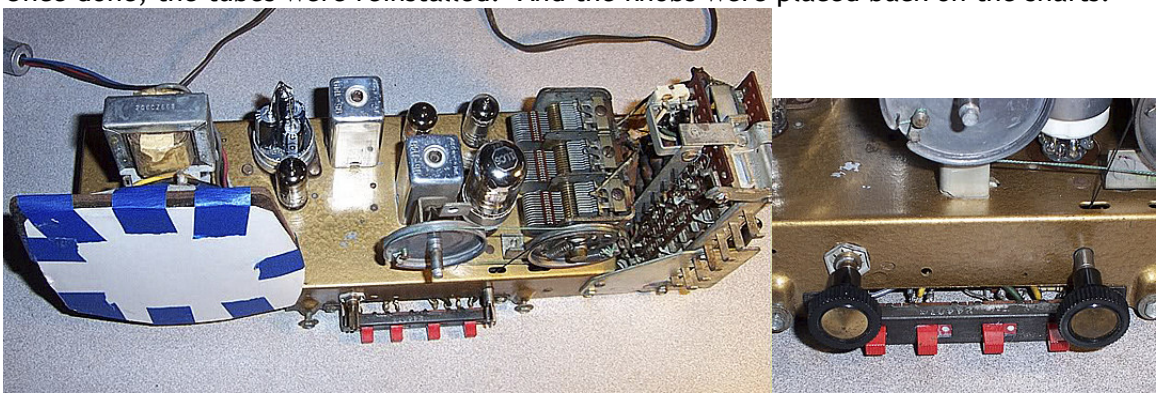
The 230 ohm sand resistor provides protection to the delicate 1.4vdc filament string by suppressing line surges that could wipe it out. Unfortunately, there's a small problem with that 230 ohms:

Before reinstalling a single tube in the chassis it was important that the filter caps be completely, completely, completely discharged. Failure to do so could cause one or more tube filaments to blow. I know this because……wellllllll, there's really no need to go there. Just be sure to discharge the positive side of the five electrolytics to chassis

ground. Make them dead, dead, dead. I used gator wires:



Once done, the tubes were reinstalled. And the knobs were placed back on the shafts.



Safety tip: It's never a good idea to apply power to a chassis, and then grab hold of a bare shaft. There's no telling how much voltage might be there…could be hundreds of volts. So after a repair action, and before firing up one of these old radios to check your work, put those knobs back on. Be safe – not dead:

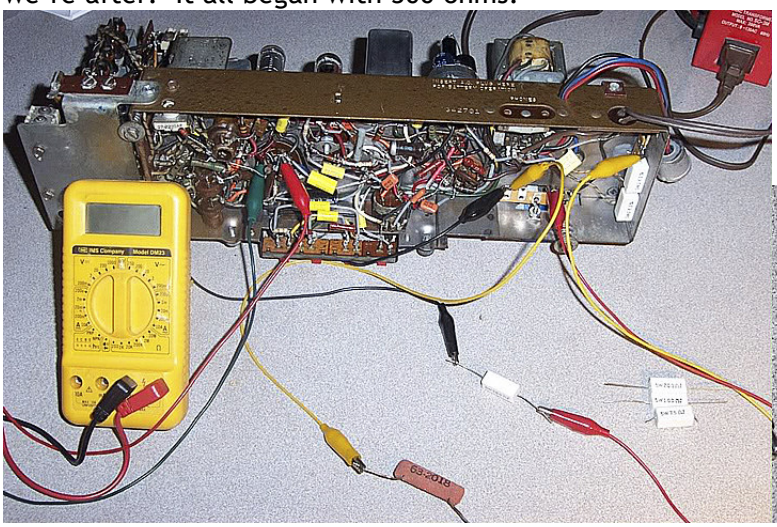
Now comes the fun part. You know that I yanked out the selenium rectifier and replaced it with a silicon diode. That selenium rectifier had a lot of internal resistance (almost a meg), but the resistance is now gone so we need to replace it with a resistor…which brings us to this question:

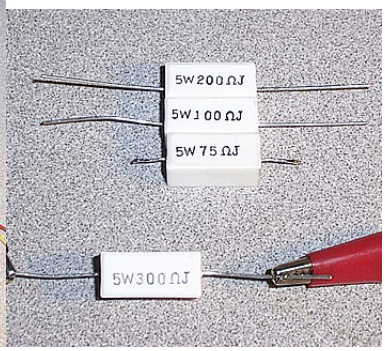
How much resistance is needed so that each of the individual tube filaments will receive 1.4vdc? Too little voltage and the tubes won't conduct…too much and poof goes a tube.

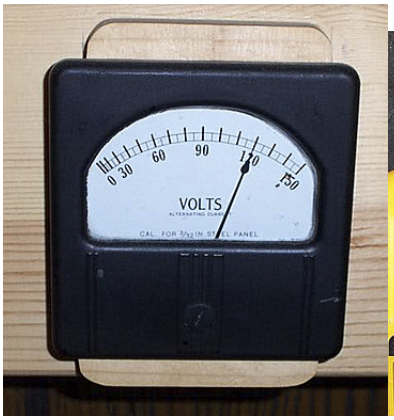
Here's how we find out: The multimeter leads are connected to the 1L6 (1LC6) filament,

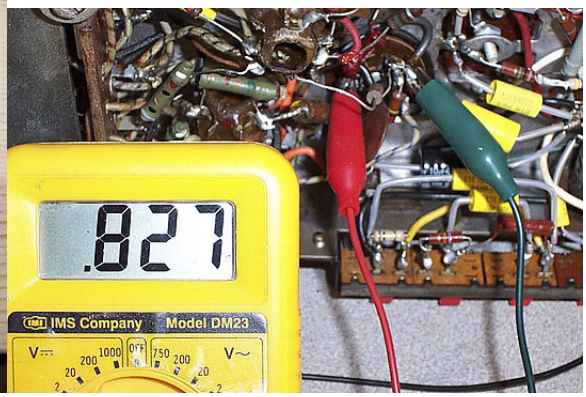
pins# 1 & 7. You can use any of the four single-filament tubes. The 3V4 output tube has a center-tapped double filament, so if you're kind of new at this I'd shy away from using that bugger.

The remaining four gator wires look confusing, but just know that they connect the white 5-watt resistor, the 3-watt sand resistor and the rectifier diode all in series with one another (located after the diode). The correct resistance for the white resistor is what we're after. It all began with 300 ohms:









I slowly increased the variac voltage, all the while keeping a very, very close eye on the multimeter. I did not want that filament voltage to go above 1.4vdc. The variac reached 120vac. But the filament voltage wasn't high enough. I needed to decrease the size of the resistor and try again. 200 ohms threw its hat into the ring:

Again at 120vac the filament voltage was not high enough. I needed to further decrease the resistance. In went 100 ohms:

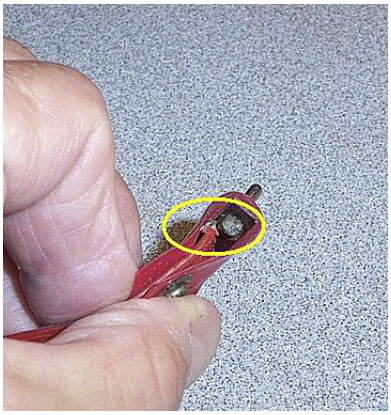
Things were getting closer, so very, very slowly the variac voltage was increased. I was surprised to again reach 120vac with the filament voltage still not high enough…no cigar yet:

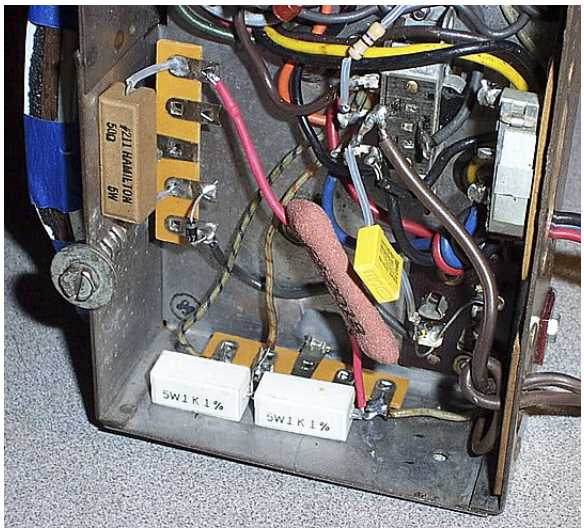
When all was said and done, it looked like 50 ohms would achieve the filament voltage I wanted.

But just to be sure I left the resistor on gator wires, hooked up the antenna and fired up the radio.

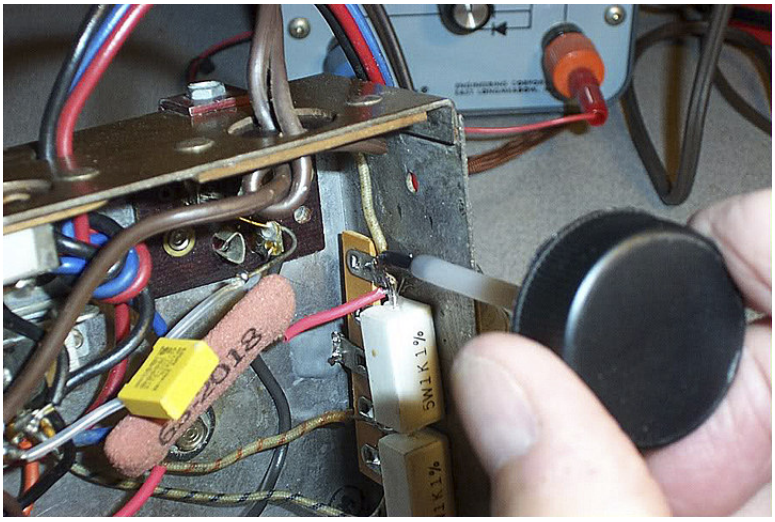
By golly, we had reception on the broadcast band and one of the shortwave bands, but the volume was way too low.

It turned out to be a broken antenna wire. I re-soldered it and the volume took off like a scalded ape. So I shut everything down and soldered the pieces in place:



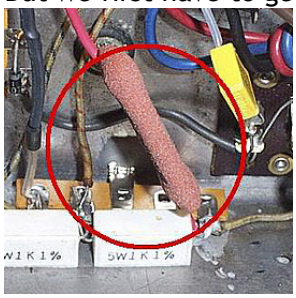


Upon further inspection, I felt that this soldering tab and wire was a little too close to the chassis, so I applied a heavy layer of Q-Dope as an insulator. I'm happier now:

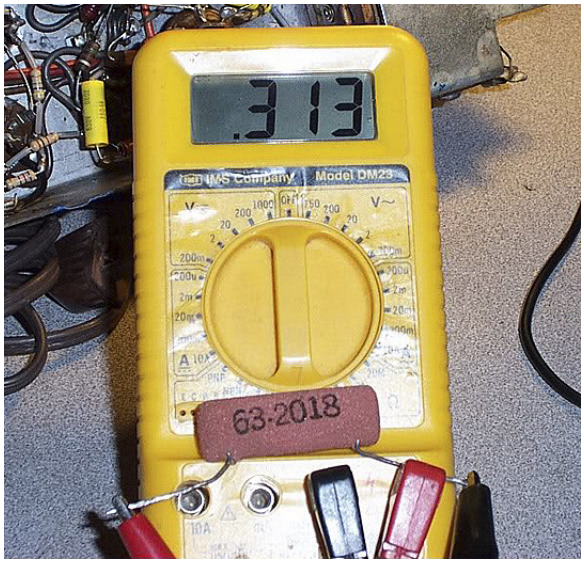


…So let's finish this chassis so we can move on to the cabinet/case...something several of you have been patiently waiting for.

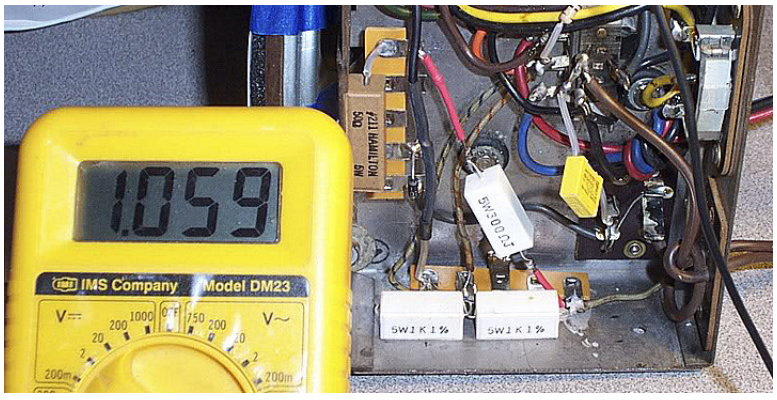
But we first have to get rid of that nasty old sand resistor (Zipohm).



