Refinishing Wood Radio Cabinets – Part 1 of 3

By Mark Palmquist

One of the joys of attending swap meets, garage sales or surfing for radios on Ebay is finding a radio that is original in all respects. Original finish, tubes and parts under the hood is getting so rare that if you find one it's probably best just to set it on the shelf as is and preserve it for future generations. Unfortunately, the type of radios I usually bring home have been used as plant stands, step stools for house painting, airplane wheel chocks or mouse maternity wards. These radios have bounced around so many swap meets in the back of pickups that they deserve frequent flyer miles. If the cabinets have been "restored" its brushed-on polyurethane put directly over the old finish during a dust storm. The guts have been tortured by a 10-year old using a blow torch and acid-core solder. The back of the cabinet has been opened up so many times it has stretch marks. If they have wood cabinets, these radios are good candidates for developing your skills in repairing or restoring the finish. In the first part of this 3-part series we'll talk about different wood finishes and how to identify the original finish. There are dozens of books about finishing wood. Three that I would recommend are Understanding Wood Finishing, by Bob Flexner[1], Fine Woodworking on Finishing and Refinishing[2], a collection of articles from several years of Fine Woodworking Magazine, and Great Wood Finishes[3], by Jeff Jewitt. These books are available at Highland Hardware on Highland Avenue, at Amazon.com or Barnes & Noble (bn.com). There are hundreds of years of collective knowledge on the subject, and no two craftsmen are likely to agree on the best course of action in restoring a piece.

Types of Wood Finishes

If left unfinished, a piece of wood furniture will gradually fall prey to whatever comes in contact with it. Finger prints and oils, food stains, moisture, heat and sunlight will eventually discolor and degrade the appearance. Putting a stable film of material between wood and the environment will preserve and beautify the wood and enable one to make choices about the color, look and feel of the wood surface. Jewitt classifies finishes in general as "**evaporative**" or "**reactive**". [3]

Shellac, lacquer and water based finishes have some resin mixed with a carrier such as lacquer thinner or water. When applied to the surface, the carrier **evaporates**, leaving dense, clear film behind that adheres to the wood. Most finishes I have tested on radios from the '30s or '40s probably fall into this category. Lacquer can be sprayed on with good results and it dries very quickly so additional coats can be built up in a short time. This is just the ticket for your depression-era high volume radio cabinet sweat shop. Spray on some finish and get the product out the door. If touchup is needed, the original

solvent can be re-applied and will soften or 'remelt" the original finish so the damaged spot can be blended in. These finishes are thermoplastic, meaning they can be softened by heat.

A **reactive** finish is one that actually forms a new compound when exposed to air after application. In addition to the resin and the carrier, it has the third part called a "vehicle". When this type of finish is applied, the carrier evaporates, leaving behind a tacky mixture of vehicle and resin. Oxygen from the air (or a catalyst mixed in just before application) reacts with this mixture, forming a new compound that is stable and does not get dissolved when another coat of finish is put on top of the dried finish. Oil-based varnishes, polyurethane varnish and catalyzed lacquers fall into this category. These finishes are "thermosetting". If you have ever applied polyurethane varnish, the directions usually call for a long drying time and sanding with 220-grit paper between coats. Sanding increases the surface area and improves the probability of a good mechanical link to the sub surface. Reactive finishes don't bond chemically to the previous coat. If you've made a mess of a project because you didn't wait for the first coat to dry properly before applying the second coat, it was because the first coat was sealed in before it had a chance to properly form the new, stable compound by reacting with oxygen in the air.

Examples of reactive finishes are linseed oil, tung oil, oil/varnish blend, wiping varnish, polyurethane, and "all-in-one" stain, seal and finish (e.g. Minwax). Once applied, these finishes can be more difficult for future generations to remove and refinish. David McDonald, expert furniture refinisher at Tara Schoolhouse Antiques in Sunnyside, GA advises, "I don't do anything to a piece of furniture that can't be undone later".

