SoundWaves

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VRPS Summer 2020

From the President

I know the cry from most …if not all quarters… is "are we ever gonna get back to normal". I sure hope what we are seeing is not the new normal, but, for a while, I am afraid it is. It may be a small consolation, but there is some good news, at least from where I sit. Let me explain. As most of you know, on the side, I have a large supply of vintage radio tubes and knobs, and also an auction business. I am happy to report all three are doing well. Since all this pandemic stuff started, I have seen an increase in request for both tubes and knobs. My auction business has been active, and I see a consistent and growing number of bidders outside of my "normal" audience.

I use all three as a barometer of our hobby. First, the tubes. Ordering tubes indicates someone…and probably many "someone's" are actually doing repairs. Some tube orders are coming from "repairmen"…but a surprising number are coming from those making repairs on their own radios. I have shipped many knobs to both coasts, as well as local (across Texas). This tells me folks are spending their "at home" time restoring their sets and making them complete. And, as further proof of the health of our hobby, I reference the results I see at my auctions. Steady Increases in prices and the number of buyers… Of course this is all good for me, but more importantly, good for the hobby.

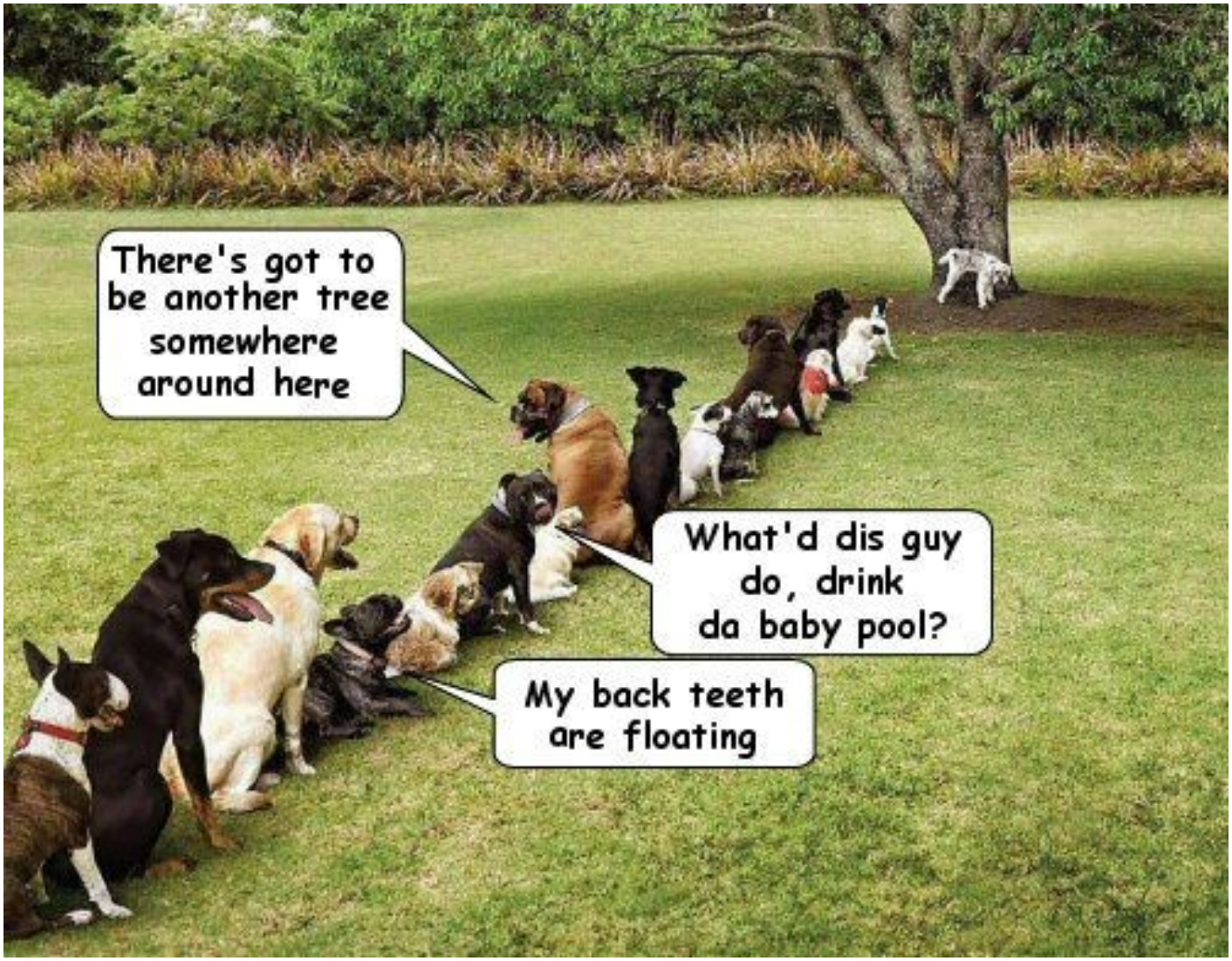
Please do not get the impression I am tooting my own horn. I am just carrying the water for the hobby. I want to do anything to make this hobby grow and flourish.