This is what the Zipohm was reading before I soldered it back in the chassis, so I figured a 300 ohm 5-watt replacement would do. Wrong!:

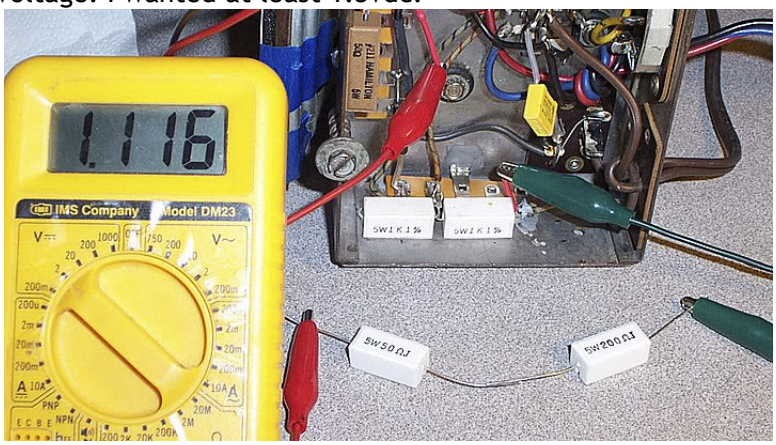


The resistor was replaced and like before, I gradually cranked up the variac to 121vdc while monitoring the 1L6 (1LC6) filament voltage (pins 1 & 7). I couldn't believe it…the voltage was way too low. Who stole the filament voltage?:

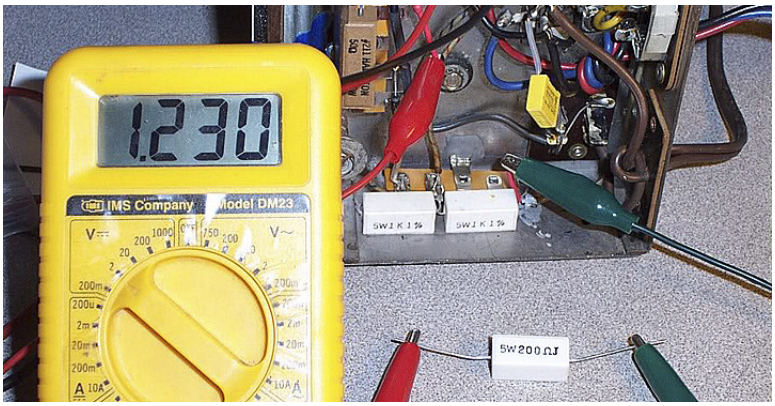


I didn't know what had happened, but it didn't matter. As much as I disliked the idea, the

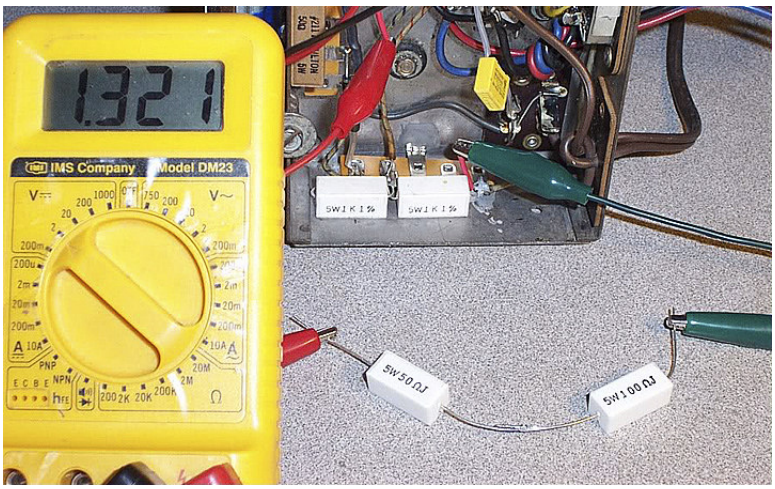
musical resistor routine would have to be repeated. Soooooooo…since I had to go through it twice…you have to go through it twice. I started with 250 ohms and got this much voltage. I wanted at least 1.3vdc:



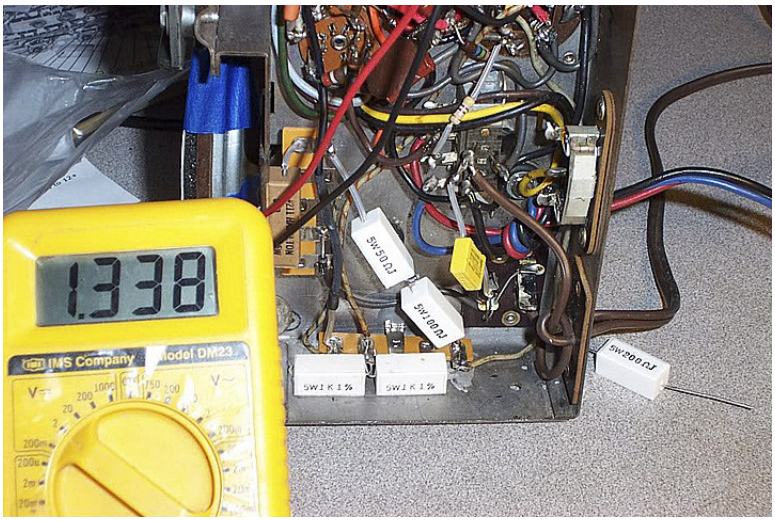
And at 200 ohms. Still too low:



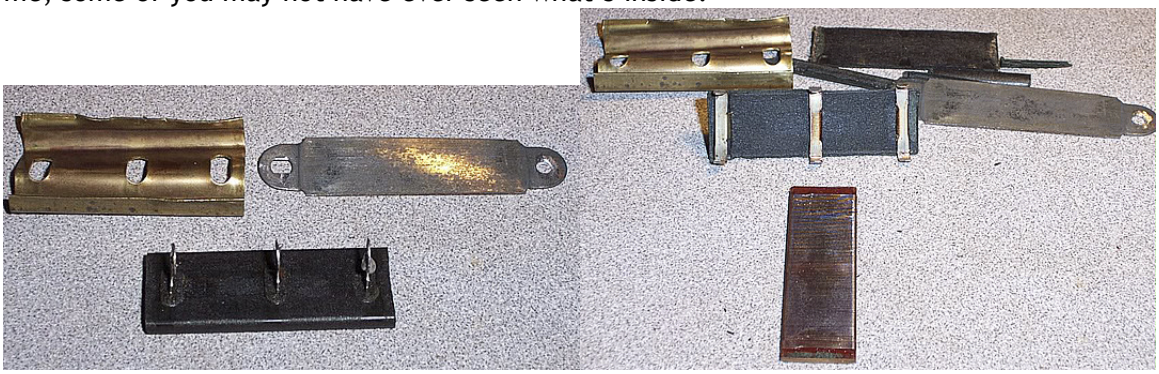
150 ohms finally did the trick:



After soldering everything up the voltage went a tad higher, but I'm happy now and the radio is playing nicely:



I thought it would be cool to tear apart that Candohm and see what makes it tick. Like me, some of you may not have ever seen what's inside:



How about that…a stick of hard chewing gum wrapped with thin copper wire.

Installation of a Zener Diode

What is a zener diode? Why do we want one in this radio? Why would we want one in any radio? Here's how I understand it all…in Newbie-speak. I trust our old pros will make corrections as necessary.

A zener diode works like a pressure relief valve on a hot water tank…the valve pops off when pressure inside the tank exceeds a certain level. The zener does the same thing, but in an electrical way. At a certain voltage level it "breaks down" and allows excess voltage to pass through it...it becomes a short.

We'll… be installing one of these 9.1volt, 5-watt zener diodes (1N5346B) in the filament string, and closing up the filter can. Prepare to be bored once more.

Sometimes by design a zener will short and pass voltage to different parts of the circuit to be used by other components. At other times the excess voltage is simply gotten rid of by sending it straight to ground. Zener diodes come in various voltage ratings and different wattages.

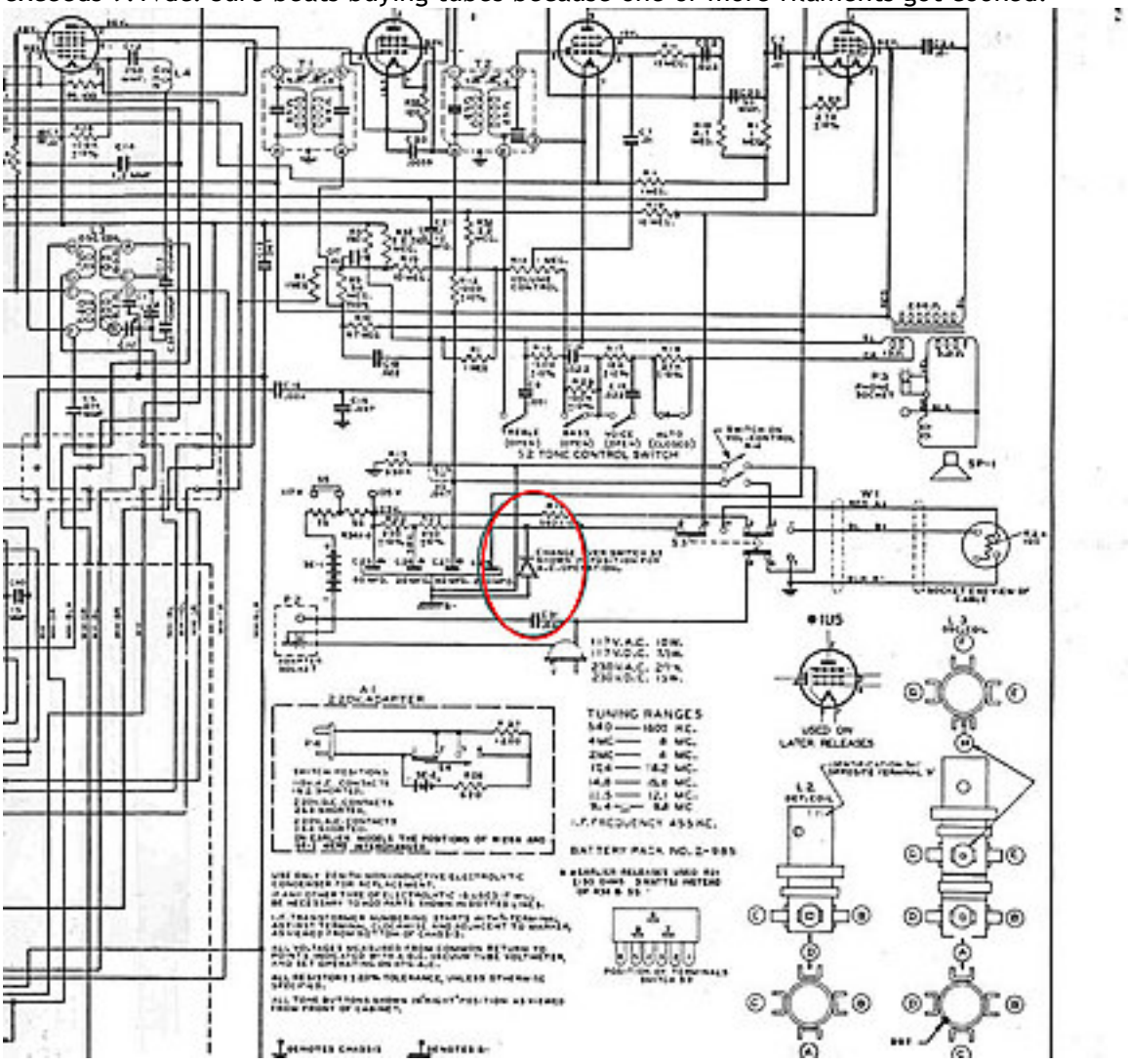
That's about all most of us really needs to know about zener diodes, but if you have a hankering to learn a whole bunch more, Google will help you get started.

So why do we want a zener diode in this radio? Answer: To keep excessive dc voltage off the filament line.