Removing the Old Finish

If your radio is a basket case and just repairing the dings is not an option, you need to decide how to remove the old finish. Mechanical methods include scraping and sanding or heat guns. Chemical methods include stripping or "refinishing". Mechanical methods can be tricky and tedious, especially if there is fine detail, carving, grillwork etc to work around. Most radios have veneered surfaces and it's easy to sand through the veneer at the edges if you are not careful. It's also going to take a lot of elbow grease if the radio is a large console. Flexner states simply "sanding, scraping and removing with a heat gun- are usually too harsh for furniture"[1]. So let's concentrate on the chemical methods.

Strippers and "Refinishers"

Flexner classifies four types of chemicals used in strippers. The two most popular are described below. All of them sound nasty and it's critical when using strippers to observe safety precautions for eyes, skin and lungs as stated on the product directions.

- *Methylene Chloride (MC)* is the most popular stripper. A popular example is Zip Strip™. It's non-flammable but it's toxic, burns when you get it on your skin, and metabolizes into carbon dioxide when you get it in your bloodstream. But hey, it really gets that old finish off in a hurry! Read ALL the directions and safety precautions on the can and follow them.. You will recognize MC as the stuff that

you lay on in a thick layer with a brush and then wait for it to bubble up and soften the finish. You then scrape off the gunk . Wash the wood with a solvent such as mineral spirits, lacquer thinner, naptha or alcohol to remove all the residue, especially if the stripper contains wax (most home owner strippers do).

- *Acetone, Toluene and Methanol (ATM)* are the components of lacquer thinner. Stuff like *Homer Formby's Furniture Refinisher* or *Ace Hardware Furniture Refinisher* contains these chemicals in varying concentrations. You apply them with steel wool or a ScotchBrite™ pad and keep working and squeezing out and re-applying with clean solvent until the original finish is gone. These work pretty good if the original finish is of the evaporative kind (like lacquer). Do any kind of stripping outdoors if possible so you don't inhale the evaporating solvents. If the original wood was an open-grain wood like walnut or mahogany (true of most old radios) it may have had a paste wood filler applied prior to the final finish to level the surface. This process may disturb the filler so you may want to re-apply some filler as part of the surface preparation process. More on this in Part 2 next time. We'll talk about surface preparation, staining and applying the final finish part 2 & 3.

This is Richard Rodgers' Wards Airline radio (model unknown) which was stripped with Ace Hardware Furniture Refinisher (ATM), cleaned with a rag soaked in the same stuff, then filled with a dark paste wood filler before final sanding and staining with Minwax Red Mahogany. The top coats are Deft Clear Wood Finish (lacquer) with a final coat of paste wax. This radio had been used as a plant stand and there was a six-inch diameter white water ring along with raised veneer on the top. The detail on the grille makes it look like a little house with fancy windows. It also has a great gold dial. It's an "All-American Six" with the extra tube used as an RF amplifier.

Alignment of AM Superheterodyne Radios

By Mark Palmquist – Part 1 of 2.

One of my favorite parts of fixing old radios is getting them "tuned to perfection". If you think about the test equipment that was available to factory technicians back in the 30's or 40's and the pressure they were under to get radios out the door, it's not surprising to find that even a pristine radio from that period can be substantially out of alignment. The other factors are that the radio has may have passed through a lot of hands and repair shops, certain circuit components may have degraded, and the guy who had it last thought that the IF and RF adjustment screws needed to be tightened down for shipping.

A properly aligned radio should "track", meaning that the radio station received and the dial setting should agree from one end of the dial to the other. If you look at most common radios, the variable tuning capacitor has two sections. One section is part of the antenna circuit that is trying to pick one station out of the air to the exclusion of others. If you are listening to WSB, the capacitor and antenna coil circuit should resonate at 750,000 cycles per second (750 kHz).

The second part of the capacitor, often with slightly smaller plates, is part of the oscillator circuit that is supposed to oscillate at a frequency typically 455 kHz HIGHER than the antenna circuit.
A tube like a 12SA7 is used as part of the oscillator and also MIXES the radio station signal with the oscillator signal in such a way that one of the components of the mixed signal is at the DIFFERENCE between the oscillator and the antenna circuit (455 kHz). This intermediate frequency (IF) is amplified by a tube like a 12SK7 and adjustable filters let the 455 kHz go through while blocking the other components of the mixed signal.