One more closing thought before I send this message down the line to the editor. I have been asked several times by many members…"Are we gonna have a VRPS Convention this year?". Good question that deserves an answer. Problem is, your board of Directors is not ready to make that call right now….either go or no go. I do promise you we will have a decision sometime in September.

Stay tuned

---Jim

June 20, 2020 Swap Meet cancelled due to lack of building access.



Example of not observing proper social distance!

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President—Jim Sargent (972) 742-8085 bsargent @swbell.net

Vice President—Randy James (817) 881-0974 randy-jeannine@sbcglobal.net

Newsletter Editor—Mary Ann Caruth mcaruth@att.net

The Case of the Recondite RCA

By Billy Smith

A guy called and asked if I would restore his old radio while the cabinet was being refinished. He said it was working ..... 35 years ago, so should be easy. Being bored, I said bring it over. The 12 inch speaker was hard wired to the chassis, so he brought it over on a 3 foot long 1x12 board.

The radio was an RCA R-90, a 10 tube radio with #56 triodes and #58 pentodes and 2A5 push-pull output tubes. It looked like it had been dug up out of the mud. The chassis was very rusty and covered with dirt. All the wiring was rubber covered and the insulation was falling off.

I left it in the garage to clean it up before taking it to my electronics shop. I pulled all the tubes, brushed the dirt off and cleaned the loose rust off with a drill and wire wheel. Then I sprayed the chassis with WD40 and wiped it down before I took it to my shop. I cleaned the tubes off and tested them on my tube tester, and they all tested good. The line cord had all the insulation falling off, so I replaced it with some old style cloth covered line cord. With the tubes still out, I plugged it into my variac with voltage and current meters and slowly brought up the voltage while watching the current meter and one hand on the power switch. No smoke or high current, so I measured the AC on the secondary of the power transformer at the pins of the # 80 rectifier. The high voltage was about 250 volts on either side of the center tap, and the filament voltage was 2.5 volts, which was correct, since all the tubes had 2.5 volt filaments.

At this point I decided since the power transformer was OK, I would go ahead and replace all the wiring on top of the chassis. The speaker wires all had to be replaced. There were 5 of them, 2 wires for the field coil, and three for the speaker. The output transformer was mounted on the speaker frame, and since the radio had push-pull output, this required three wires from B+, and the two 2A5 plates. All the wires from the IF transformer had crumbling insulation so they were shorting to the top of cans where they went to the grid caps of the #58 tubes.

The way I fix this without removing the cans is very simple. I cut off the wires about ½ inch from the top of the can and crumble off the insulation and tin the wire sticking out. I then solder on a new wire and using about one inch of heat shrink, I slide it down as far as it will go and heat it with a heat gun. The grid caps were very rusty, so I cleaned them up with the Dremel with a wire wheel on it, and reinstalled them.