The five tubes in a Transoceanic H-500 contain six filaments (the 3V4 has two) and they ideally drop a total of 8.4vdc. In this radio they're dropping 8.42vdc, measured of course by my uncalibrated multimeter. If the filament line were to receive a sudden voltage surge (or spike) one or more of the filaments would blow (trust me, I know). So a 9.1volt, 5-watt zener diode was placed in the line. If it works correctly, everything over 9.1vdc will now

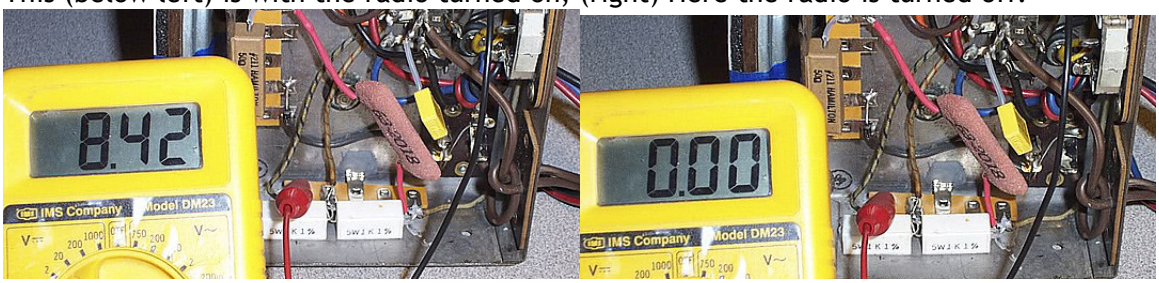
be sent straight to B minus.

The schematic shows where I placed the zener. Note that the negative end (the cathode) is connected to the positive dc voltage line…and the positive end (the anode) is connected to B minus. In other words, it's connected negative to positive and positive to negative. It's called "reverse biasing". Guess what would happen if I were to connect it the other way around (forward biasing)…the positive end of the diode to the positive voltage line. Since it would be "positive to positive" all voltage coming down that line would pass right through the diode and go straight to B minus. That would suck, so the diode had to be reverse biased, essentially keeping the electrical door shut until the filament line voltage exceeds 9.1vdc. Sure beats buying tubes because one or more filaments got cooked:

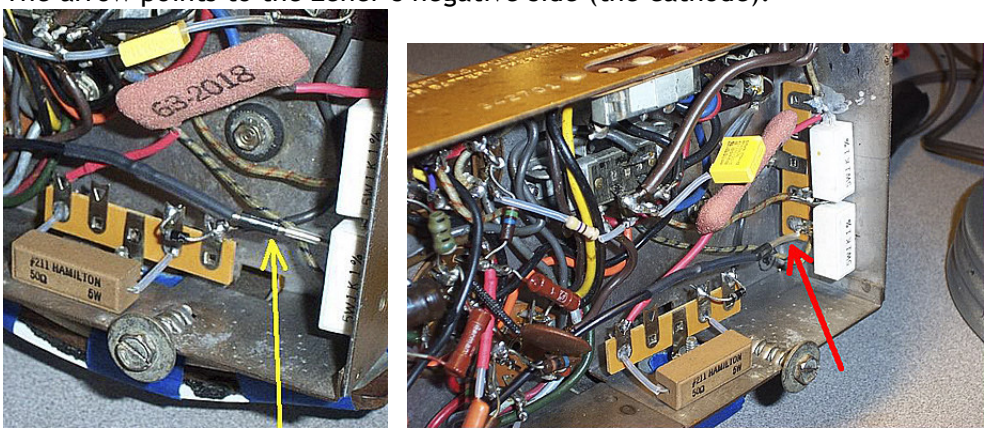


It was important to make sure voltage would stop flowing to the diode after the radio was

turned off, so before installing it I took readings where the cathode would be soldered. This (below left) is with the radio turned on; (right) Here the radio is turned off:

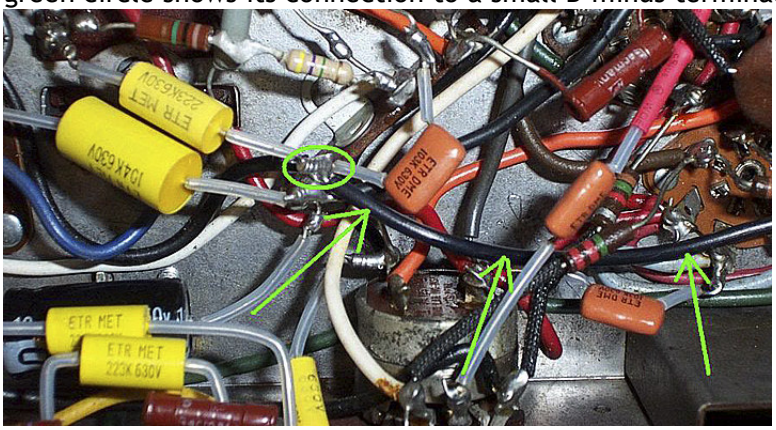


The arrow points to the zener's negative side (the cathode):

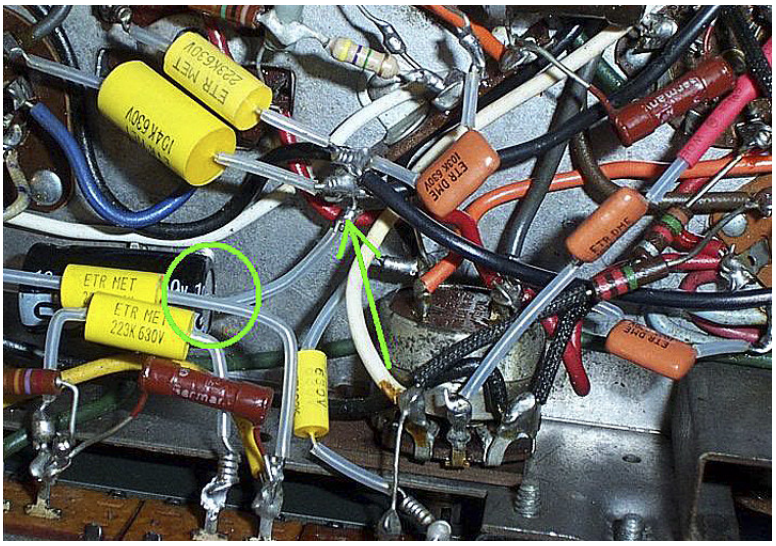


A better view of the cathode connection point. Works fine – last a long time:

The green arrows point to the wire coming from the opposite end of zener diode. The green circle shows its connection to a small B-minus terminal strip:



B-minus is the same point where the negative end of the 12uf e-cap (C-21) is connected, also circled in green. Note: I replaced the 12uf with a 10uf.

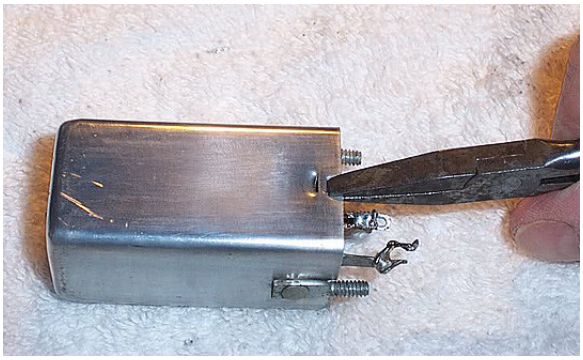


You'll recall that this radio has a floating ground, so the grounds are not directly connected to the chassis. They're connected to what's called B-minus, which is isolated from the chassis by a capacitor, probably C-15 (.047uf).

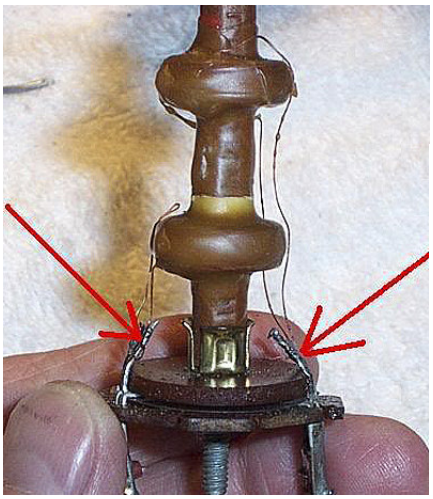
Repairing an IF Transformer

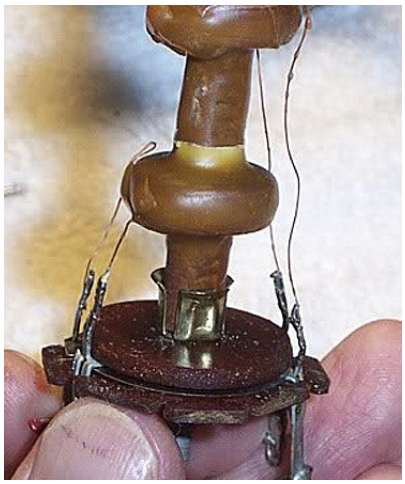
This Transoceanic is beginning to try my patience. (One) problem no sooner gets fixed and WHAM!...up pops something else, no doubt caused/aggravated by the heavy rains we've been experiencing in Arkansas. It rained for almost a month straight. Anyway, here's my next headache. Can you say "Silver Mica Disease?"

After taking several close-ups of the IF can connections, and also making a couple of sketches, the first can was removed from the chassis. Two of the bottom edges are slightly crimped to hold the coil in place. A pair of duckbill pliers will flatten them out. The coil (transformer) should then slide out easily. From this point on it's important to work very carefully, very slowly…taking your time…thinking things out:



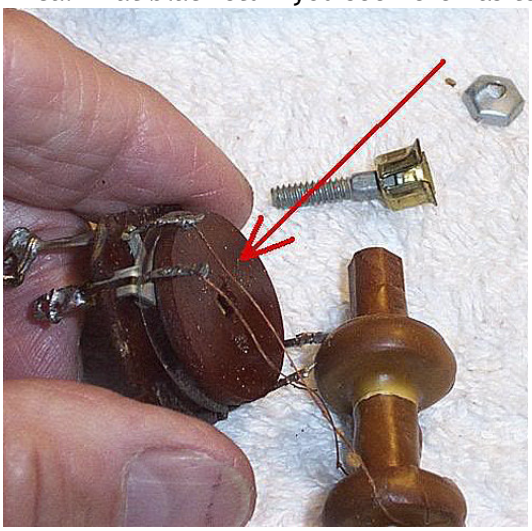
The solder lugs at the bottom will need to be slightly straightened…bent away from the center. Not a whole lot…just a tad. About like this (right, below)





Now remove the nut at the bottom. It's not on very tight:

That brown disk will now lift right off…but be very careful around those thin wires. Coordinate those shakes. With a pair of tweezers, gently slip out the small round piece of mica. That black stuff you see here has to go away. It's the migration:



Clean both sides with alcohol. It'll remove quite a bit, but not all (left). Not long ago one

of our forum members said he used a pencil eraser to clean away migration. Sounded like a good idea, so I tried it…but it had to be done very gently. Turned out pretty good (above, right).

The last thing to do is scrub the plates with alcohol. Get those buggers clean…but again, be very careful around those thin wires. I can't stress that enough.
Now put everything back together in reverse order and all should be well:

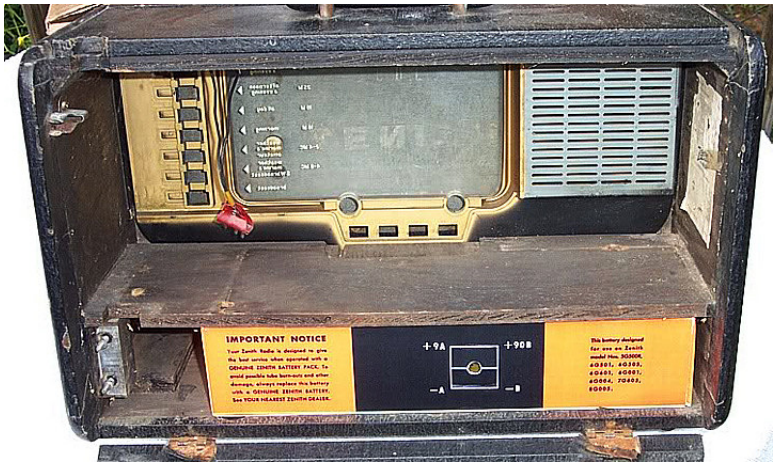
Battery Power Pack

I received another care package, this time from fellow forum member, Bill Morris* in Indiana. It's a reproduction Z-985 Transoceanic battery pack, and I'm very pleased.