The output of the IF circuit then goes to a multipurpose tube like a 12SQ7 which has the ability to "detect" or remove the 455kHz part of the signal, leaving only Neal Boortz' voice to be sent to the volume control and further amplified by another part of the 12SQ7 and sent on to the audio amplifier tube (50L6).

To align a radio you need a signal generator that can be amplitude-modulated so it puts out a signal at a known frequency that looks like the signal from a radio station. The modulation is usually a sine wave at 400 Hz or 1000 Hz. You also need a way to observe the magnitude of the signal that gets through the radio. Normally you hook up an oscilloscope or an AC voltmeter to the speaker terminals. Connect the signal generator output to the "converter grid" e.g. pin 8 of the 12SA7 with the signal generator set at 455 kHz. Typically a 0.1 uFd capacitor is used to couple the signal generator to the converter tube. The volume control is set at max and the signal generator set to the smallest output level that will allow you to hear the 400 Hz tone on the speaker. The slugs or trimmers in the IF transformers are adjusted to get the maximum signal through at 455 kHz. If the settings are way off, you may have to start at a different frequency just to hear the tone, then tweak and gradually "walk" the signal generator back to 455kHz. Alignment instructions are usually found in the Rider's manuals that can be found at http://www.nostalgiaair.org/. The IF frequency will not always be 455 kHz. Some radios from the 30's used 175 kHz. Tube auto radios from the '40s and '50s often used 262.5 kHz.

Next time we'll talk about how to get the numbers on the dial to line up with the radio station.

President's Page – By Gordon Hunter

Our summer swap meet schedule started off with a bang with our own Meet in Alpharetta on June 22. Once again, reports seem to be that it was a successful meet with about 25 vendors, and although sales seemed to be calm, rather than frenzied, everyone seemed to enjoy the time together. We planned to have music transmitted from the parking lot from 1160/1170 AM, but as it turned out, the station was running a series of info-mercials at that time, so Marty came to the rescue and set up a PA system and played some great music from tapes. I think that piped-in music always adds to swap meets. The adjacent Car Show brought in quite a few curious folks and I know that I sold a couple of radios to people off the street. It seems to be a formula that works well for us, and we'll do it again next year if the club wants to continue it. I actually sold a few more radios than I bought, but my prize for the show was a WSB book that Bill Jackson had set aside for me. I'd been looking for one for years, so I was thrilled to get it.It's a great local artifact of radio history.

Next up in July was the Lansing, Michigan Swap Meet which has become the most popular event of the year. We had a good representation of SARS members there, and it turned out to be an excellent meet. We had perfect summer weather, great and friendly hosts, and a wonderful contest and display featuring Crosley radios. I meant to get up there early this year, but as things went, I flew in there about midnight and woke up my roommate, John Wynn. We yakked for awhile, got to sleep very late, and then got up at 0430 to get out to the big parking lot for the early bird deals. As it turned out, people didn't get started quite as early as in the past, and so the flashlights weren't as necessary as they had been in the past, and there weren't that many super radios out before dawn. But it was fun anyway, and by early afternoon we were dragging pretty low! I only bought a couple of radios, but I found a lot of paper and miscellaneous things that were of

interest, so it turned out fine for me. Barry Etheridge, John Wynn and Rick Taylor helped me out by hauling a few things back for me so that I wasn't overloaded at the airport. Thank goodness for good friends.
I haven't been to the Elgin, Illinois Swap Meet for many years, but I have a travel opportunity (a Chicago layover with a Delta Air Lines working trip) that will enable me to ride out to Elgin for the first day of the meet. I don't think that anyone else from our club will be attending, so I will give a full report in the next newsletter.
I think that we have had some really good monthly meetings lately. Our guest speaker in June was Don Carle, the Sales and Promotions Manager for 1160/1170 AM, and he really enjoyed being with us. He gave us some ideas of what their plans are for the future, and he had some interesting stories of the radios business. Our July meeting had about the biggest and most interesting Show-and-Tell that we've had which featured test equipment and a great assortment of radios. Keep up the good work.
The date has been set for the Fall Meet - October 5th. It should just about wind up the year for us. Hope things continue to go well for all of us.

Gordon