I finally decided that I had put it off long enough, so I put all the tubes in, connected an antenna, and using the variac again, I applied power. At 120 volts it drew around one half amp after the tubes warmed up, and I got no stations, but plenty of hum, as I expected. Time to turn the chassis over and work on the innards. This radio used one wet electrolytic in a big can and a smaller dry electrolytic, but both were bad. I removed the can and installed a terminal strip to mount the replacements on; one on each side of the speaker field coil. Turning it on again, I got a very weak signal from WBAP. Thus encouraged, I decided to go ahead and replace all of the really gross looking bypass and

coupling capacitors. There were eleven of them; mostly 0.1 microfarad, with a couple of 0.01 microfarads. I replaced them with 600 volt epoxy-cased polyester film caps. I have had good luck with these. Firing it up again, I found that the signal was still very weak, so I decided to check the alignment of the IF transformers. I stuck my Stanley screwdriver in the alignment hole and got a lot of sparks. The adjustment screw was hot. I should have known that, but I forgot. I put some heat shrink on the screwdriver shaft leaving only the very tip uncovered, and this worked very well. Turning the trimmers just a little increased volume greatly, so I connected my RF generator and varied the frequency for maximum volume. This turned out to be upwards of 300 kHz. The IF frequency is supposed to be 175 kHz, so I set the generator for this and aligned the Ifs, and WBAP came booming in, and I could pick up a lot of other stations also. I tweaked the trimmers at the high and low ends of the band and the radio worked great. This should be the end of the story, but there is much more.

PART II

I now turned my attention to the 10 inch speaker. It was in bad shape, with several holes and tears in the cone, and several sections were missing where the cone attaches to the basket , and the edge was very brittle. I patched the holes by gluing on thin pieces of paper, and brushed a layer of Weldwood contact adhesive, which is a thin rubber glue, over the edge of the cone. This keeps the cone from tearing farther and gives it a sort of rubber suspension. This worked very well, and the radio sounded great. I was ready to call it fixed, but the cone looked terrible with the white patches all over, so I decided to take the speaker out to the garage and paint the cone flat black, which I proceeded to do. It looked pretty good, so I brought it back in and wired it up again and turned the radio on. All I got was a very weak garbled signal. I must have done something to the speaker. My first thought was that when I sprayed the cone, I got some paint down in the voice coil gap, keeping it from moving. Nope, the cone was free. The output transformer windings, voice coil winding, and field coil windings were ok. I finally connected the output transformer and speaker in my signal tracer, and substituted a 2000 ohm resistor for the field coil and tried it again. The result was the same. There was nothing wrong with the speaker.

So, I reconnected the speaker and connected a homemade probe that has AC, DC, and RF coupling and traced the signal from the antenna all the way to the volume control. It was bad all the way, and I could hear what sounded like a couple of stations at the same time. I had a voltage chart for all the tubes so I checked the voltages on all the tubes. All voltages were correct except for the AVC tube (a #56). There was supposed to be 20 volts on the grid, but it measured zero. There was an untuned transformer between the first IF/AVC and the second IF. There were 20 volts on one end, and none on the grid. I removed the transformer and found that there was about an eighth inch of wire sticking out from the end of the winding, but no connection to the terminal. I scraped the enamel off the wire with an Exacto knife and soldered a piece of fine wire from there to the terminal. I reinstalled the transformer and got 20 volts on the grid, but that did not fix my problem.

I decided that the only way I would be getting two or more station at the same time would be if the oscillator or mixer (first detector) wasn't working. I turned on my oscilloscope and looked at the plate of the oscillator. No signal. I checked continuity of the oscillator coil windings and they were ok. I checked continuity from the oscillator section of the tuning capacitor to the coil and it was good. It was a big job to pull the oscillator coil, so I called Mike McCarty to see if he had any ideas. He suggested using the RF generator to supply a signal 175 kHz above WBAP's frequency (820 + 175 = 995 kHz). When I applied the signal to the plate it killed the generator signal. I put it on the grid and I could see the 995 kHz, but it had no effect otherwise. Mike thought the oscillator coil might have a shorted turn that wouldn't show up with a continuity check, so I decided to pull the coil and examine it.

There were 8 wires on 6 terminals, so I made a drawing of the connections, and removed the coil and examined it with a 15x magnifier. There was nothing wrong with it, so I reinstalled it after putting a new lead on it where it connected to the oscillator section of the tuning capacitor. As I was getting ready to solder the new lead to the capacitor, it suddenly occurred to me that while I had checked continuity from the capacitor through the coil, I had never measured it from the capacitor to ground. Before installing the wire, I measured the resistance to ground, and it measured less than 1 ohm. There was a short between the rotor and stator plates. I rotated the capacitor through its range and could not see any plates rubbing, and then I looked at the back of the capacitor and saw a fine piece of wire about 1/8 inch long going from one of the stator plates to ground. It appeared to be a piece of steel wool. I sprayed the capacitor with brake pad cleaner and blew it out with compressed air. I applied power and the radio worked perfectly.