A few months ago I was popping around the net in search of Transoceanic info and came across one of Bill's You tube videos showing his idea of what a reproduction Transoceanic battery box should look like. To Bill's credit, the product was attractive and looked to be very sturdy…seemingly head and shoulders above all the others I had seen. The box is constructed of Masonite (hardboard) and the outside cover is printed on a laser printer. So a little of this…a little of that…and one of Bill's repro Z-985s magically appeared in yesterday's mail. The quality is even better than anticipated:

Bill Morris is Battery-Maker on Antique Radio Forum

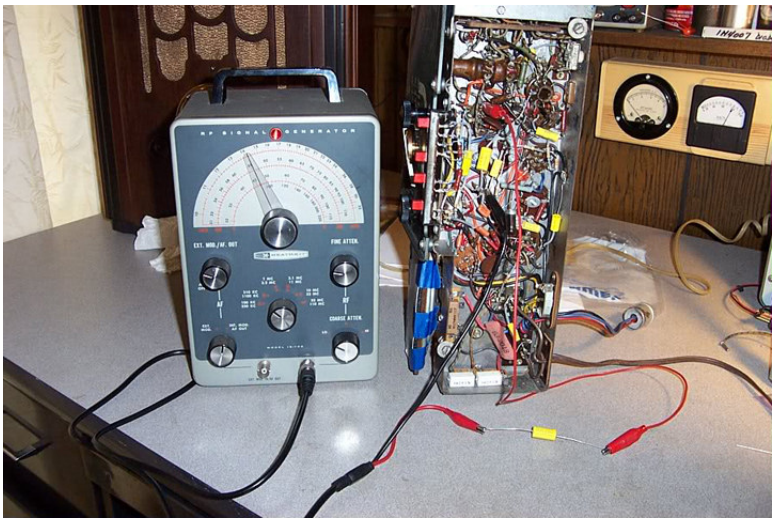
This is where she'll sit. You know…my 13-year old grandson better appreciate all of this:



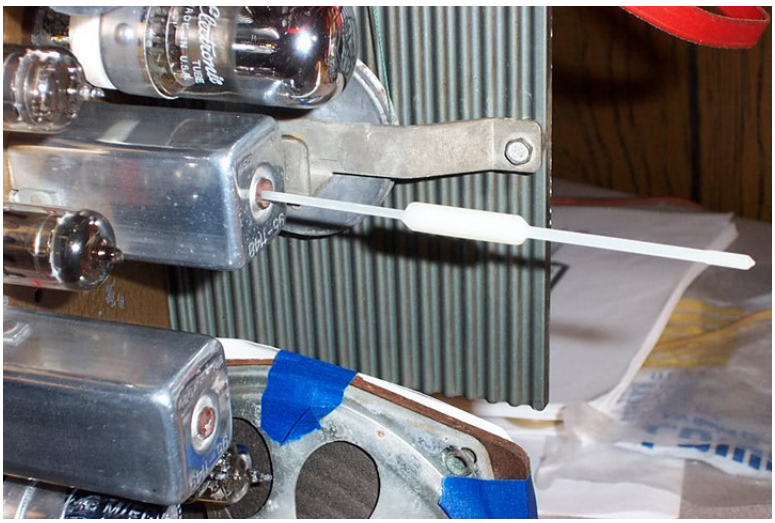
Chapter 5
RF Alignment

Per the alignment instructions, I connected a .1uf capacitor (dummy load) to the positive lead of the signal generator. A gator wire was then connected from the other side of the capacitor to the control grid of the 1L6 (1LC6) tube, pin# 6. The signal generator black wire was connected to B minus. The signal generator was adjusted for 455kc and the radio dial set to 600kc.

This radio has a floating ground, so B minus is the negative. Non-floating ground radios usually have the chassis as ground:



The sig. gen. was now feeding 455kc to the circuit, so it was time to peak out L5, L6, L7 and L8. They're the four slugs in the IF cans, two in each can. A 6-sided, non-metallic tool is needed to make the adjustments:

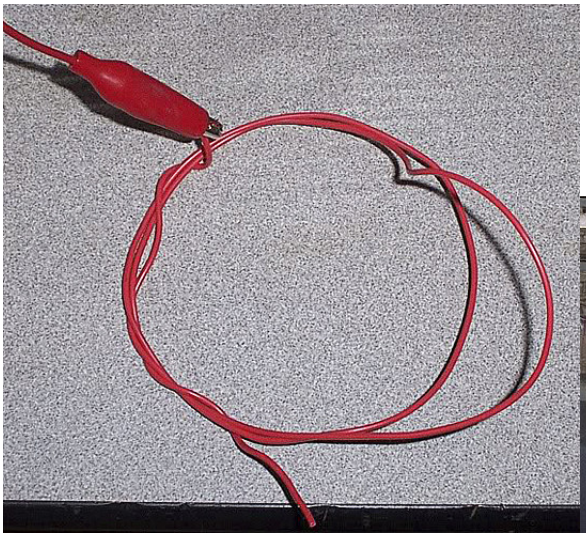


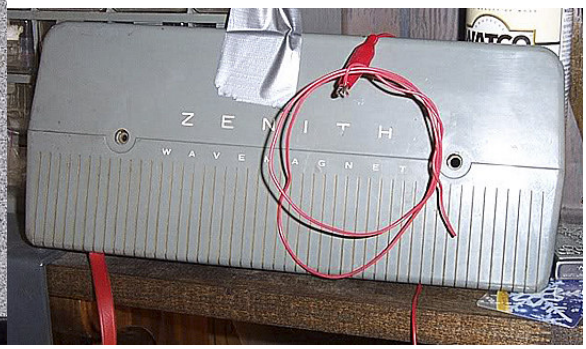
The instructions said that the best alignment is achieved by placing the chassis on top of a metal plate, the same distance away as the top of battery pack is from the bottom of the chassis when everything is back in the cabinet. It's supposed to simulate the approximate amount of metal in the RF and oscillator coil fields as when the chassis is sitting over the battery pack. Wellllllll, I decided to do that some other time. Right now I'd just turn the IF slugs and see what happened.

I was also supposed to hook up an AC output meter, I assume to the audio output transformer, but the instructions didn't say. And it had to be a meter with a copper oxide rectifier. I'm fresh out of those, so I decided to do it by ear. Hasn't failed me yet.
Each IF can contains two tuning slugs, one sitting on top of the other. Both are hollow, enabling adjustments to be made from the top of the can. Here the adjustment tool is in position to adjust the top slug (the secondary coil)

Considering how well the radio had been playing on the broadcast band, I was surprised at how much adjustment was needed. Luckily, they peaked perfectly without any damage to the delicate slugs. Those puppies can be very brittle from age, so care and patience is a must when turning them. Easy, easy does it…or you could learn a very hard lesson.

Next came the antenna, RF and local oscillator adjustments. They're located on top of the tuner. But first a small coil of wire had to be connected to the signal generator positive lead and hung over the Wavemagnet antenna (the loop antenna). I used a random piece of wire from my workbench drawer:

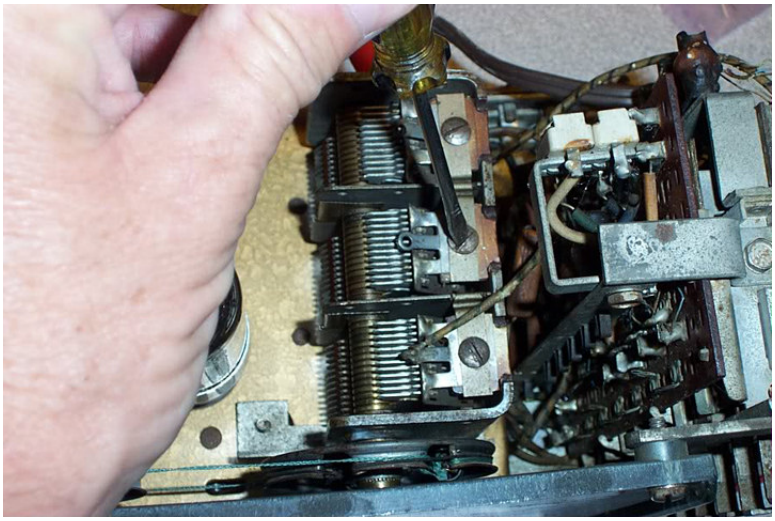




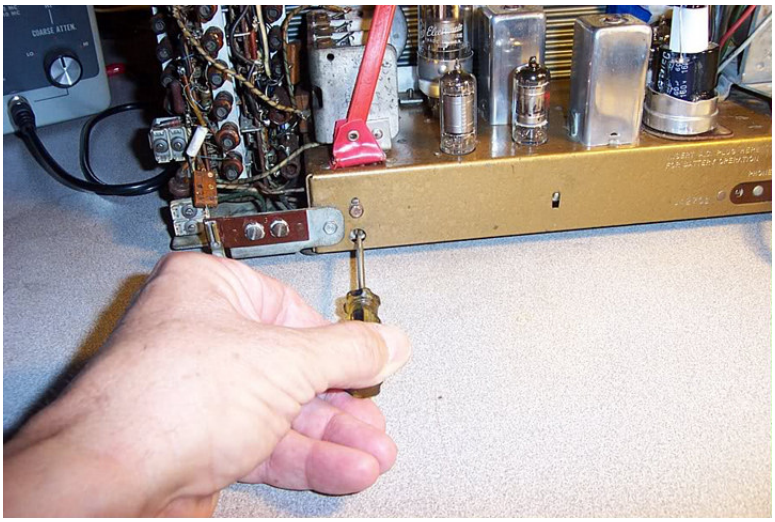
With the signal generator and radio tuned to 1600kc, the oscillator was adjusted for maximum tone (the bottom adjustment screw in the pic).

Then the signal generator and radio were retuned to 1400kc and the center screw (RF) and upper screw (Antenna) were adjusted for maximum tone.

Each of these adjustments can affect the other, so it's always a good idea to go back and forth two or three times with this until things are peaked out:



The final broadcast band adjustment is C32, located at the rear of the chassis. It's done with the signal generator and radio both tuned to 600kc.

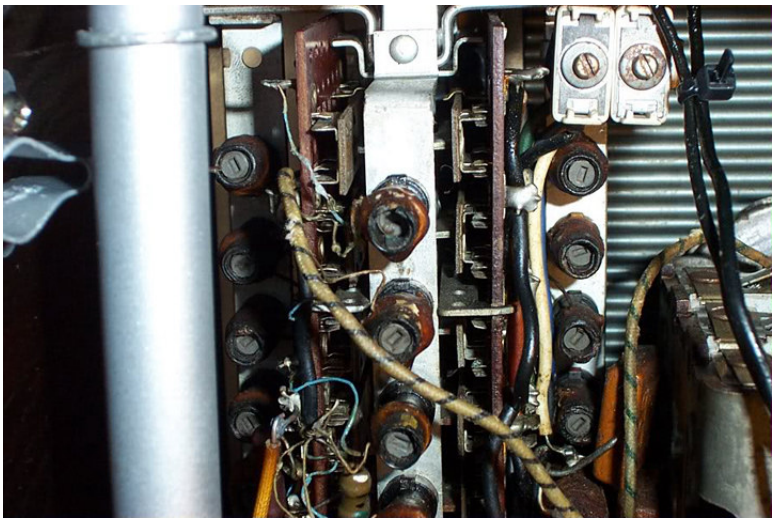


Shortwave alignment

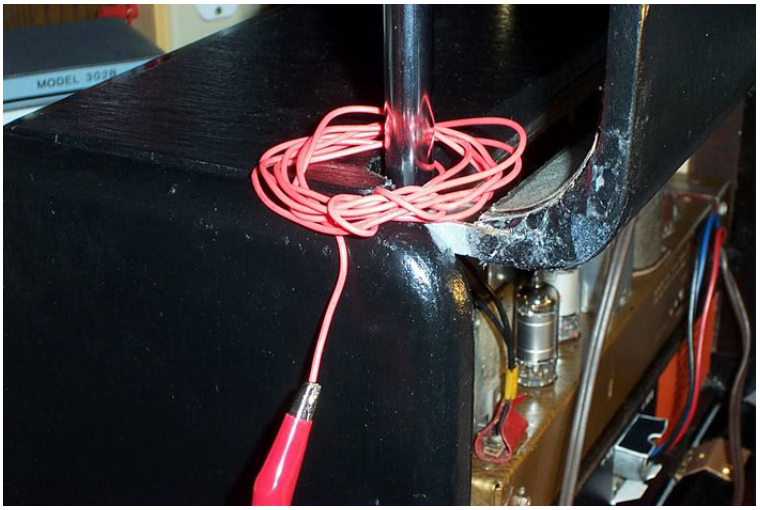
The broadcast band has already been aligned, leaving the six shortwave bands to be done. Since they're all the same, I'll only go through one. But I do have a caveat…my frequency counter went bonkers and I don't have an analog multimeter to monitor the output. But the sig. gen. is fortunately right on target, having tested it with the counter before it gave up the ghost, also with a digitally tuned radio. So I fed in the different signals and tweaked the shortwave by ear. Seems to have worked well. The radio doesn't haul in a million shortwave stations, but those that do come in sound pretty good. Later on I'll mess with it a little more. So let's get on with it.