I can't believe I spent the better part of three days on such a simple problem, but I learned a lot. The steel wool is now in the garage, and the workbench has been vacuumed.

Great Tee Shirts seen at recent VRPS events.

Billy Smith's Space-X Tee

Worn by Mike McCarty

Seen at the 2019 Convention

Randy James, with his Crosley Collection

Tips and Tangled Cords

IF Transformers #1

Contributed by Blake Dietze

IF Transformers. When they work properly, they're fine. There are far too many failure cases to cover in just one column, so I'm going to divide them into multiple articles. In this installment I'm going to cover the IF coils found in superhetrodyne radios from the 1930's and 1940's. These are typically in metal cans mounted topside on the chassis and usually have screw adjustments on top or on the side.

There are several common failure modes that can occur:

- Trim caps get dirty, corroded, or worse.
- Connection of coils can fail.
- One or more of the coils can be open.
- Breaks in the connecting wire insulation can short out to the chassis.

Dirty trimmers caps can short out if the dust is conductive. The conductive dust and debris can collect around the base of the trimmer (often out of site) shorting out the trimmer causing the resonant point of that side of the IF transformer to shift or short. You may be able to adjust the trimmer, but it may not peak properly. A thorough cleaning with a toothbrush and contact cleaner once disassembled usually corrects this problem. Use caution when brushing the trimmers, the mica wafers can easily be damaged by the toothbrush or even a blast of compressed air.

Measure the resistance of both sides of the coil to ensure the coils are not open, if they are, start with a good inspection of the IF transformer itself. If the break is visible, and in a place where it can easily be addressed, fix it. If the break is not obvious and you have a suitable replacement, that may be your best bet.

If you don't have a replacement handy, or your unlucky enough to have a radio with an oddball IF frequency, there is still hope. A handy little trick is to replace the defective winding with a capacitor and resistor. If the primary is open, which is the most likely to fail since it's carrying high voltage to the plate of the previous tube, you can replace the open winding with a capacitor and resistor as shown in figure 1.

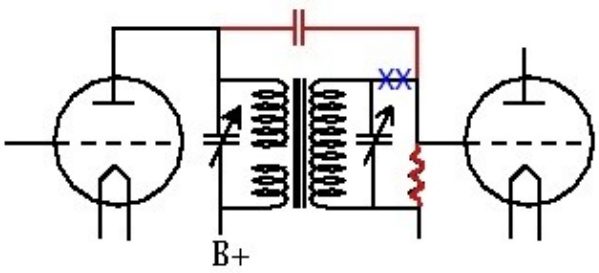

Figure 1. Replacing an Open Winding

By replacing the open winding on the primary (left side) with a capacitor around 150pF to 250pF (.00015uF to .00025uF) the signal can still pass to the grid of the next tube while allowing B+ to flow to the plate of the previous tube. You'll need a load resistor as shown in the figure of about 100KOhms and you will need to open the connection between the grid of the tube and the top of the secondary coil as shown in the diagram. You will only be able to peak one of the two trim caps and there will be some loss of signal strength, but this trick will work for most of the radios you'll encounter. The same trick can be used on audio transformers, but I'll save that for a later column.

In the next column, I'll cover the IF transformers of the fifties and sixties, their unique issues, and how to address them. We'll focus on the K-Tran and J-Tran Inductively tuned units. Unfortunately these IF transformers are more likely to fail and can't be modified in the same manner, they usually have to be disassembled and modified.

That's it for this time; "happy hunting" and "keep 'em playing".

VRPS, INC.
P.O. BOX 165345
IRVING, TX 75016

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Due to the Corona Virus Pandemic, VRPS meetings will be suspended until further notice.

Watch the website at VRPS.ORG for announcements of future events.

Membership dues of $20 are due November 1st every year. Renewals may be sent to the post office address given at the top of this page: **VRPS, INC., P.O. BOX 165345, IRVING, TX 75016**