Looking at the coil tower from the rear, you'll see three vertical rows of coils. Those in the center are the antenna coils. On the right are the oscillator coils and on the left the detector coils. The alignment procedure for each band requires that you adjust three of those coils, but

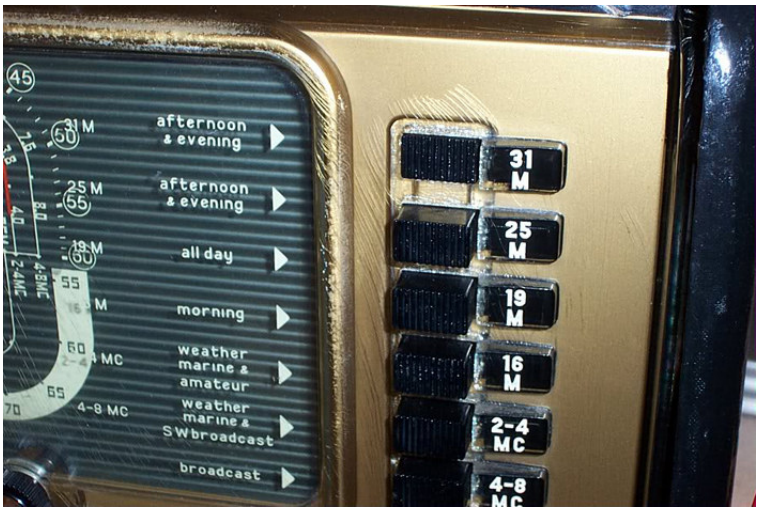
it does not stipulate in which order, so after feeding in the signal I just kept going back and forth between the three coils until things were finally righteous. It sometimes took quite a while:



The alignment procedure says to first hook up a 3-foot length of wire to the positive lead of the signal generator, then place the wire about a foot from the extended Waverod. But I discovered that it didn't make any difference where the wire was located, a foot away or right up next to the antenna, so I just wrapped the wire around the rod. Curt also said it would work just as well. He was right. Also, the procedure said to not hook up the negative lead, so it was left laying on the bench:

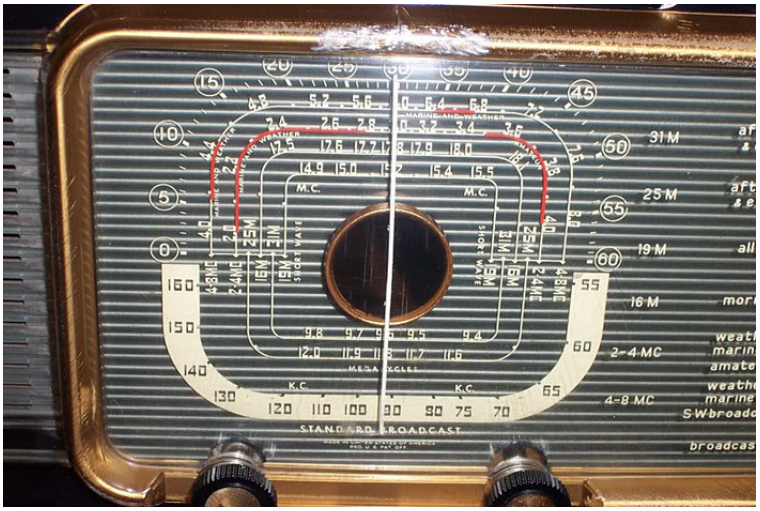


I started the alignment with the 31-meter band, so the top band switch was pressed in:

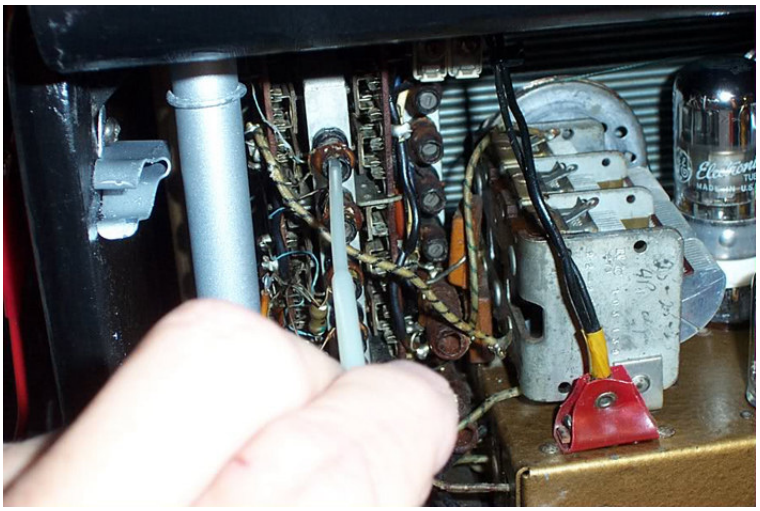


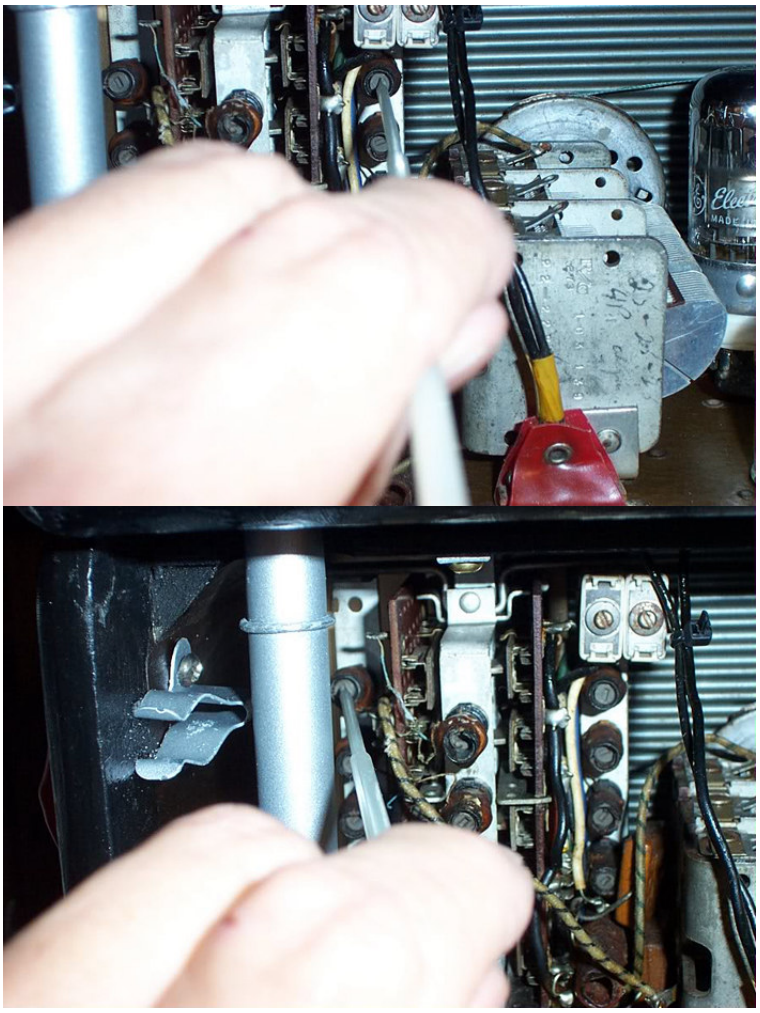
Per the alignment instructions, the signal generator was adjusted to 9.6Mc:

And the radio was tuned to 9.6Mc. Immediately, the signal was heard, but I very finely tweaked both the sig. gen and the tuner until the tone maxed out:

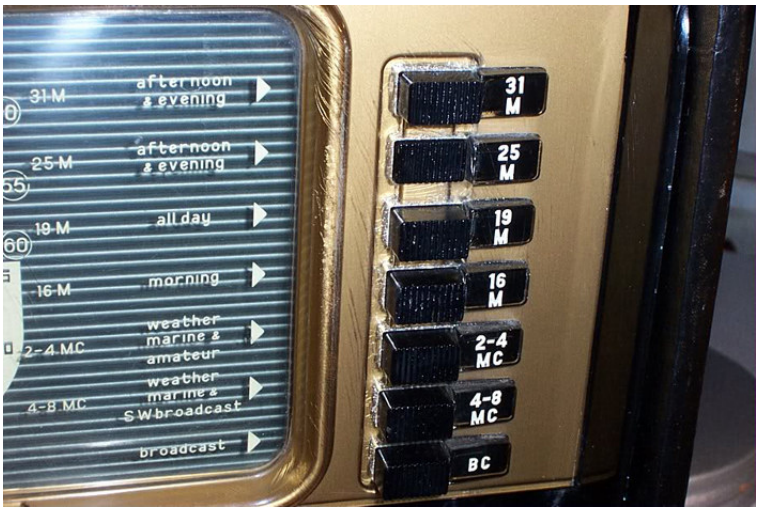


The location of the band switch buttons on the front of the radio directly corresponds to the location of the coils on the tower. In other words…the 31 Meter band switch button is at the top and so are the three coils for that band. I went back and forth between the three until I couldn't squeeze out another drop of signal volume:



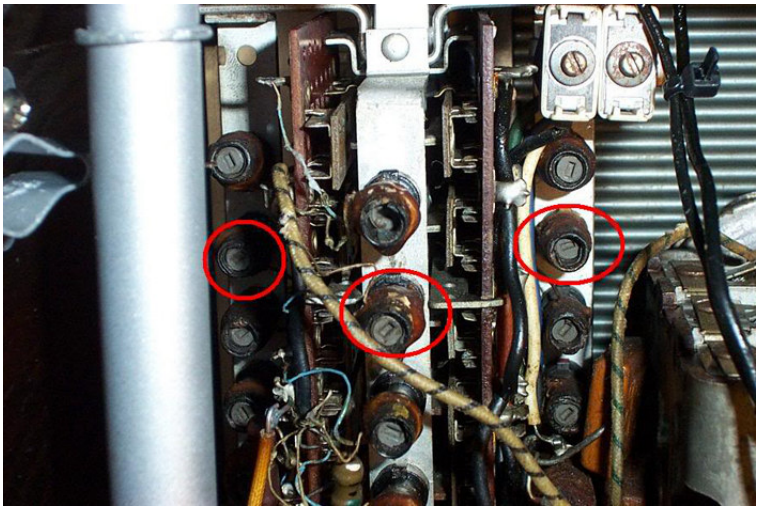


With the 31-meter band tweaked up, it was time to do the 25-meter band. The same procedure was followed. The band switch button was pressed:



The signal generator was adjusted to 11.8Mc:

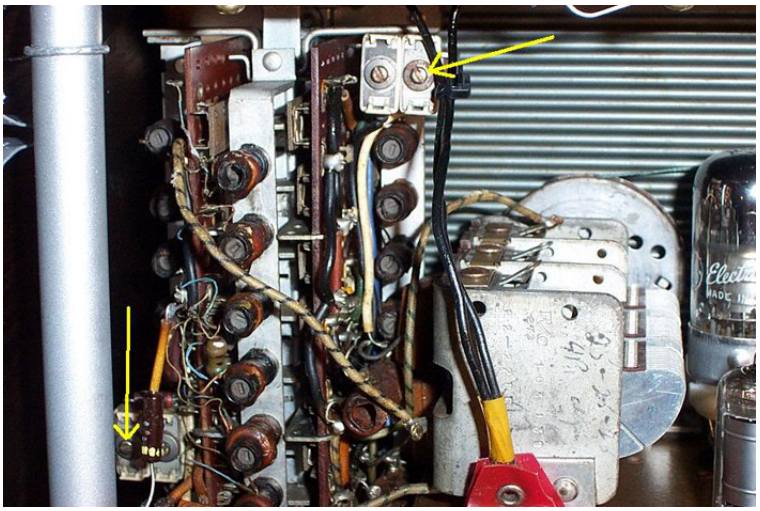
The radio was tuned to 11.8Mc. And the second row of coils were tweaked and peaked for maximum signal tone:



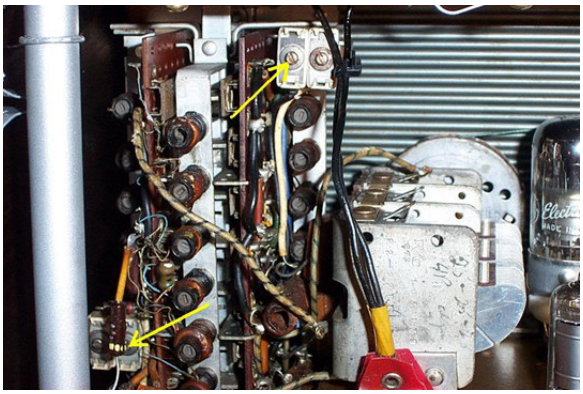
The same alignment procedure was done for the 19 and 16-meter bands. However, alignment of the 2-4 Mc band does not require coil-tweaking. Instead, trimmer capacitors C-33B, C36B & C37B (osc., det. & ant) are adjusted, but the mechanics remained the same. Just follow the alignment instructions.

The trimmers are located here. I just realized this isn't such a hot pic. Tomorrow I'll replace it with a better one:

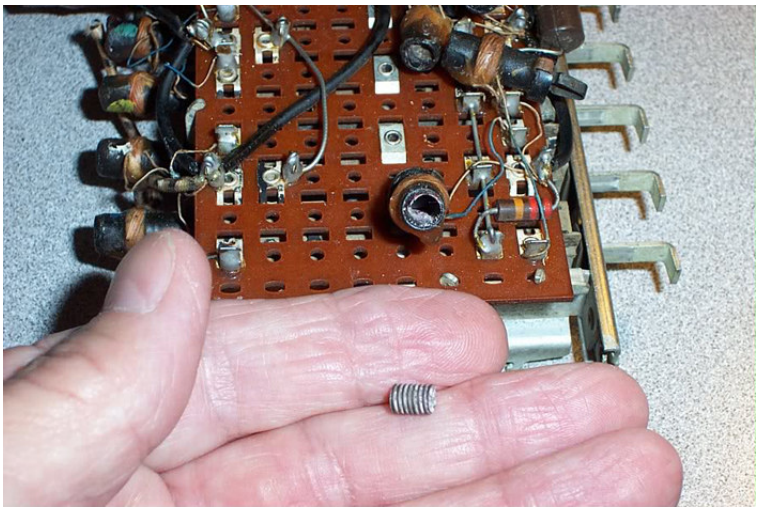
Here's a closeup of two of the trimmers (33B & 37B):



The 4-8Mc band also required the adjustment of trimmer capacitors, C33A, C36A & C37A (osc., det, & ant). Those trimmers sit right next to those for the 2-4MC band:



One last thing…don't let the adjustment of those small coils spook you. If one of the slugs falls out just screw it back in. It's not a big deal. They look like this:

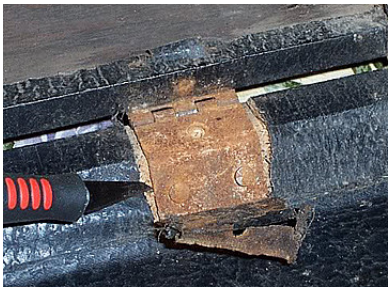


Chapter 6
Cabinet Restoration

Back in the chassis thread we did a top to bottom inspection of this cabinet and found it to be in pretty good shape, so I'll do my best to not cause any new damage. In other words…I won't overdo it, but it will have to come apart.

Let's start with the back cover and those rusty hinges. The screws came right out. No problem at all.

The Stag had to be cut and peeled back to get at the two lower screws. Uh-oh, they're not screws. They're some sort of fastener:

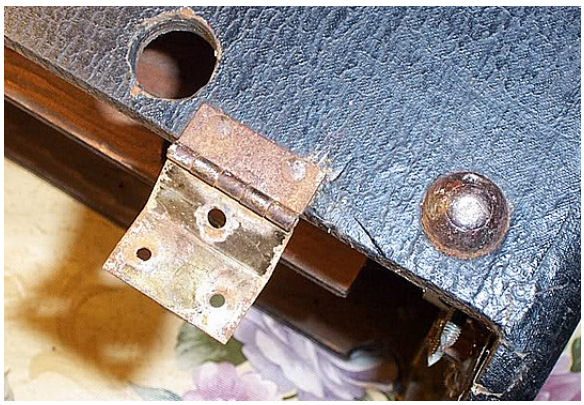


There's nothing like a good pair of Vice Grips. This is them. Trust me, we'll see more of these critters:

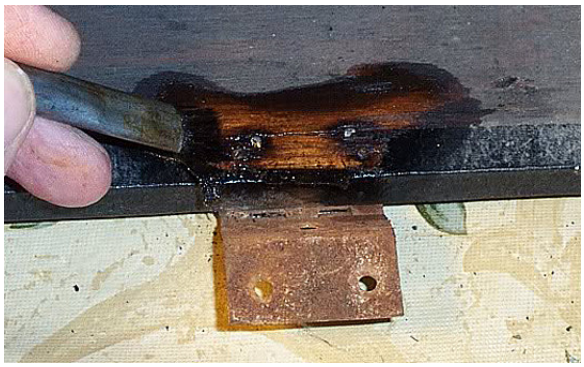
The other half of the hinges were also fastened to the cabinet by the clothespin thingys,

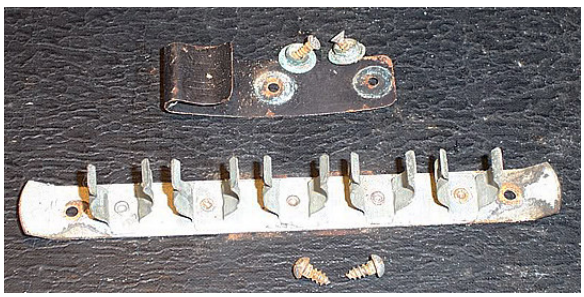
but on the other side of the wood the ends were bent over. It looked like it was done with some sort of press.

Removing them was out of the question. It would cause too much damage to the wood:



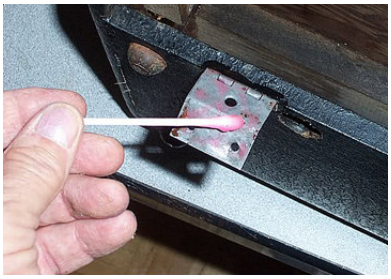
This shows the bent over ends:

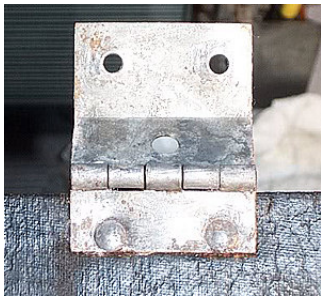


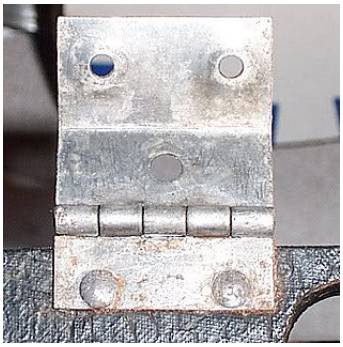


Before going any further all the other pieces and parts on the back cover were removed.

Coarse sandpaper and three applications of Naval Jelly took care of nearly all the hinge rust. Later on both will get one more Jelly treatment:





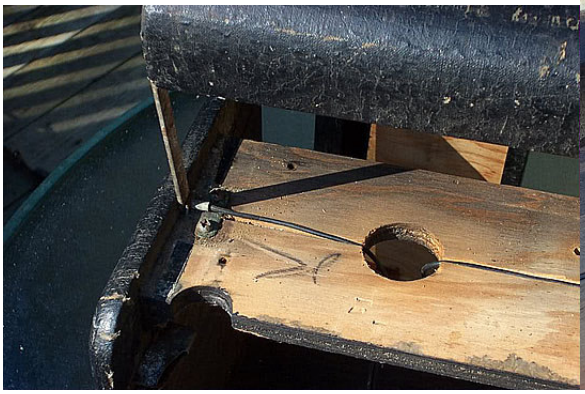


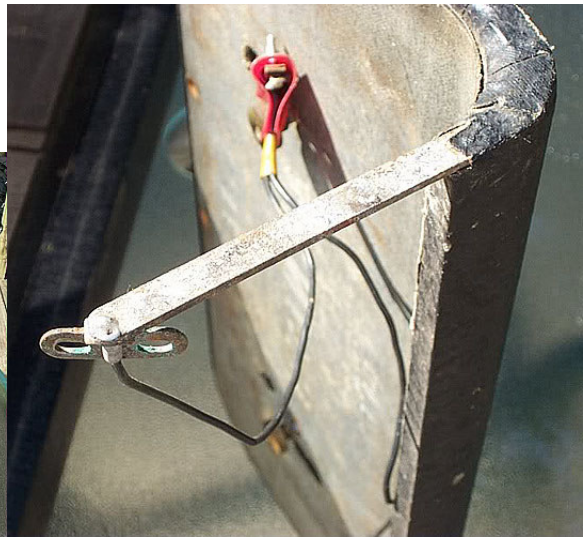
With the hinges looking better, it was time to do some serious ripping and tearing. The carrying handle was next to come off. It's held on by two large screws:

The top of the cabinet consists of two pieces of plywood screwed together with five small wood screws. The wires from the Wavemagnet antenna sit in a slot between them. The screws were removed:


This series of pics shows the top removed, the slot, the wires and how they're connected to the front cover hinge arms. Pretty cool idea on Zenith's part:





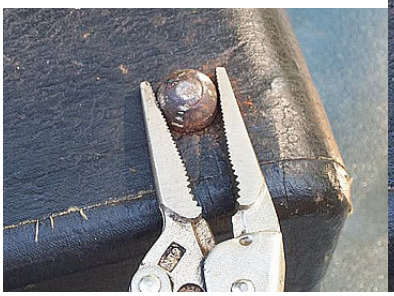
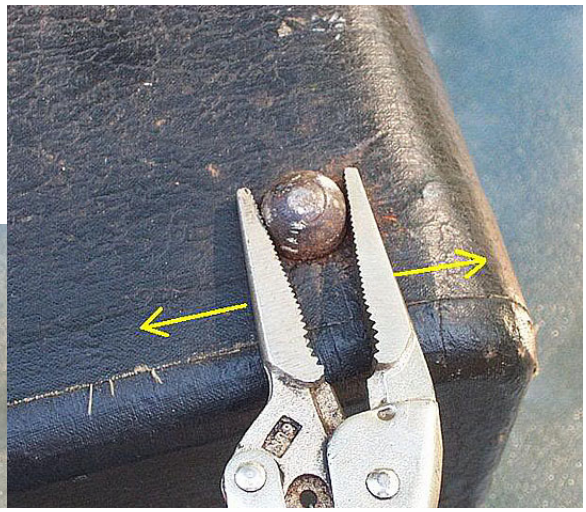



The plastic dial cover was removed. Note that three of the screws are smaller. They go through the three holes in the bottom of the cover:

Removal of the cabinet feet:

Be careful when removing these cup-shaped feet. Take your time and resist the urge to muscle them off. They're hollow and the metal is fairly thin, so excessive squeezing/pressure along the sides will bend them inward. But if you do happen to squeeze too hard, they're pretty easy to straighten out. Of course, that's just a guess on my part.

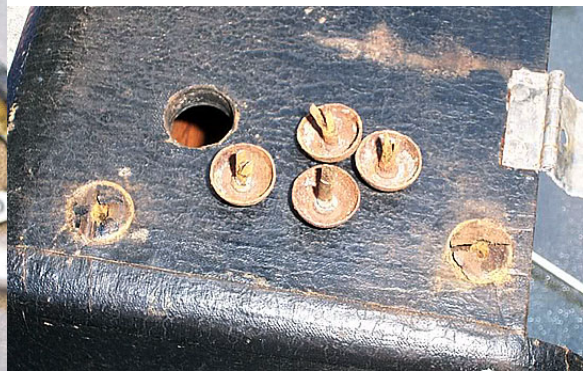
Use just enough clamping power to prevent the Vice Grips from spinning round and round. The grip has to be just right. It's a judgement thing. Then horizontally rock the foot back and forth about 1/8 inch in each direction. Also use a little upward pulling action. After three or four rocking and pulling movements, you'll feel the foot beginning to loosen up:

Create some wiggle room by carefully working around the loosened foot with a small flat tip screwdriver. Doing the same with a larger flat tip will then get it out. Just like pulling a tooth:



Two of them had a lot of rust underneath:

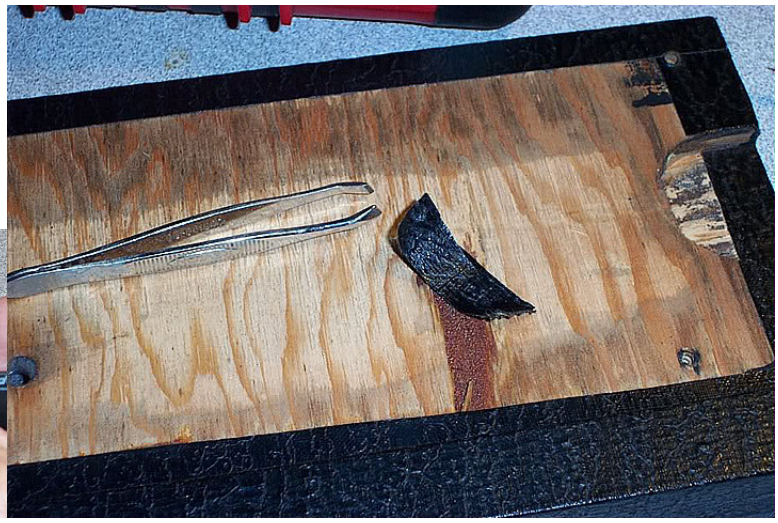
With the feet removed, it was finally time to do a little experimental cleaning and repair work. The top would be the first victim:

These cabinets have hair-like Stag strings everywhere. A cigarette lighter will quickly singe them away. Ummm….don't set the cabinet on fire:

While preparing for this tread I must have come across a million different ideas on how to clean Transoceanic Stag…steel wool to dish soap to mineral spirits. But I'm a joker who's stuck in his ways. For me, the answer was elbow grease and good ole Saddle Soap:

A lot of grime came off that little bit of Stag:

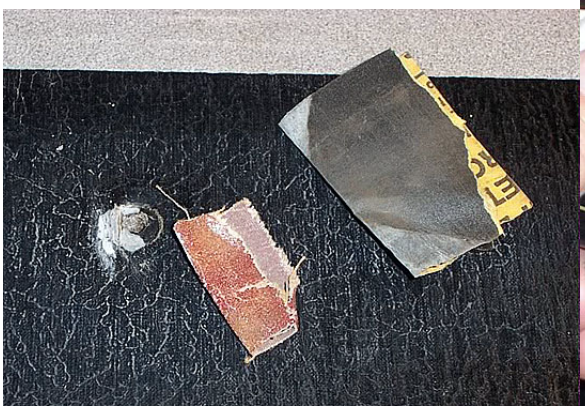
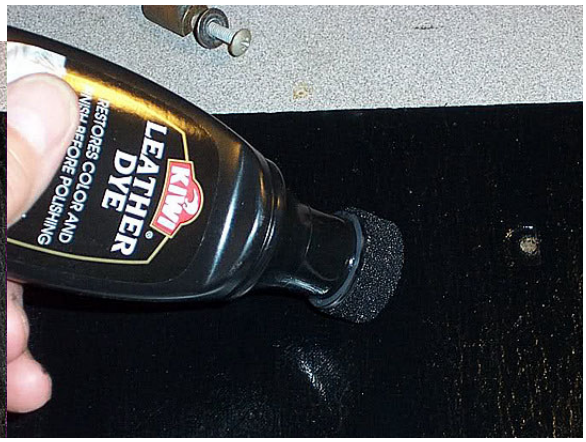
With the cleaning finished, I used my X-acto knife to lop off a couple pieces of excess Stag. I probably won't need them for patchwork…but one never knows:

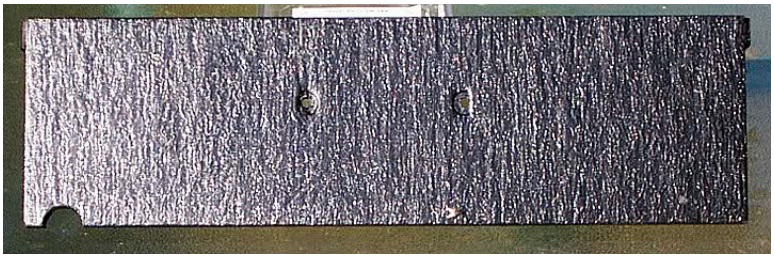
The Stag on this top is in very good shape, missing only a tiny bit where the carrying handle attaches. J-B Weld filled the hole.



When dry, a couple light touches with a medium grit stone (photo above, right) followed by coarse and fine sandpaper had it looking righteous. It was then given two treatments of Kiwi Leather Dye:

The top is done. Turned out better than expected. Even that fly liked it:



Next on the agenda was a scrub-a-dub-dub to the rest of the Stag and wood. They were pretty mangy. Saddle Soap not only does a good job of removing crud, but it also eliminates that ever-present, old radio, musty-mildew odor…and this radio had a lot of it. Some surfaces were scrubbed twice:

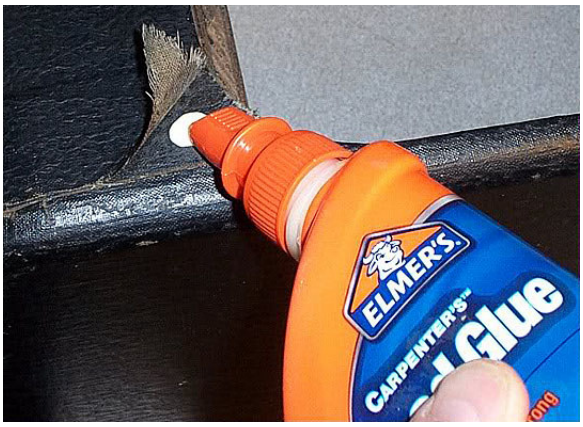


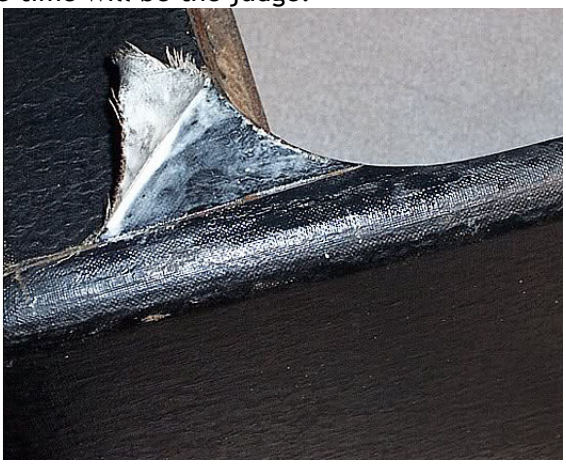
Of course, the various holes do fill up with suds. A Q-Tip takes care of it:

Scratch one of the wife's towels. Amazing, isn't it?:

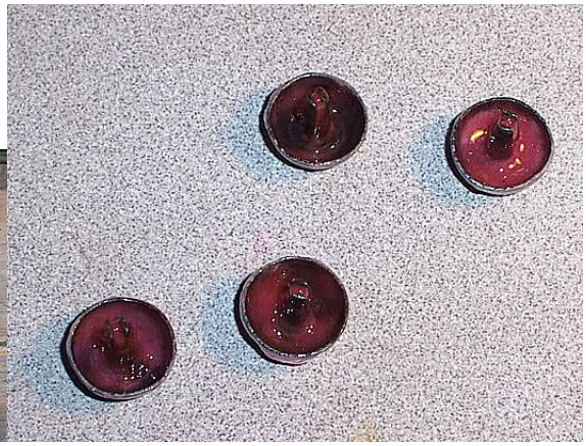
All of the loose Stag could now be glued back down. There wasn't much of it, so I decided

to just use Elmer's. It worked ok, but I suppose time will be the judge:





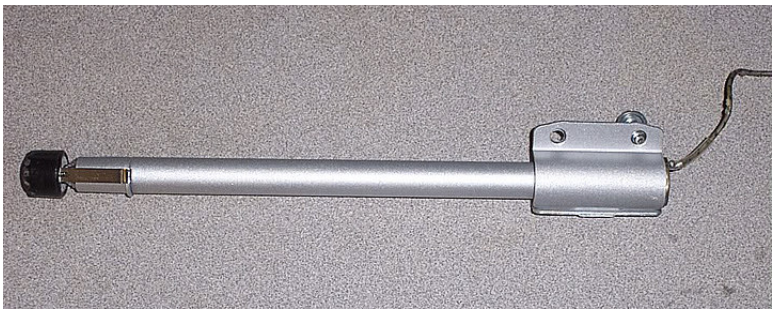
Before leaving work last night I stopped off in the company maintenance section to use the wire wheel on their big grinder. The rusty outside surfaces of the four cabinet feet were given the what-for:



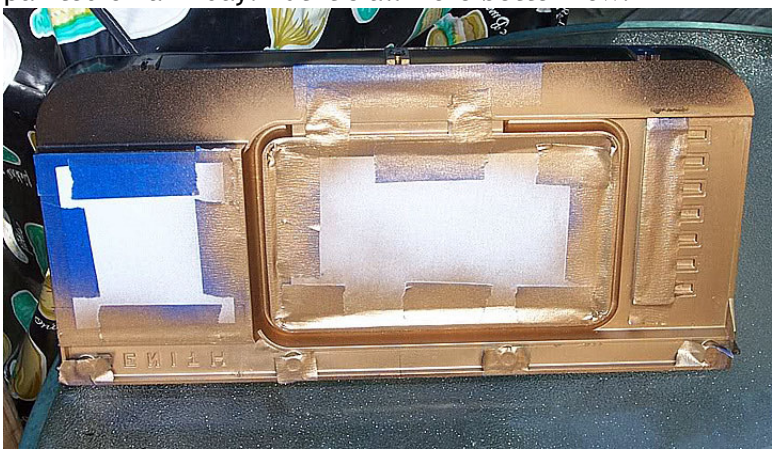
The inside surfaces were still mega-rusty, so this morning they got the Naval Jelly what-for. I poured it in, then let them soak for four hours. Tomorrow morning they'll get another hour's worth. Once again my ole buddy, Wade, the night supervisor of the chrome vats where I work, took care of me. Ain't they cooooool?:

I decided to spruce up the telescopic antenna (Waverod). To help prevent further insulation fray a short piece of clear heat-shrink tubing was put on the plug end:

But overall the antenna still looked pretty shabby. It was resolved with 400-grit sandpaper, followed by two coats of gray primer, two coats of silver paint and two coats of clear acrylic:



Lastly, gold paint was missing from a few areas on the rear of the dial cover. It looked like they had not received any paint at the factory…fast production lines and all that. Probably painted on a Friday. But it's all more better now:



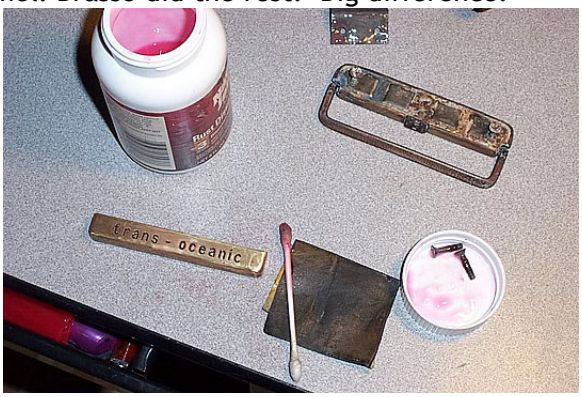
The key to this Stag repair is to not go crazy with it. Don't try to fix every teeny-weeny blemish. It would take forever and in the end you wouldn't be satisfied with the results anyway. So be reasonable about it. In other words…be on the lookout for that point of diminishing returns.

You'll recall that the Stag beneath the four cabinet feet was all but history. It needed to be removed and the four areas cleaned and repaired. So that's what happened. An old, plastic McDonald's gift card smushed in the J-B Weld and smoothed it over. As before, once the Weld was dry everything got a good hand-sanding with 80-grit

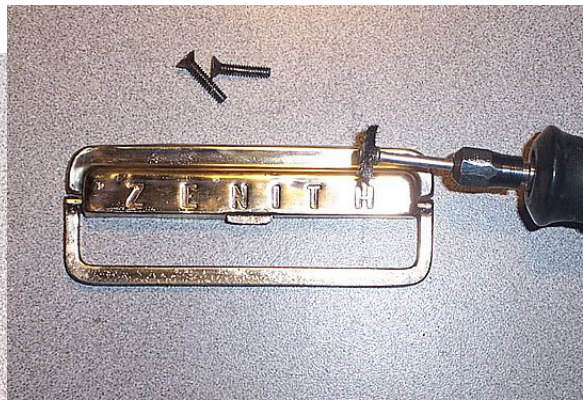

paper followed by a light wet-sanding with 400-grit silicon carbide. Be gentle with this sanding business. Easy, easy does it. The light touch reigns supreme.

The hinges also received their final application of Naval Jelly:

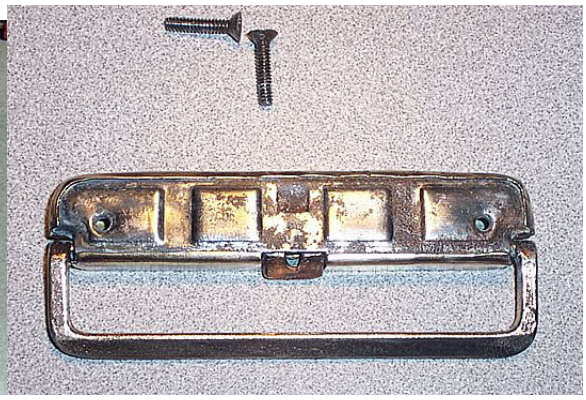
And a little work was done on the lower half of the brass cover latch. Naval Jelly removed the minor rust and a light sanding with 600-grit silicon carbide removed what seemed to be a coating of clear enamel. Brasso did the rest. Big difference.



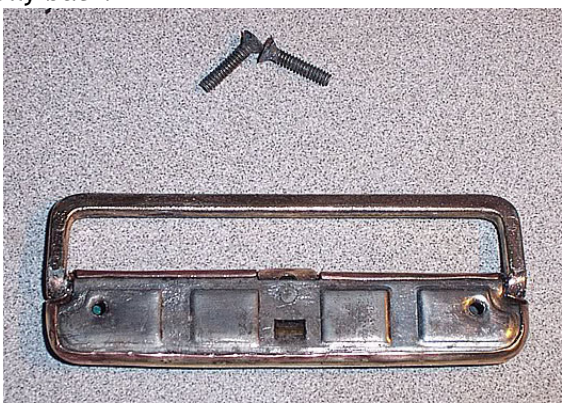
The ole Dremel Tool and wire wheel made quick work of the remaining corrosion and discoloration. What would I do without that thing?:



The metal plate on the rear looked worse than it actually was. The wire wheel cleaned it up right fast like:

After which of course came the usual Naval Jelly bath:

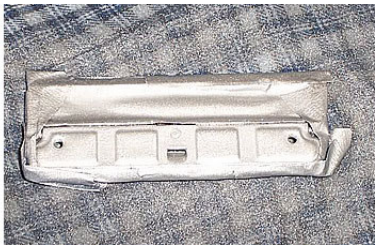



Looks good, but tomorrow it'll get one more treatment…after the front and bail get a workover with Brasso.

Work continued on the brass cover latch. The rear plate looked even better after a second Naval Jelly treatment, but it remained vulnerable to rust, so something more had to be

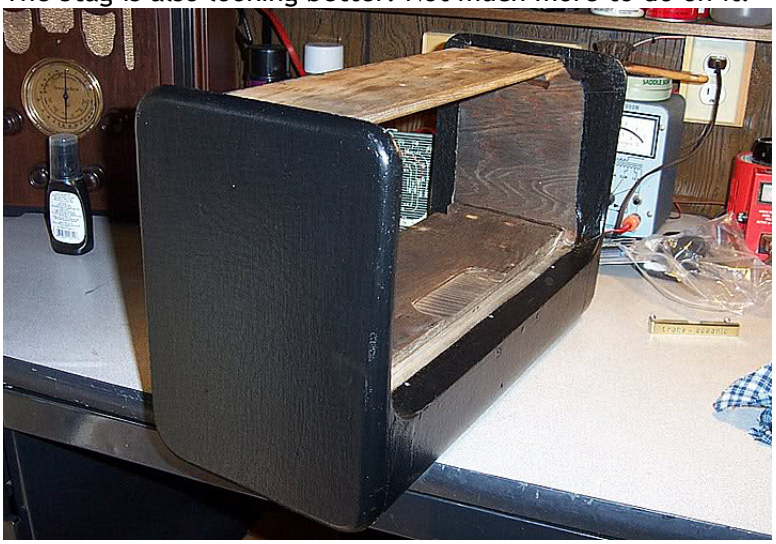
done. The answer was a few layers of paint:





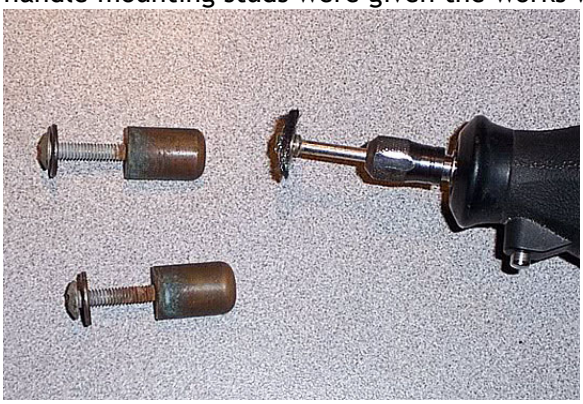
First came two coats of gray primer, followed by two coats of metallic silver, then two coats of clear acrylic enamel.

The Stag is also looking better. Not much more to do on it:



I was a bit lazy this morning…didn't feel like doing much, but a little more work was accomplished on the Stag. I also dressed up the plastic carrying handle and the two brass studs that hold it in place.
But first, here's the backside of the cover latch without all that tape. There shouldn't be another rust/corrosion problem for quite a while:

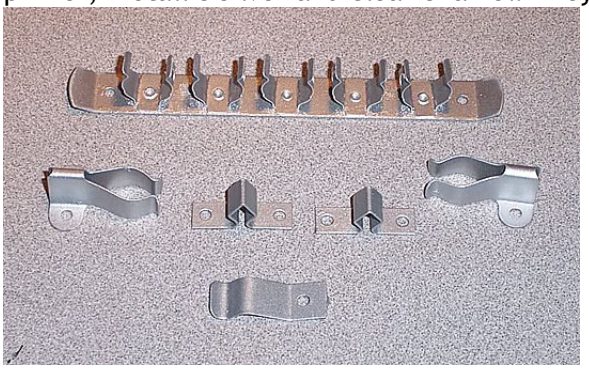
A creature of habit I shall always be, so out came the Dremel Tool and both carrying handle mounting studs were given the works with the wire wheel. Then came a good lick



with Brasso. Almost like new. The carrying handle also got the Brasso once-over. The stuff does wonders to plastic. I have no first hand experience, but I hear it also perks up Bakelite:

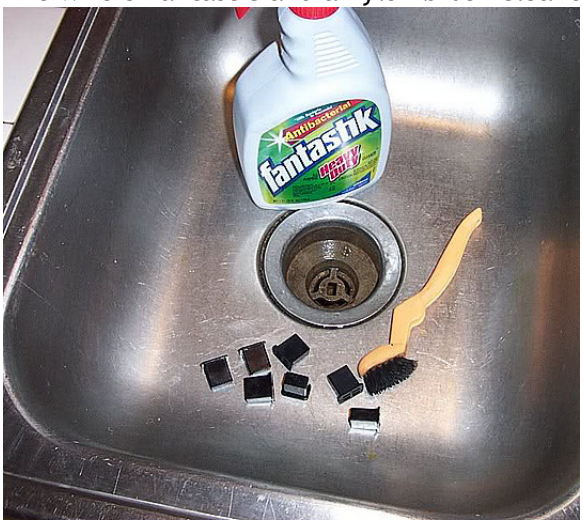
We're beginning to wind down this project. The Stag repair is finally finished. It didn't turn out too bad…not perfect, but not all that shabby either. It was the best I could do. Here's the bottom half:

The miscellaneous hardware was given the Naval Jelly treatment, then painted with primer, metallic silver and clear enamel. They turned out pretty good:



Rusty screws are always an issue. Just completely cover them with Naval Jelly and let them soak for hours…stirring them now and then. This bunch soaked for 10 hours. The brown color pretty much tells you when they're ready to come out. Piece of cake:

The wife's Fantastic and a nylon brush cleaned up the seven plastic bandswitch buttons:

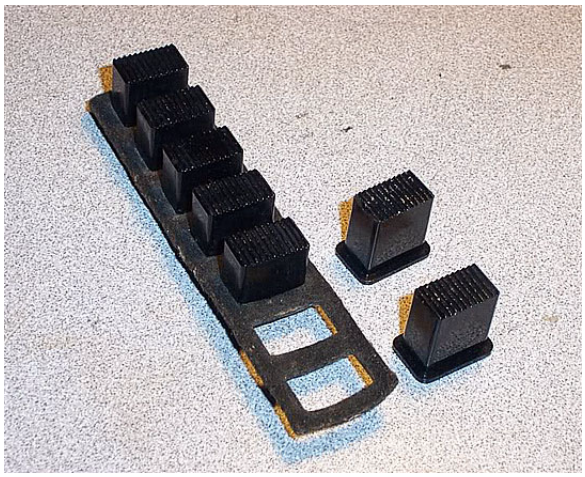


The clamps that hold the cover swing arms in place were also de-rusted, then given two coats of clear enamel:

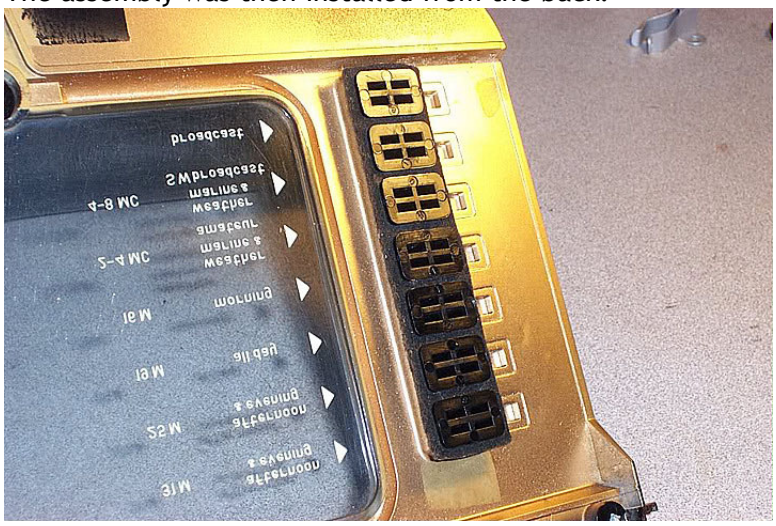
The arms were painted silver, (and) the rear door hinges were painted gold:

The carrying handle was installed and the cabinet partially reassembled. Here and there a few blemishes remain, but they're nothing to write home about. Here's where we now stand:

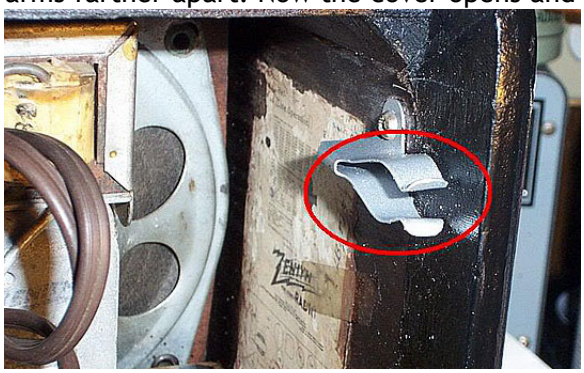
Before reinstalling the dial scale (face plate) the seven bandswitch buttons had to be reinserted into their felt holder:



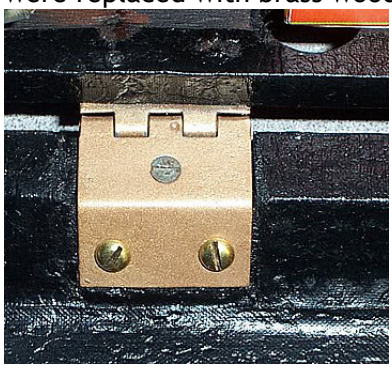
The assembly was then installed from the back:



It practically took the world's strongest man to open the rear cover on this thing. Since we're not the same person something had to be done. The solution was to spread the latch arms farther apart. Now the cover opens and closes just fine:



I didn't like the rear cover hinges being covered with Stag, and I didn't like those split-rivet things that fastened the hinges to the wood. So the Stag went bye-bye and the rivets were replaced with brass wood screws:



If you ever restore a Transoceanic H-500 one or more of these little buggers might fall out of the coil tower. All seven of mine did. They're tiny rubber bumpers designed to cushion the snap action of the band switches when they pop back out. At least I think that's what they're for. Anyway, I couldn't figure out how to get them back in without tearing the tower completely apart, so they're now in my parts bin (photo above, right).

I still need to pick up a small bottle of black, and white, model paint to repaint the various letters and do some spot-painting here and there. But right now I'm sorry to say that my part in this thread is officially ended.